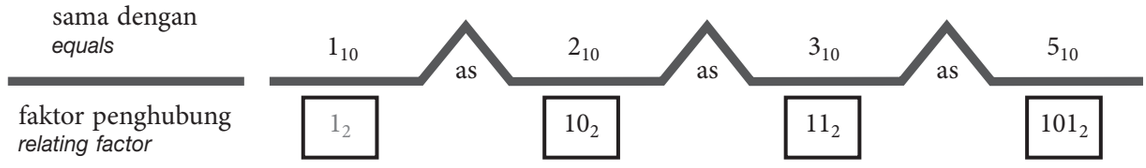
JAWAPAN

BAB 1: ASAS NOMBOR

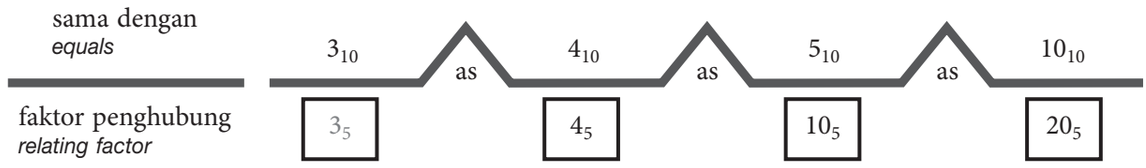
1.1

A

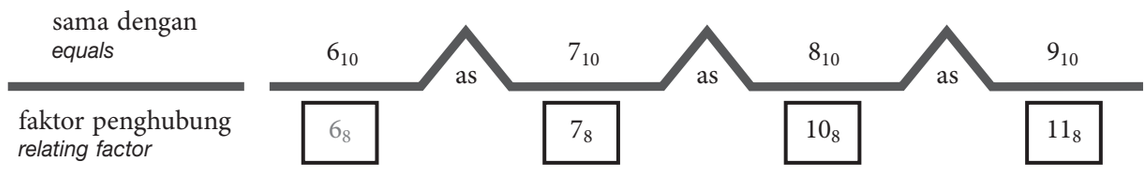
1.



2.



3.



B

1.

2^4	2^3	2^2	2^1	2^0
1	0	0	$\underline{1}$	0

$1 \times 2^1 = 1 \times 2$
$= 2$

2.

2^4	2^3	2^2	2^1	2^0
$\underline{1}$	1	0	0	1

$1 \times 2^4 = 1 \times 16$
$= 16$

3.

2^5	2^4	2^3	2^2	2^1	2^0
1	0	$\underline{1}$	0	1	0

$1 \times 2^3 = 1 \times 8$
$= 8$

4.

2^5	2^4	2^3	2^2	2^1	2^0
1	$\underline{1}$	0	0	1	0

$1 \times 2^4 = 1 \times 16$
$= 16$

5.

2^5	2^4	2^3	2^2	2^1	2^0
$\underline{1}$	0	1	1	1	1

$1 \times 2^5 = 1 \times 32$
$= 32$

C

1.

8^3	8^2	8^1	8^0
2	3	4	$\underline{5}$

$5 \times 8^0 = 5 \times 1$
$= 5$

2.

8^1	8^0
$\underline{7}$	6

$7 \times 8^1 = 7 \times 8$
$= 56$

3.

8^2	8^1	8^0
$\underline{5}$	7	1

$5 \times 8^2 = 5 \times 64$
$= 320$

4.

8^3	8^2	8^1	8^0
$\underline{1}$	4	7	0

$1 \times 8^3 = 1 \times 512$
$= 512$

5.

8^5	8^4	8^3	8^2	8^1	8^0
7	$\underline{1}$	5	6	0	1

$1 \times 8^4 = 1 \times 4\,096$
$= 4\,096$

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D

1.

5^3	5^2	5^1	5^0
3	1	<u>4</u>	0

$4 \times 5^1 = 4 \times 5$
$= 20$

2.

5^1	5^0
<u>3</u>	4

$3 \times 5^1 = 3 \times 5$
$= 15$

3.

5^3	5^2	5^1	5^0
2	<u>1</u>	4	2

$1 \times 5^2 = 1 \times 25$
$= 25$

4.

5^4	5^3	5^2	5^1	5^0
<u>2</u>	0	1	4	3

$2 \times 5^4 = 2 \times 625$
$= 1\ 250$

5.

5^4	5^3	5^2	5^1	5^0
4	<u>3</u>	6	2	1

$3 \times 5^3 = 3 \times 125$
$= 375$

E

1.

2^4	2^3	2^2	2^1	2^0
1	0	0	0	0

$1 \times 2^4 = 1 \times 16$
$= 16$

2.

8^2	8^1	8^0
6	1	4

$1 \times 8^1 = 1 \times 8$
$= 8$

3.

5^3	5^2	5^1	5^0
4	1	0	2

$1 \times 5^2 = 1 \times 25$
$= 25$

F

1. $1101_2 = 1 \times 2^3 + 1 \times 2^2 + 0 \times 2^1 + 1 \times 2^0$

2^3	2^2	2^1	2^0
1	1	0	1

2. $4567_8 = 4 \times 8^3 + 5 \times 8^2 + 6 \times 8^1 + 7 \times 8^0$

8^3	8^2	8^1	8^0
4	5	6	7

3. $2310_5 = 2 \times 5^3 + 3 \times 5^2 + 1 \times 5^1 + 0 \times 5^0$

5^3	5^2	5^1	5^0
2	3	1	0

4. $10111_2 = 1 \times 2^4 + 0 \times 2^3 + 1 \times 2^2 + 1 \times 2^1 + 1 \times 2^0$

5. $25370_8 = 2 \times 8^4 + 5 \times 8^3 + 3 \times 8^2 + 7 \times 8^1 + 0 \times 8^0$

6. $32041_5 = 3 \times 5^4 + 2 \times 5^3 + 0 \times 5^2 + 4 \times 5^1 + 1 \times 5^0$

G

Cerakinan *Expanded notation*	**Nombor dalam asas dua** *Number in base two*
1. $2^3 + 2^2 + 1 = \underline{1} \times 2^3 + \underline{1} \times 2^2 + \underline{0} \times 2^1 + \underline{1} \times 2^0$	1101_2
2. $2^4 + 2^2 + 2 = \underline{1} \times 2^4 + \underline{0} \times 2^3 + \underline{1} \times 2^2 + \underline{1} \times 2^1 + \underline{0} \times 2^0$	10110_2
3. $2^6 + 2^4 + 2^2 + 2 = \underline{1} \times 2^6 + \underline{0} \times 2^5 + \underline{1} \times 2^4 + \underline{0} \times 2^3 + \underline{1} \times 2^2 + \underline{1} \times 2^1 + \underline{0} \times 2^0$	1010110_2
4. $2(2^4 + 2) = 2^5 + 2^2 = \underline{1} \times 2^5 + \underline{0} \times 2^4 + \underline{0} \times 2^3 + \underline{1} \times 2^2 + \underline{0} \times 2^1 + \underline{0} \times 2^0$	100100_2

H

Cerakinan *Expanded notation*	**Nombor dalam asas lapan** *Number in base eight*
1. $8^3 + 7 = \underline{1} \times 8^3 + \underline{0} \times 8^2 + \underline{0} \times 8^1 + \underline{7} \times 8^0$	1007_8
2. $4 \times 8^2 + 3 \times 8 + 2 = \underline{4} \times 8^2 + \underline{3} \times 8^1 + \underline{2} \times 8^0$	432_8
3. $2 \times 8^4 + 5 \times 8^2 + 4 = \underline{2} \times 8^4 + \underline{0} \times 8^3 + \underline{5} \times 8^2 + \underline{0} \times 8^1 + \underline{4} \times 8^0$	20504_8
4. $8(8^3 + 4 \times 8 + 1) = 8^4 + 4 \times 8^2 + 1 \times 8^1 = \underline{1} \times 8^4 + \underline{0} \times 8^3 + \underline{4} \times 8^2 + \underline{1} \times 8^1 + \underline{0} \times 8^0$	10410_8

I

Cerakinan *Expanded notation*	**Nombor dalam asas lima** *Number in base five*
1. $5^4 + 5 + 2 = \underline{1} \times 5^4 + \underline{0} \times 5^3 + \underline{0} \times 5^2 + \underline{1} \times 5^1 + \underline{2} \times 5^0$	10012_5
2. $4 \times 5^4 + 3 \times 5^2 + 1 = \underline{4} \times 5^4 + \underline{0} \times 5^3 + \underline{3} \times 5^2 + \underline{0} \times 5^1 + \underline{1} \times 5^0$	40301_5
3. $2 \times 5^4 + 5^2 + 2 \times 5 + 3 = \underline{2} \times 5^4 + \underline{0} \times 5^3 + \underline{1} \times 5^2 + \underline{2} \times 5^1 + \underline{3} \times 5^0$	20123_5
4. $5(5^3 + 2) = 5^4 + 5 \times 2 = \underline{1} \times 5^4 + \underline{0} \times 5^3 + \underline{0} \times 5^2 + \underline{2} \times 5^1 + \underline{0} \times 5^0$	10020_5

J

1. $1011_2 = 1 \times 2^3 + 0 \times 2^2 + 1 \times 2^1 + 1 \times 2^0$
$= 8 + 0 + 2 + 1$
$= 11_{10}$

2. $101011_2 = 1 \times 2^5 + 0 \times 2^4 + 1 \times 2^3 + 0 \times 2^2 + 1 \times 2^1 + 1 \times 2^0$
$= 32 + 0 + 8 + 0 + 2 + 1$
$= 43_{10}$

3. $65_8 = 6 \times 8^1 + 5 \times 8^0$
$= 48 + 5$
$= 53_{10}$

4. $2147_8 = 2 \times 8^3 + 1 \times 8^2 + 4 \times 8^1 + 7 \times 8^0$
$= 1024 + 64 + 32 + 7$
$= 1127_{10}$

5. $413_5 = 4 \times 5^2 + 1 \times 5^1 + 3 \times 5^0$
$= 100 + 5 + 3$
$= 108_{10}$

6. $5342_5 = 5 \times 5^3 + 3 \times 5^2 + 4 \times 5^1 + 2 \times 5^0$
$= 625 + 75 + 20 + 2$
$= 722_{10}$

K

1. $1 \times 2^4 + m \times 2^3 + 1 \times 2^0 = 25$
$16 + 8m + 1 = 25$
$17 + 8m = 25$
$8m = 8$
$m = 1$

2. $3 \times 8^2 + 5 \times 8^1 + m \times 8^0 = 238$
$192 + 40 + m = 238$
$232 + m = 238$
$m = 6$

3. $m \times 5^2 + 1 \times 5^1 + 4 \times 5^0 = 59$
$25m + 5 + 4 = 59$
$25m + 9 = 59$
$25m = 50$
$m = 2$

L

1. (i)

2	38	Baki
2	19	……0 ↑
2	9	……1
2	4	……1
2	2	……0
2	1	……0
	0	……1

Maka, $38_{10} = 100110_2$

(ii)

8	38	Baki
8	4	……6
	0	……4

Maka, $38_{10} = 46_8$

(iii)

5	38	Baki
5	7	……3
5	1	……2
	0	……1

Maka, $38_{10} = 123_5$

2. (i)

2	462	Baki
2	231	……0
2	115	……1
2	57	……1
2	28	……1
2	14	……0
2	7	……0
2	3	……1
2	1	……1
	0	……1

Maka, $462_{10} = 111001110_2$

(ii)

8	462	Baki
8	57	……6
8	7	……1
	0	……7

Maka, $462_{10} = 716_8$

(iii)

5	462	Baki
5	92	……2
5	18	……2
5	3	……3
	0	……3

Maka, $462_{10} = 3322_5$

M

1. $24_8 = 10100_2$

2			4_8		
4	2	1	4	2	1
0	1	0	1	0	0

2. $765_8 = 111110101_2$

7			6			5_8		
4	2	1	4	2	1	4	2	1
1	1	1	1	1	0	1	0	1

3. $412_5 = 4 \times 5^2 + 1 \times 5^1 + 2 \times 5^0$
$= 100 + 5 + 2$
$= 107_{10}$
$= 1101011_2$

2	107	Baki
2	53	……1
2	26	……1
2	13	……0
2	6	……1
2	3	……0
2	1	……1
	0	……1

N

1. $110101_2 = 65_8$

4	2	1	4	2	1
1	1	0	1	0	1
6			5_8		

2. $100000111_2 = 407_8$

4	2	1	4	2	1	4	2	1
1	0	0	0	0	0	1	1	1
4			0			7_8		

3. $242_5 = 2 \times 5^2 + 4 \times 5^1 + 2 \times 5^0$
$= 50 + 20 + 2$
$= 72_{10}$
$= 110_8$

8	72	Baki
8	9	……0
8	1	……1
	0	……1

O

1. $11010_2 = 1 \times 2^4 + 1 \times 2^3 + 0 \times 2^2 + 1 \times 2^1 + 0 \times 2^0$
$= 16 + 8 + 0 + 2 + 0$
$= 26_{10}$
$= 101_5$

5	26	Baki
5	5	……1
5	1	……0
	0	……1

2. $152_8 = 1 \times 8^2 + 5 \times 8^1 + 2 \times 8^0$
$= 64 + 40 + 2$
$= 106_{10}$
$= 411_5$

5	106	Baki
5	21	……1
5	4	……1
	0	……4

3. $643_8 = 6 \times 8^2 + 4 \times 8^1 + 3 \times 8^0$
$= 384 + 32 + 3$
$= 419_{10}$
$= 3134_5$

5	419	Baki
5	83	……4
5	16	……3
5	3	……1
	0	……3

P

1.
$$\begin{array}{r} 1\ 1\ 0\ 1 \\ +\quad 1\ 1\ 0 \\ \hline 1\ 0\ 0\ 1\ 1_2 \end{array}$$

2.
$$\begin{array}{r} 1\ 0\ 1\ 0\ 1 \\ +\quad 1\ 0\ 1 \\ \hline 1\ 1\ 0\ 1\ 0_2 \end{array}$$

3.
$$\begin{array}{r} 1\ 0\ 1\ 1\ 0 \\ +\quad 1\ 1\ 0\ 1 \\ \hline 1\ 0\ 0\ 0\ 1\ 1_2 \end{array}$$

4.
$$\begin{array}{r} 1\ 0\ 1\ 1 \\ -\quad 1\ 1\ 1 \\ \hline 1\ 0\ 0_2 \end{array}$$

5.
$$\begin{array}{r} 1\ 0\ 1\ 0\ 0 \\ -\quad 1\ 1\ 1 \\ \hline 1\ 1\ 0\ 1_2 \end{array}$$

6.
$$\begin{array}{r} 1\ 0\ 1\ 1\ 1\ 0 \\ -\quad 1\ 1\ 0\ 1\ 1 \\ \hline 1\ 0\ 0\ 1\ 1_2 \end{array}$$

7. 1110_2

8. 100110_2

9. 110110_2

10. 1001111_2

11. 101_2

12. 1001_2

13. 11000_2

14. 10011_2

Praktis Formatif: Kertas 1

1. C

$1\underline{1}01_2 = 1 \times 2^2$
$= 1 \times 4$
$= 4$

2. B

$567_8 = 6 \times 8^1$
$= 48$

3. B

$32421_5 = 4 \times 5^2$
$= 4 \times 25$
$= 100$

4. C

$2^5 + 2^2 + 1$
$= \underline{1} \times 2^5 + \underline{0} \times 2^4 + \underline{0} \times 2^3 + \underline{1} \times 2^2 + 0 \times 2^1 + \underline{1} \times 2^0$
$= 100101_2$

5. C

$\underline{2^p} + 2^4 + 1 = \underline{1}0010001_2$
$2^p = 1 \times 2^7$
$p = 7$

6. C

$6 \times 8^4 + 3 \times 8^2 + 1$
$= \underline{6} \times 8^4 + \underline{0} \times 8^3 + \underline{3} \times 8^2 + \underline{0} \times 8^1 + \underline{1} \times 8^0$
$= 60301_8$

7. C

$1 \times 8^3 + 6 \times 8$
$= \underline{1} \times 8^3 + \underline{0} \times 8^2 + \underline{6} \times 8^1 + \underline{0} \times 8^0$
$= 1060_8$

8. A

$5(5^4 + 3)$
$= 5^5 + 3 \times 5^1$
$= \underline{1} \times 5^5 + \underline{0} \times 5^4 + \underline{0} \times 5^3 + \underline{0} \times 5^2 + \underline{3} \times 5^1 + \underline{0} \times 5^0$
$= 100030_5$

9. C

$3(5^4 + 5)$
$= 3 \times 5^4 + 3 \times 5^1$
$= \underline{3} \times 5^4 + \underline{0} \times 5^3 + \underline{0} \times 5^2 + \underline{3} \times 5^1 + \underline{0} \times 5^0$
$= 30030_5$

10. D

$P_5 = 5(5^4 + 5^2 + 5^1)$
$= 5^5 + 5^3 + 5^2$
$= 101100_5$
Bilangan digit = 6

11. D

$376_8 = 3 \times 8^2 + 7 \times 8^1 + 6 \times 8^0$
$= 254_{10}$
$= 2004_5$

5	254	Baki
5	50	……4
5	10	……0
5	2	……0
	0	……2

12. A

		1	1	0	1	0	0	1_2
4	2	1	4	2	1	4	2	1
1			5			1_8		

$1101001_2 = 151_8$

13. C

$1330_5 = 1 \times 5^3 + 3 \times 5^2 + 3 \times 5^1 + 0$
$= 215_{10}$
$= 327_8$
$\therefore p = 3$

		Baki
8	215	
8	26	……7
8	3	……2
	0	……3

14. D

	1	0	1	0	1	0	0	1_2
4	2	1	4	2	1	4	2	1
2			5			1_8		

$k = 5$

15. B

$161_{10} = 1m21_5$
$= 1121_5$
$\therefore m = 1$

		Baki
5	161	
5	32	……1
5	6	……2
5	1	……1
	0	……1

16. C

0	0	1	1	1	0	1	1	1_2
4	2	1	4	2	1	4	2	1
1			6			7_8		

$p = 167$

17. B

$67_8 = 6 \times 8^1 + 7 \times 8^0$
$= 55_{10}$
$53_{10} < x_{10} < 55_{10}$
$x_{10} = 54_{10}$
$= 110110_2$

		Baki
2	54	
2	27	……0
2	13	……1
2	6	……1
2	3	……0
2	1	……1
	0	……1

18. D

$370_8 = 3 \times 8^2 + 7 \times 8^1$
$= 248_{10}$
$248_{10} = q_{10} - 5_{10}$
$q_{10} = 248_{10} + 5_{10}$
$= 253_{10}$
$\therefore q = 253$

19. D

$$\begin{array}{r} 1\ 1\ 0\ 0\ 1_2 \\ +\quad 1\ 0\ 1_2 \\ \hline 1\ 1\ 1\ 1\ 0_2 \end{array}$$

20. D

$$\begin{array}{r} 1\ 0\ 1\ 0\ 0\ 1\ 1_2 \\ -\quad 1\ 0\ 1\ 0\ 1_2 \\ \hline 1\ 1\ 1\ 1\ 1\ 0_2 \end{array}$$

21. D

$$\begin{array}{r} 1\ 0\ 1\ 0\ 0_2 \\ -\quad 1\ 0\ 1_2 \\ \hline 1\ 1\ 1\ 1_2 \end{array}$$

22. C

$$\begin{array}{r} 1\ 1\ 0\ 1\ 0\ 1_2 \\ -\quad 1\ 1\ 1_2 \\ \hline 1\ 0\ 1\ 1\ 1\ 0_2 \end{array}$$

23. A

$$\begin{array}{r} 1\ 0\ 1\ 0\ 1_2 \\ -\quad 1\ 0\ 1\ 1_2 \\ \hline 1\ 0\ 1\ 0_2 \end{array}$$

24. A

$$\begin{array}{r} 1\ 1\ 0\ 0\ 1\ 1\ 0\ 1_2 \\ -\ 1\ 0\ 0\ 1\ 1\ 1\ 1\ 0_2 \\ \hline 1\ 1\ 1\ 1\ 1\ 1\ 1_2 \end{array}$$

25. B

$x_2 + 10100_2 = 11010001_2$
$x_2 = 11010001_2 - 10100_2$
$= 10111101_2$

$$\begin{array}{r} 1\ 1\ 0\ 1\ 0\ 0\ 0\ 1_2 \\ -\quad 1\ 0\ 1\ 0\ 0_2 \\ \hline 1\ 0\ 1\ 1\ 1\ 1\ 0\ 1_2 \end{array}$$

FOKUS KBAT

$3 \times 3 = 9$

Asas 10	7_{10}	8_{10}	9_{10}
Asas 2	111_2	1000_2	1011_2
Asas 8	7_8	10_8	11_8
Asas 5	12_5	13_5	14_5

Maka, $x = 10$, $y = 8$ dan $z = 5$. **(D)**

JAWAPAN

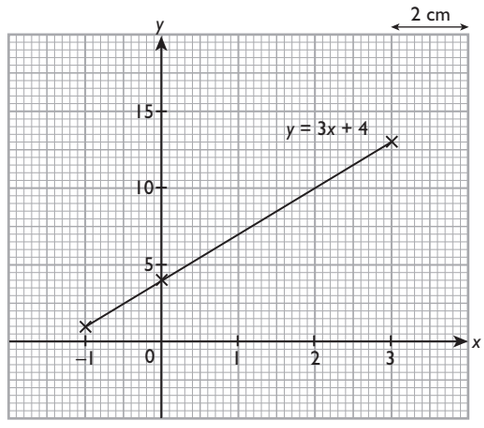
BAB 2: GRAF FUNGSI II

2.1

A

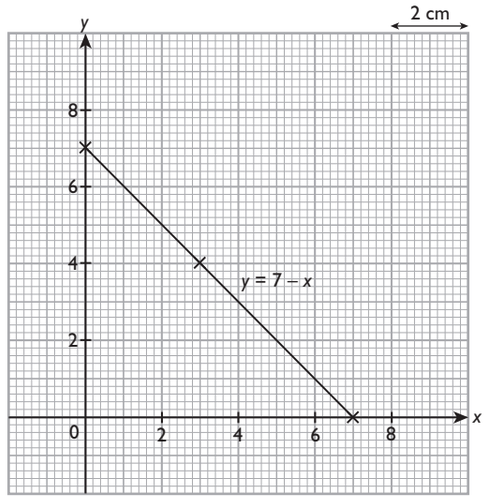
1. $y = 3x + 4$

x	−1	0	3
y	1	4	13



2. $y = 7 - x$

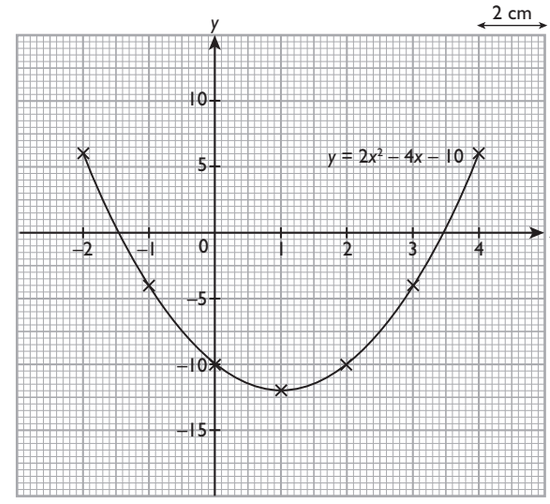
x	0	3	7
y	7	4	0



B

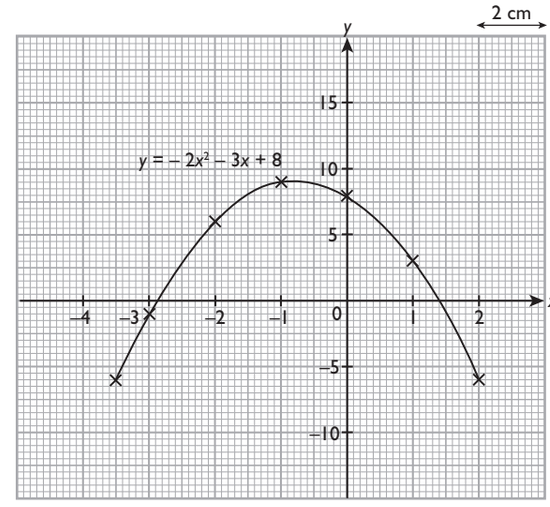
1. $y = 2x^2 - 4x - 10$

x	−2	−1	0	1	2	3	4
y	6	−4	−10	−12	−10	−4	6



2. $y = -2x^2 - 3x + 8$

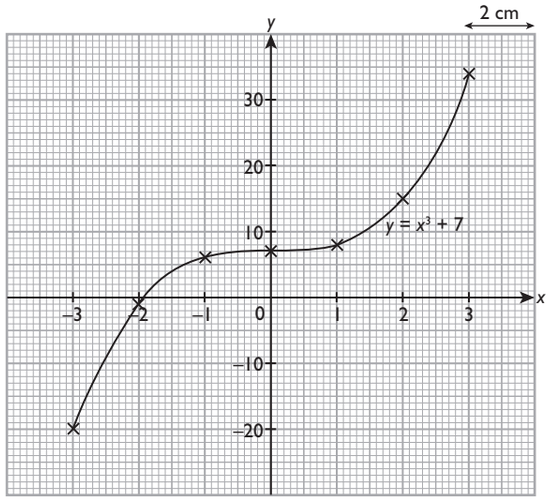
x	−3.5	−3	−2	−1	0	1	2
y	−6	−1	6	9	8	3	−6



C

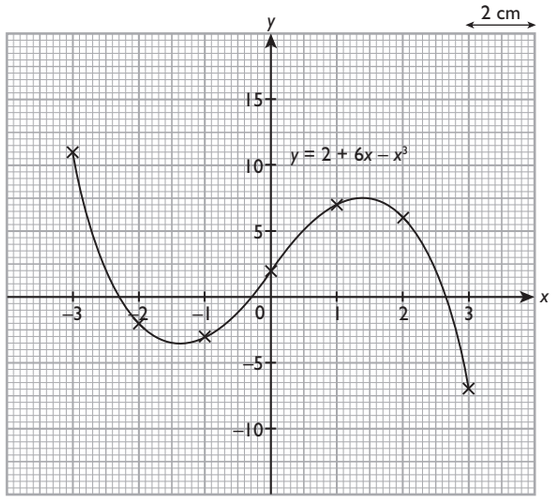
1. $y = x^3 + 7$

x	−3	−2	−1	0	1	2	3
y	−20	−1	6	7	8	15	34



2. $y = 2 + 6x - x^3$

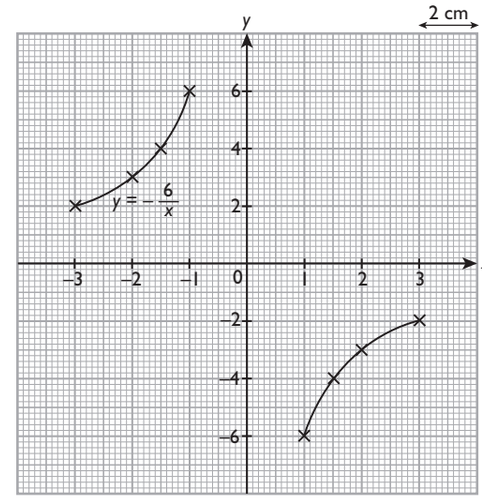
x	−3	−2	−1	0	1	2	3
y	11	−2	−3	2	7	6	−7



D

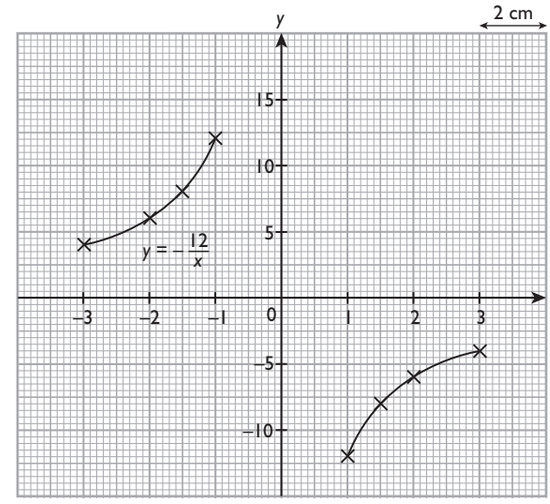
1. $y = -\frac{6}{x}$

x	−3	−2	−1.5	−1	1	1.5	2	3
y	2	3	4	6	−6	−4	−3	−2



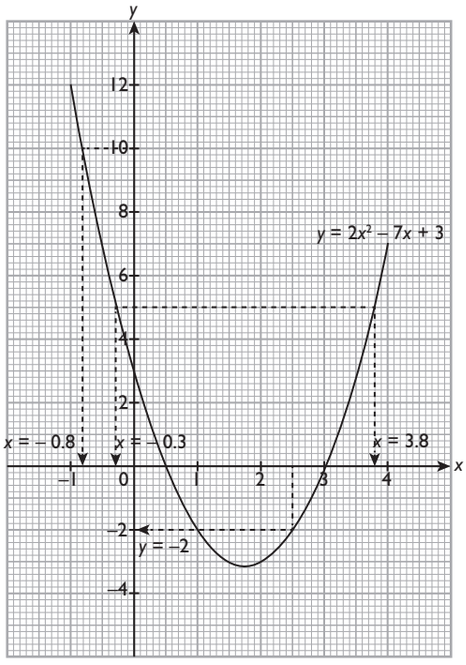
2. $y = -\frac{12}{x}$

x	−3	−2	−1.5	−1	1	1.5	2	3
y	4	6	8	12	−12	−8	−6	−4



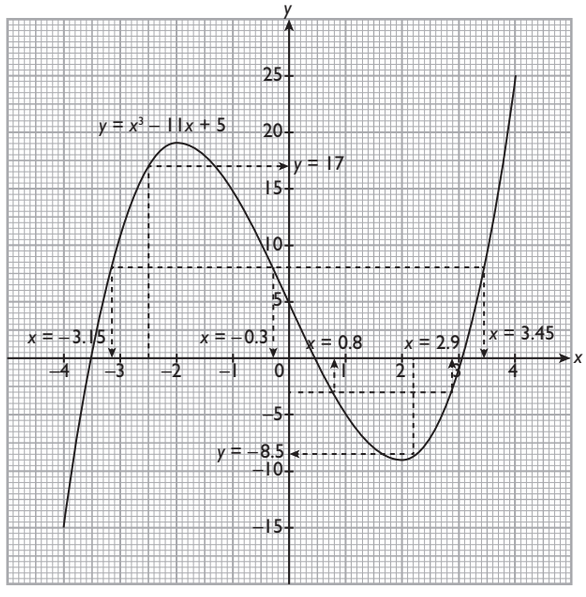
E

1. $y = 2x^2 - 7x + 3$



(a) $y = -2$
(b) $x = -0.3, 3.8$
(c) $x = -0.8$

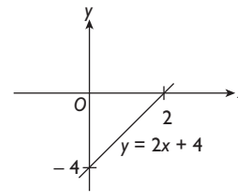
2. $y = x^3 - 11x + 5$



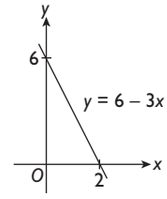
(a) $y = 17$
(b) $y = -8.5$
(c) $x = -3.2, -0.3, 3.5$
(d) $x = 0.8, 2.9$

E

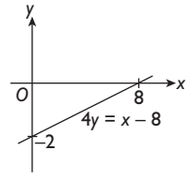
1. $y = 2x - 4$



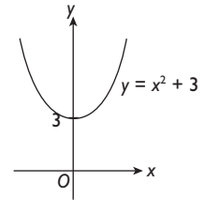
2. $y = 6 - 3x$



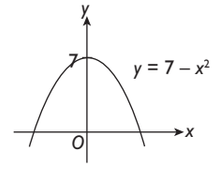
3. $4y = x - 8$



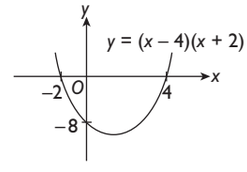
4. $y = x^2 + 3$



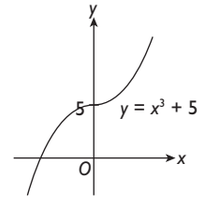
5. $y = 7 - x^2$



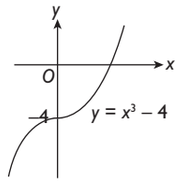
6. $y = (x - 4)(x + 2)$



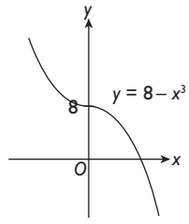
7. $y = x^3 + 5$



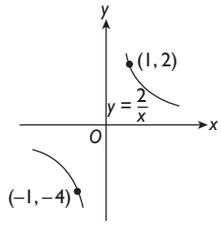
8. $y = x^3 - 4$



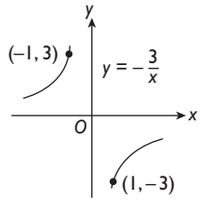
9. $y = 8 - x^3$



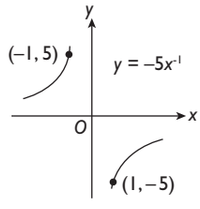
10. $y = \frac{2}{x}$



11. $y = -\frac{3}{x}$



12. $y = -5x^{-1}$

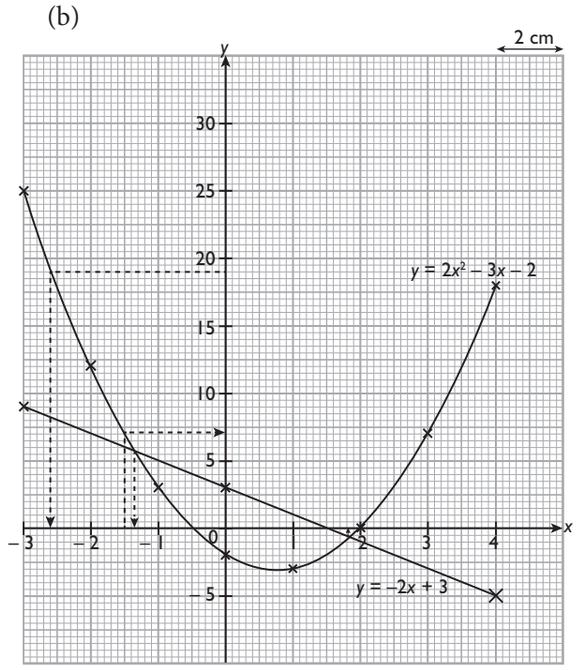


2.2

1. (a) $y = 2x^2 - 3x - 2$

x	−1	2
y	3	0

(b)



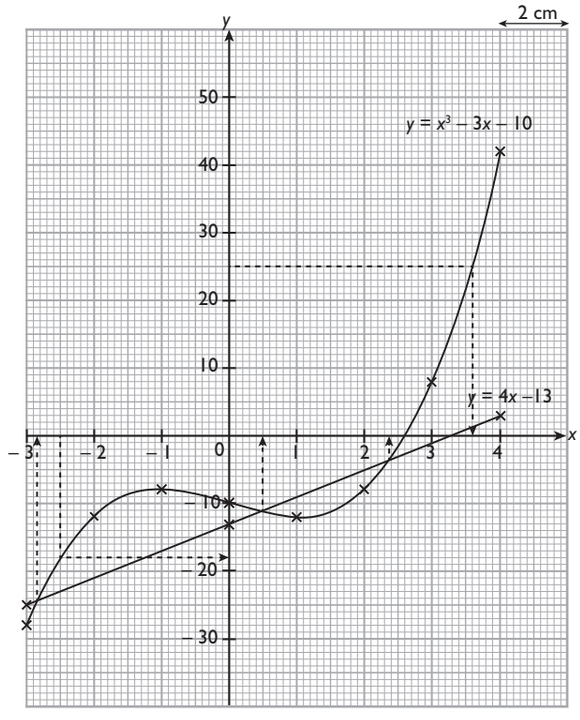
(c) (i) $y = 7.5$
(ii) $x = -2.6$

(d) $y = 2x^2 - 3x - 2$ … ①
$0 = 2x^2 - x - 5$ … ②
① − ②: $y = -2x + 3$
Persamaan garis lurus: $y = -2x + 3$
$x = -1.35, 1.85$

2. (a) $y = x^3 - 3x - 10$

x	−1	3
y	−8	8

(b)



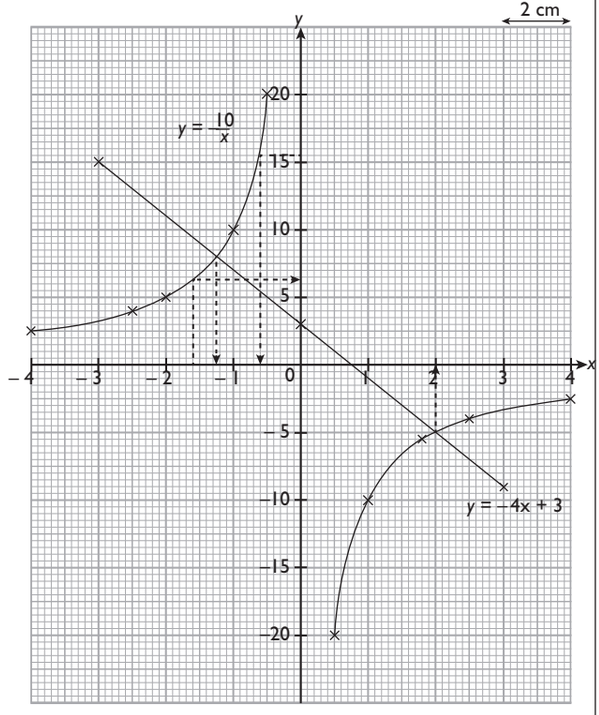
(c) (i) $y = -18$
(ii) $x = 3.6$

(d) $y = x^3 - 3x - 10$ … ①
$0 = x^3 - 7x + 3$ … ②
① − ②: $y = 4x - 13$
Persamaan garis lurus: $y = 4x - 13$
$x = -2.85, 0.5, 2.35$

3. (a) $y = -\frac{10}{x}$

x	−2.5	1
y	4	−10

(b)



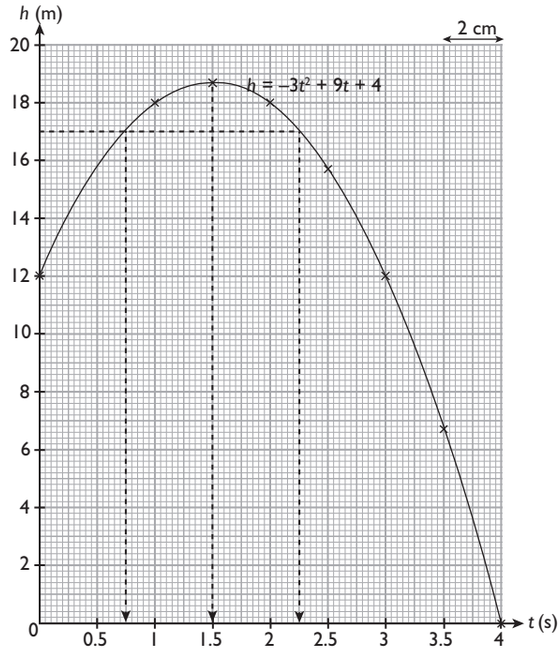
(c) (i) $y = 6.25$
(ii) $x = -0.6$

(d) $y = -\frac{10}{x}$ … ①
$0 = 4x^2 - 3x - 10$ … ②
② ÷ x: $0 = 4x - 3 - \frac{10}{x}$
$0 = 4x - 3 + y$
$y = -4x + 3$
Persamaan garis lurus: $y = -4x + 3$
$x = -1.25, 2$

4. (a) $h = -3t^2 + 9t + 12$

t (s)	1	3
h (m)	18	12

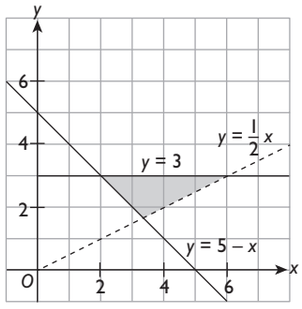
(b)



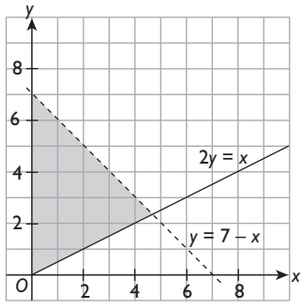
(c) (i) 0.75 saat dan 2.25 saat
(ii) 1.5 saat
(iii) 4 saat

2.3

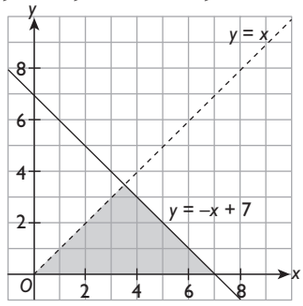
1. $y > \frac{1}{2}x$, $y \geq 5 - x$, $y \leq 3$



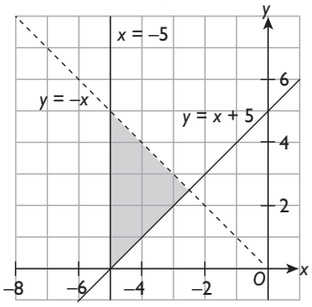
2. $y < 7 - x$, $2y \geq x$, $x \geq 0$



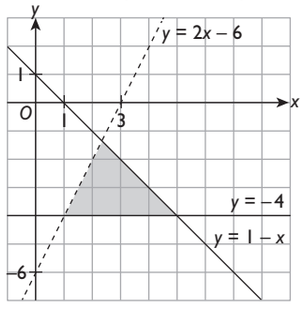
3. $y < x$, $y \leq -x + 7$, $y \geq 0$



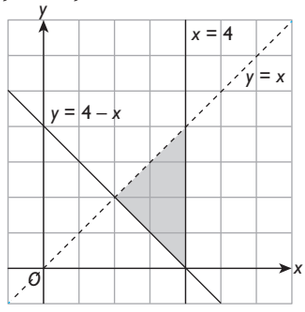
4. $y < -x$, $x \geq -5$, $y \geq x + 5$



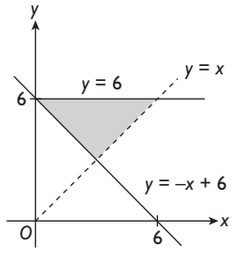
5. $y < 2x - 6$, $y \leq 1 - x$, $y \geq -4$



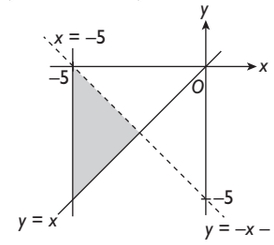
6. $y < x$, $y \geq 4 - x$, $x \leq 4$



7. $y \geq -x + 6$, $y \leq 6$, $y > x$



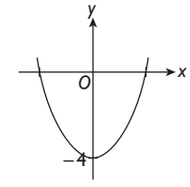
8. $y < -x - 5$, $y \geq x$, $x \geq -5$



Praktis Formatif: Kertas 1

1. C

$y = x^2 - 4$



2. C

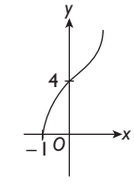
$y = 4x^3 + 4$

$y = 0;\ 0 = 4x^3 + 4$

$4x^3 = -4$

$x^3 = -1$

$x = -1$



3. B

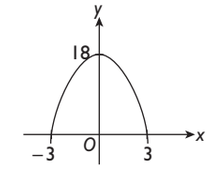
$y = 18 - 2x^2$

$y = 0;\ 0 = 18 - 2x^2$

$2x^2 = 18$

$x^2 = 9$

$x = \pm 3$

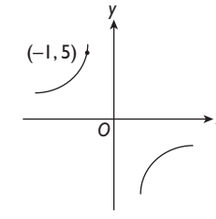


4. A

$y = -\frac{5}{x}$

$x = -1;\ y = -\frac{5}{(-1)}$

$= 5$



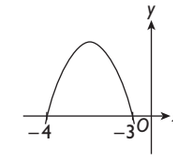
5. B

$y = -x^2 - 7x - 12$

$y = 0;\ 0 = -x^2 - 7x - 12$

$0 = (x + 4)(x + 3)$

$x = -4,\ x = -3$



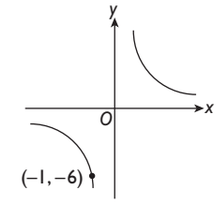
6. D

$y = 6x^{-1}$

$y = \frac{6}{x}$

$x = -1,\ y = \frac{6}{(-1)}$

$= -6$

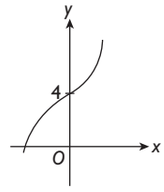


7. A

$y = x^3 + 27$
$y = 0;\ 0 = x^3 + 27$
$x^3 = -27$
$x = -3$

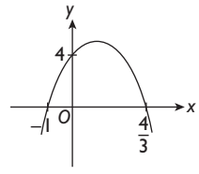
8. C

$y = ax^n + c$
$a = 1,\ n = 3,\ c = 4$
$y = x^3 + 4$



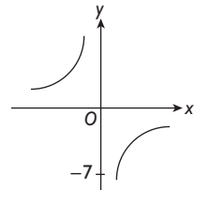
9. D

$y = 4 + x - 3x^2$
$y = 0;\ 0 = 4 + x - 3x^2$
$0 = (x + 1)(3x - 4)$
$\therefore x = -1,\ x = \frac{4}{3}$



10. D

$xy = -7$
$y = -\frac{7}{x}$



11. B

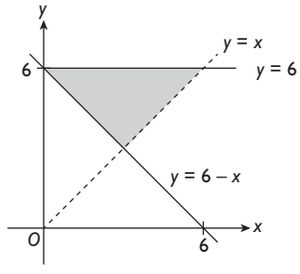
$y = x^3 + 27$

12. A

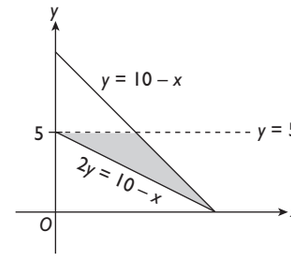
$y = -x^2 + 4$
$y = 0;\ 0 = -x^2 + 4$
$x^2 = 4$
$x = \pm 2$

Praktis Formatif: Kertas 2

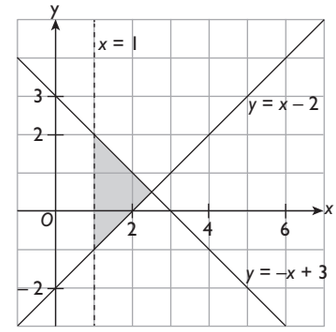
1.



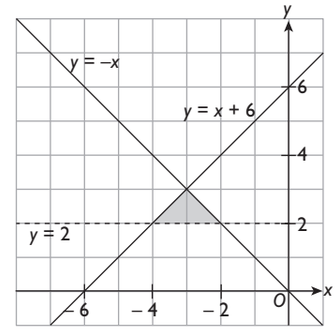
2.



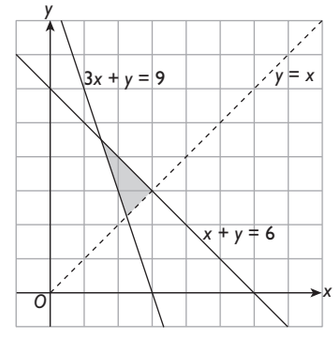
3.



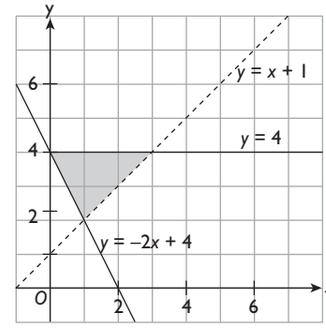
4.



5.



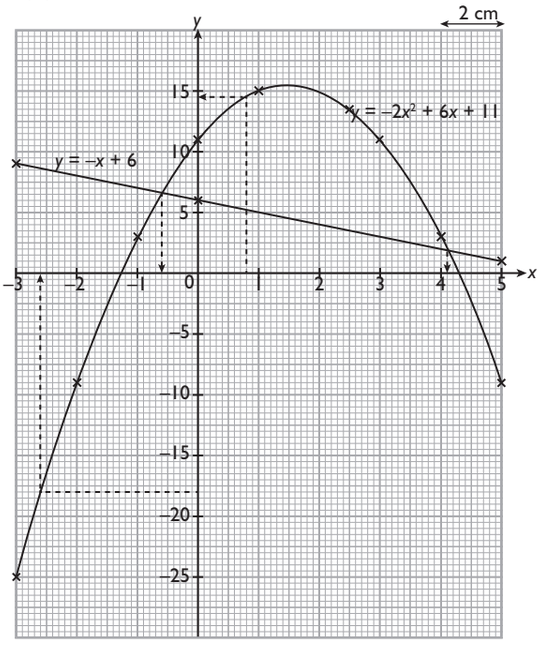
6.



7. (a) $y = -2x^2 + 6x + 11$

x	−2	3
y	−9	11

(b)



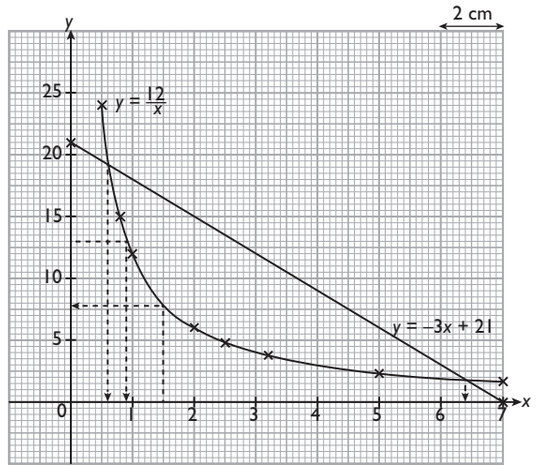
(c) (i) 14.5
(ii) −2.6

(d) $y = -2x^2 + 6x + 11$ … ①
$0 = -2x^2 + 7x + 5$ … ②
① − ②: $y = -x + 6$
Persamaan garis lurus: $y = -x + 6$
$x = -0.6, 4.1$

8. (a) $y = \frac{12}{x}$

x	0.8	5
y	15	2.4

(b)



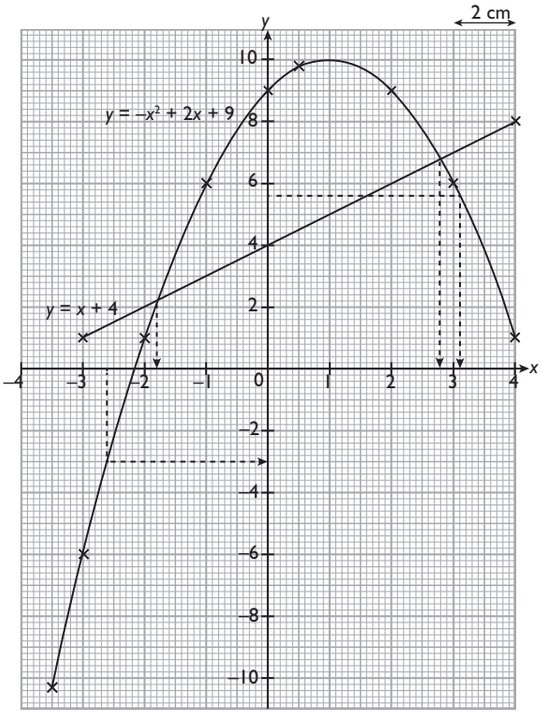
(c) (i) 7.75
(ii) 0.9

(d) $y = \frac{12}{x}$ … ①
$12 = -3x^2 + 21x$ … ②
② ÷ x: $\frac{12}{x} = -3x + 21$ … ③
Gantikan ① ke dalam ③: $y = -3x + 21$
Persamaan garis lurus: $y = -3x + 21$
$x = 0.6, 6.4$

9. (a) $y = -x^2 + 2x + 9$

x	−3	2
y	−6	9

(b)



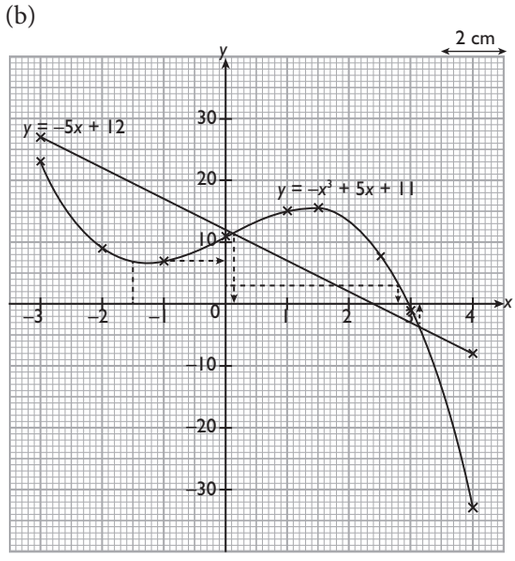
(c) (i) −3
(ii) 3.1

(d) $y = -x^2 + 2x + 9$ … ①
$0 = -x^2 + x + 5$ … ②
① − ②: $y = x + 4$
Persamaan garis lurus: $y = x + 4$
$x = -1.8, 2.8$

10. (a) $y = -x^3 + 5x + 11$

x	−2	1.5
y	9	15.1

(b)



(c) (i) 7
(ii) 2.8

(d) $y = -x^3 + 5x + 11$ … ①
$0 = x^3 - 10x + 1$ … ②
① + ②: $y = -5x + 12$
Persamaan garis lurus: $y = -5x + 12$
$x = 0.15, 3.15$

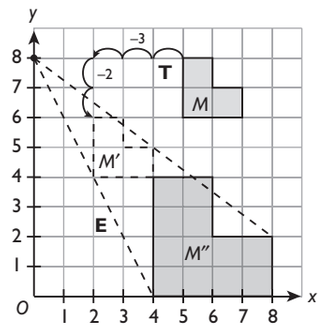
JAWAPAN

BAB 3: PENJELMAAN III

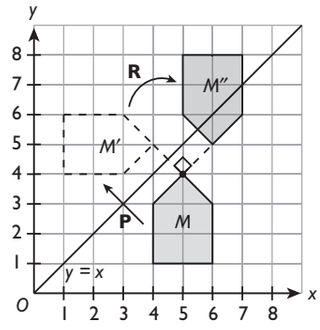
3.1

A

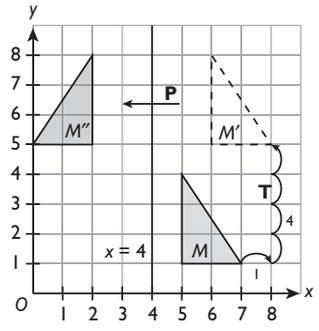
1.



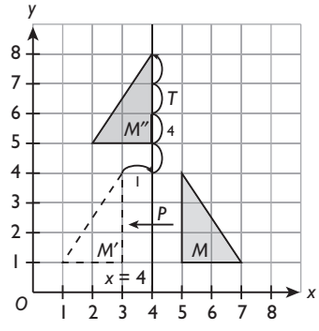
2.



3. (a)



(b)



B

1. (a) $J \xrightarrow{\mathbf{P}} J'(7, 2) \xrightarrow{\mathbf{T}} J''(4, 0)$

(b) $J \xrightarrow{\mathbf{T}} J'(4, 6) \xrightarrow{\mathbf{R}} J''(3, 3)$

2. (a) $K \xrightarrow{\mathbf{T}} K'(4, 7) \xrightarrow{\mathbf{P}} K''(4, 1)$

(b) $K \xrightarrow{\mathbf{P}} K'(2, 5) \xrightarrow{\mathbf{R}} K''(8, 7)$

3. (a) $L \xrightarrow{\mathbf{T}} L'(2, 2) \xrightarrow{\mathbf{R}} L''(1, 5)$

(b) $L \xrightarrow{\mathbf{R}} L'(-1, 6) \xrightarrow{\mathbf{P}} L''(5, 6)$

4. (a) $M \xrightarrow{\mathbf{P}} M'(-4, 4) \xrightarrow{\mathbf{R}} M''(-6, 2)$

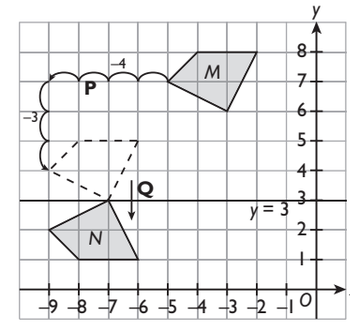
(b) $M \xrightarrow{\mathbf{R}} M'(-6, 4) \xrightarrow{\mathbf{T}} M''(-8, 7)$

5. (a) $N \xrightarrow{\mathbf{P}} N'(2, 5) \xrightarrow{\mathbf{R}} N''(5, -2)$

(b) $N \xrightarrow{\mathbf{T}} N'(1, 5) \xrightarrow{\mathbf{T}} N''(-3, 8)$

C

1.

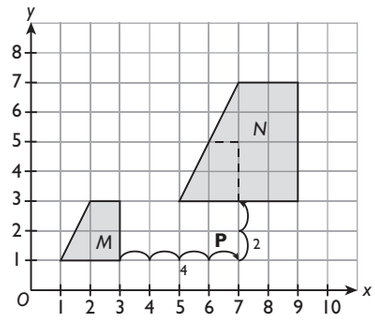


P: Satu translasi $\begin{pmatrix} -4 \\ -3 \end{pmatrix}$

A translation $\begin{pmatrix} -4 \\ -3 \end{pmatrix}$

Q: Satu pantulan pada garis $y = 3$
A reflection in the line y = 3

2.

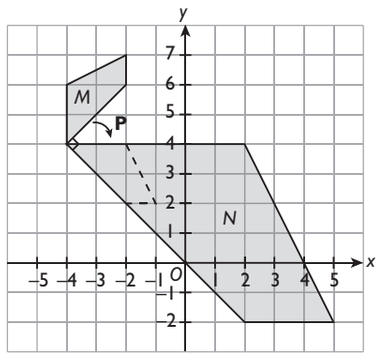


P: Satu translasi $\begin{pmatrix} 4 \\ 2 \end{pmatrix}$

A translation $\begin{pmatrix} 4 \\ 2 \end{pmatrix}$

Q: Satu pembesaran dengan faktor skala 2 pada pusat (5, 3)
An enlargement of scale factor 2 with centre (5, 3)

3.

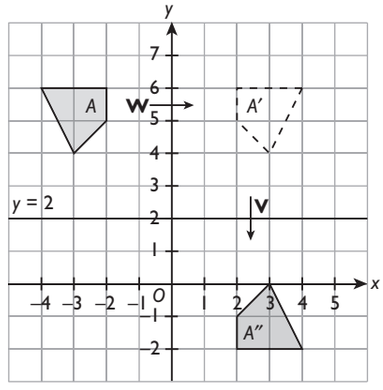


P: Satu putaran 90° ikut arah jam pada pusat (–4, 4)
A clockwise rotation of 90° about the centre (–4, 4)

Q: Satu pembesaran dengan faktor skala 3 pada pusat (–4, 4)
An enlargement of scale factor 3 with centre (–4, 4)

D

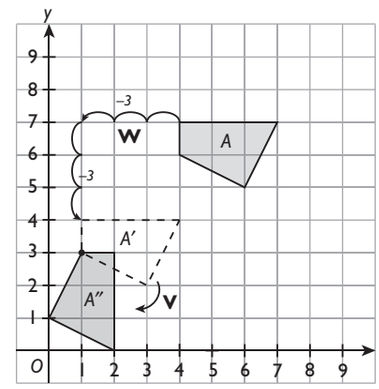
1.



Penjelmaan tunggal yang setara dengan **VW**:
The single transformation which is equivalent to **VW***:*

Satu putaran 180° pada pusat (0, 2)
A rotation of 180° about the centre (0, 2)

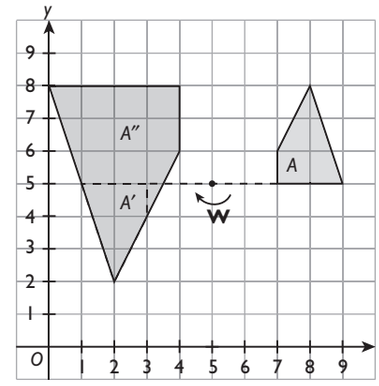
2.



Penjelmaan tunggal yang setara dengan **VW**:
The single transformation which is equivalent to **VW***:*

Satu putaran 90° ikut arah jam pada pusat (1, 6)
A clockwise rotation of 90° about the centre (1, 6)

3.



Penjelmaan tunggal yang setara dengan **VW**:
The single transformation which is equivalent to **VW***:*

Satu pembesaran dengan faktor skala –2 pada pusat (6, 6)
An enlargement of scale factor –2 with centre (6, 6)

E

1. (a) (i) **Q** = Pantulan pada garis $y = 3$

(ii) Faktor skala, $k = \frac{BC}{JK} = \frac{2}{1} = 2$

P = Pembesaran dengan faktor skala 2 pada pusat $A(3,4)$

(b) Luas imej $= 2^2 \times 16$
$= 64 \text{ m}^2$
Luas kawasan berlorek $= 64 - 16$
$= 48 \text{ m}^2$

atau

Luas $EFGH = 16 = 2.5$ grid
Luas kawasan berlorek $= x = 7.5$ grid

$$\frac{16}{x} = \frac{2.5}{7.5}$$
$$x = 48$$

Luas kawasan berlorek $= 48 \text{ m}^2$

2. (a) (i) **W** = Translasi $\begin{pmatrix} 4 \\ -7 \end{pmatrix}$

(ii) Faktor skala

$k = \frac{JM}{EH} = \frac{6}{3} = 2$

V = Pembesaran dengan faktor skala 2 pada pusat (0, –2)

(b) Luas imej = $2^2 \times 5.5$
= 22 m^2

Luas kawasan berlorek = 22 – 5.5
= 16.5 m^2

atau

Luas *ABCD* = 5.5 = 6.5 grid

Luas kawasan berlorek = x = 19.5 grid

$\frac{5.5}{x} = \frac{6.5}{19.5}$

$x = 16.5$

Luas kawasan berlorek = 16.5 m^2

3. (a) **M** = Putaran 90° ikut arah jam pada pusat (–1, 5)

Faktor skala,

$k = \frac{KL}{GF} = \frac{3}{1} = 3$

N = Pembesaran dengan faktor skala 3 pada pusat $E(-2, 2)$

(b) x = Luas *ABCD*

$(120 + x) = 3^2 \times x$

$120 + x = 9x$

$8x = 120$

$x = 15$ cm^2

atau

Luas kawasan berlorek = 120 = 32 grid

Luas *ABCD* = x = 4 grid

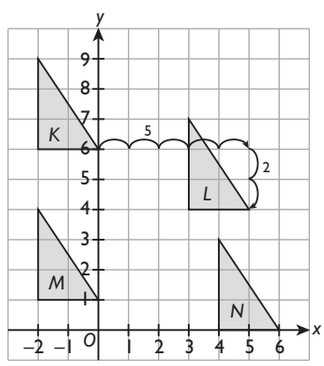
$\frac{120}{x} = \frac{32}{4}$

$x = 15$

Luas *ABCD* = 15 cm^2

Praktis Formatif: Kertas 1

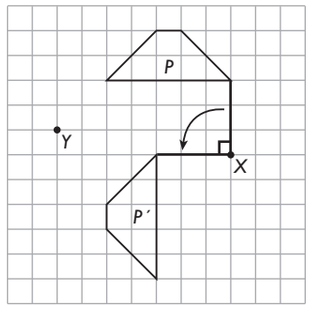
1. A



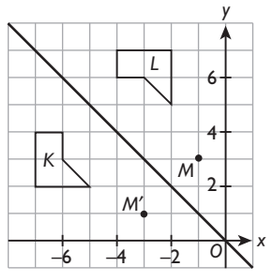
2. A

3. C

4. B



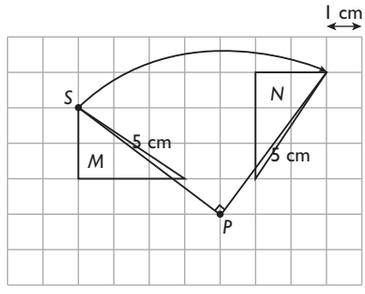
5. B



Koordinat imej titik *M* = (–3, 1)

6. C

7. B



Jarak = $\frac{1}{4} \times \frac{22}{7} \times 2 \times 5$

= 7.86 cm

8. C

Luas imej = $k^2 \times$ Luas objek

$= \left(\frac{1}{4}\right)^2 \times \frac{1}{2} \times 6 \times 5$

$= 3\frac{3}{4}$ cm^2

Luas imej = $\frac{1}{2} \times 3 \times 2.5$

$= 3\frac{3}{4}$ cm^2

9. A

10. B

$k^2 = \frac{64\pi}{16\pi}$

$= 4$

$k = \sqrt{4}$

$= 2$

11. B

Faktor skala $= \frac{PW}{PS}$

$= \frac{1}{3}$

12. A

Faktor skala $= -\frac{5}{2\,000}$

$= -\frac{1}{400}$

Jarak $= 10 \text{ cm} \div \frac{1}{400}$

$= 10 \text{ cm} \times 400$

$= 4\,000 \text{ cm}$

13. A

Jejari bulatan kecil

$= 9 \text{ cm} - 6 \text{ cm}$

$= 3 \text{ cm}$

Faktor skala $= \frac{9}{3}$

$= 3$

14. D

15. A

16. C

Praktis Formatif: Kertas 2

1. (a) (i) $Q(4, 4) \xrightarrow{\mathbf{T}} (-1, 2)$

(ii) $Q(4, 4) \xrightarrow{\mathbf{T}} (-1, 2) \xrightarrow{\mathbf{R}} (3, 2)$

(b) (i) **V** = Putaran 90° ikut arah jam pada pusat (0, 2)

(ii) Faktor skala $= \frac{UV}{RS} = \frac{2}{1} = 2$

W = Pembesaran dengan faktor skala 2 pada pusat $P(1, 5)$

(c) Katakan luas $PQRS = x \text{ m}^2$

$x + 24 = 2^2 \times x$ ← Luas imej $= k^2 \times$ Luas objek

$x + 24 = 4x$

$3x = 24$

$x = 8$

Luas $ABCD$ = Luas $PQRS$

$= 8 \text{ m}^2$

2. (a) (i) $A(1, 5) \xrightarrow{\mathbf{T}} (5, 2) \xrightarrow{\mathbf{R}} (3, 4)$

(ii) $A(1, 5) \xrightarrow{\mathbf{R}} (0, 0) \xrightarrow{\mathbf{R}} (5, -1)$

(b) (i) (a) **W** = Pantulan pada garis $y = x$

(b) Faktor skala $= \frac{KM}{PS} = \frac{6}{3} = 2$

V = Pembesaran dengan faktor skala 2 pada pusat $R(5, 3)$

(ii) Luas kawasan berlorek

= Luas $LKMR$ – Luas $QPSR$

$= (2^2 \times 65) - 65$ ← Luas $QPSR$ = Luas $ABCD$

$= 260 - 65$

$= 195 \text{ m}^2$

3. (a) (i) $P(2, 4) \xrightarrow{\mathbf{T}} (5, 5) \xrightarrow{\mathbf{R}} (-4, 6)$

(ii) $P(2, 4) \xrightarrow{\mathbf{R}} (-3, 3) \xrightarrow{\mathbf{T}} (0, 4)$

(b) (i) (a) **W** = Pantulan pada garis $y = 2$

(b) Faktor skala $= \frac{PK}{PQ} = \frac{6}{2} = 3$

V = Pembesaran dengan faktor skala 3 pada pusat $P(1, 7)$

(ii) Luas kawasan berlorek

= Luas $PKLMN$ – Luas $PQRST$

$= (3^2 \times 36) - 36$ ← Luas $PQRST$ = Luas $ABCDE$

$= 324 - 36$

$= 288 \text{ m}^2$

4. (a) (i) $A(-2.5, 3) \xrightarrow{\mathbf{T}} (-2, 7) \xrightarrow{\mathbf{T}} (-1.5, 11)$

(ii) $A(-2.5, 3) \xrightarrow{\mathbf{R}} (1.5, 5) \xrightarrow{\mathbf{T}} (2, 9)$

(b) (i) (a) **N** = Pantulan pada garis $FCBE$

(b) Faktor skala $= \frac{FD}{CG} = \frac{6}{2} = 3$

M = Pembesaran dengan faktor skala 3 pada pusat $(-2, 2)$

(ii) Luas kawasan berlorek

= Luas FDE – Luas BCG

$= (3^2 \times 28) - 28$ ← Luas BCG = Luas CAB

$= 252 - 28$

$= 224 \text{ m}^2$

5. (a) (i) $K(-7, 7) \xrightarrow{\mathbf{T}} K'(-5, 4) \xrightarrow{\mathbf{T}} K''(-3, 1)$

(ii) $K(-7, 7) \xrightarrow{\mathbf{P}} K'(-7, 1) \xrightarrow{\mathbf{T}} K''(-5, -2)$

(b) (i) (a) **W** = Putaran 90° ikut arah jam pada pusat (6, 8)

(b) Faktor skala, $k = \frac{PT}{AE} = \frac{4}{2} = 2$

V = Pembesaran dengan faktor skala 2 pada pusat $P(5, 7)$

(ii) **Kaedah 1:**

Luas objek $ABCDE = \frac{160}{2^2}$

$= \frac{160}{4}$

$= 40 \text{ m}^2$

Kaedah 2:
Luas $PQRST$ = 160 = 14 grid
Luas $ABCDE = x$ = 3.5 grid

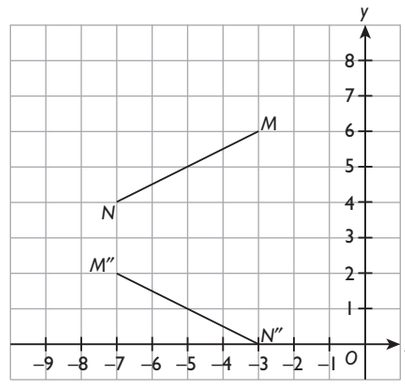
$$\frac{160}{x} = \frac{14}{3.5}$$

$$x = 40$$

Luas $ABCDE$ = 40 m^2

6. (a) (i) $N(-7, 4) \xrightarrow{\mathbf{P}} N'(-3, 0) \xrightarrow{\mathbf{P}} N''(-7, 4)$

(ii)



(b) (i) (a) **X** = Pantulan pada garis $x + y = 5$

(b) Faktor skala, $k = \frac{7}{3}$

Y = Pembesaran dengan faktor skala $\frac{7}{3}$ pada pusat (1, 1)

(ii) Luas imej $R = \left(\frac{7}{3}\right)^2 \times 18$

= 98

Luas kawasan berwarna hitam
= 98 + 18
= 116 cm^2

JAWAPAN

BAB 4: MATRIKS

4.1

A

1. $\begin{pmatrix} 3 \\ -8 \end{pmatrix}$	**2.** $\begin{pmatrix} 4 & -1 & 6 \end{pmatrix}$	**3.** $\begin{pmatrix} 4 & 2 & 1 \\ -3 & 9 & 2 \\ 6 & 0 & -5 \end{pmatrix}$
2	1	3
1	3	3
2×1	1×3	3×3

B

1. (a) $a_{23} = 9$
(b) $a_{31} = -3$
(c) $a_{22} = 7$
(d) $a_{32} = 2$
(e) $a_{21} = -6$
(f) $a_{13} = 5$

2. (a) $p_{11} = 0$
(b) $p_{22} = 4$
(c) $p_{13} = 3$
(d) $p_{21} = -2$
(e) $p_{12} = -7$
(f) $p_{23} = 0$

4.2

1. $x = 5$
$-2y = -8$
$y = 4$

$5 + z = -3$
$z = -5 - 3$
$= -8$

2. $x = 6$
$y = -3$
$6z = -12$
$z = -2$

3. $x + 2 = 8$
$x = 6$
$y - 1 = 6$
$y = 7$
$z = 4(7)$
$= 28$

4.3

A

1. $\begin{pmatrix} 5 & -1 \\ 3 & 5 \end{pmatrix} + \begin{pmatrix} 4 & -2 \\ -6 & 7 \end{pmatrix}$
$= \begin{pmatrix} 5+4 & -1-2 \\ 3-6 & 5+7 \end{pmatrix}$
$= \begin{pmatrix} 9 & -3 \\ -3 & 12 \end{pmatrix}$

2. $\begin{pmatrix} -3 \\ 7 \end{pmatrix} + \begin{pmatrix} -1 \\ -2 \end{pmatrix}$
$= \begin{pmatrix} -3-1 \\ 7-2 \end{pmatrix}$
$= \begin{pmatrix} -4 \\ 5 \end{pmatrix}$

3. $\begin{pmatrix} 4 & 8 & 6 \\ -5 & -3 & 7 \end{pmatrix} - \begin{pmatrix} 9 & 2 & 8 \\ 4 & -6 & 10 \end{pmatrix}$
$= \begin{pmatrix} 4-9 & 8-2 & 6-8 \\ -5-4 & -3+6 & 7-10 \end{pmatrix}$
$= \begin{pmatrix} -5 & 6 & -2 \\ -9 & 3 & -3 \end{pmatrix}$

4. $\begin{pmatrix} 3 & 5 \\ 0 & 4 \end{pmatrix} - \begin{pmatrix} 6 & -1 \\ 3 & -2 \end{pmatrix}$
$= \begin{pmatrix} 3-6 & 5+1 \\ 0-3 & 4+2 \end{pmatrix}$
$= \begin{pmatrix} -3 & 6 \\ -3 & 6 \end{pmatrix}$

B

1. $(5 \quad -2 \quad 4) + (3 \quad 6 \quad 8) - (9 \quad 7 \quad -3)$
$= (5+3-9 \quad -2+6-7 \quad 4+8+3)$
$= (-1 \quad -3 \quad 15)$

2. $(3 \quad -4) - (6 \quad -7) + (-2 \quad 5)$
$= (3-6-2 \quad -4+7+5)$
$= (-5 \quad 8)$

3. $\begin{pmatrix} 2 & 1 \\ 3 & -2 \end{pmatrix} + \begin{pmatrix} 1 & -4 \\ 5 & -7 \end{pmatrix} - \begin{pmatrix} 3 & -5 \\ -1 & 6 \end{pmatrix}$
$= \begin{pmatrix} 2+1-3 & 1-4+5 \\ 3+5+1 & -2-7-6 \end{pmatrix}$
$= \begin{pmatrix} 0 & 2 \\ 9 & -15 \end{pmatrix}$

4. $\begin{pmatrix}5\\2\end{pmatrix} - \begin{pmatrix}2\\-4\end{pmatrix} + \begin{pmatrix}-1\\3\end{pmatrix}$

$= \begin{pmatrix}5-2-1\\2+4+3\end{pmatrix}$

$= \begin{pmatrix}2\\9\end{pmatrix}$

C

1. $4 - y = 7$ $\qquad$ $x - 2 = 2x$

$y = 4 - 7$ $\qquad$ $2x - x = -2$

$= -3$ $\qquad$ $x = -2$

2. $x - 5 = 10$ $\qquad$ $4 - (-8) = 2y$

$x = 15$ $\qquad$ $12 = 2y$

$y = 6$

3. $3x - 5 = 7$ $\qquad$ $2 - 4y = 10$

$3x = 7 + 5$ $\qquad$ $-4y = 10 - 2$

$3x = 12$ $\qquad$ $-4y = 8$

$x = 4$ $\qquad$ $y = -2$

4. $6x - 8 = -2$ $\qquad$ $-4 + 2y = 12$

$6x = -2 + 8$ $\qquad$ $2y = 12 + 4$

$6x = 6$ $\qquad$ $2y = 16$

$x = 1$ $\qquad$ $y = 8$

5. $5y - 4 = 6$ $\qquad$ $x - y = 4$

$5y = 10$ $\qquad$ $x - 2 = 4$

$y = 2$ $\qquad$ $x = 6$

6. $x + 2 - 5 = -9$ $\qquad$ $-6 - 8 = -2y$

$x - 3 = -9$ $\qquad$ $-14 = -2y$

$x = -6$ $\qquad$ $y = 7$

4.4

A

1. $4\begin{pmatrix}-3\\2\end{pmatrix} = \begin{pmatrix}-12\\8\end{pmatrix}$

2. $-5(-1 \quad 0 \quad 3) = (5 \quad 0 \quad -15)$

3. $\frac{1}{6}(18 \quad -12) = (3 \quad -2)$

4. $\frac{1}{2}\begin{pmatrix}10 & -6 & 0\\2 & 4 & -8\end{pmatrix} = \begin{pmatrix}5 & -3 & 0\\1 & 2 & -4\end{pmatrix}$

B

1. $2\begin{pmatrix}-1 & 0 & 2\\3 & -4 & 5\end{pmatrix} + \frac{1}{4}\begin{pmatrix}8 & 12 & -4\\0 & 16 & -8\end{pmatrix}$

$= \begin{pmatrix}-2 & 0 & 4\\6 & -8 & 10\end{pmatrix} + \begin{pmatrix}2 & 3 & -1\\0 & 4 & -2\end{pmatrix}$

$= \begin{pmatrix}-2+2 & 0+3 & 4-1\\6+0 & -8+4 & 10-2\end{pmatrix}$

$= \begin{pmatrix}0 & 3 & 3\\6 & -4 & 8\end{pmatrix}$

2. $\begin{pmatrix}1 & -4\\6 & 2\\-3 & 5\end{pmatrix} - 3\begin{pmatrix}-2 & 0\\1 & 3\\4 & -1\end{pmatrix} = \begin{pmatrix}1 & -4\\6 & 2\\-3 & 5\end{pmatrix} - \begin{pmatrix}-6 & 0\\3 & 9\\12 & -3\end{pmatrix}$

$= \begin{pmatrix}1+6 & -4+0\\6-3 & 2-9\\-3-12 & 5+3\end{pmatrix}$

$= \begin{pmatrix}7 & -4\\3 & -7\\-15 & 8\end{pmatrix}$

3. $5\begin{pmatrix}1\\0\\-2\end{pmatrix} - \frac{1}{3}\begin{pmatrix}12\\6\\-9\end{pmatrix} = \begin{pmatrix}5\\0\\-10\end{pmatrix} - \begin{pmatrix}4\\2\\-3\end{pmatrix}$

$= \begin{pmatrix}5-4\\0-2\\-10+3\end{pmatrix}$

$= \begin{pmatrix}1\\-2\\-7\end{pmatrix}$

4. $\frac{1}{2}(4 \quad -8) + 5(1 \quad 0) = (2 \quad -4) + (5 \quad 0)$

$= (2+5 \quad -4+0)$

$= (7 \quad -4)$

5. $2(-1 \quad 3 \quad -2) - \frac{1}{8}(0 \quad -16 \quad 8)$

$= (-2 \quad 6 \quad -4) - (0 \quad -2 \quad 1)$

$= (-2-0 \quad 6+2 \quad -4-1)$

$= (-2 \quad 8 \quad -5)$

C

1. $-2\mathbf{Q} + \frac{1}{3}\mathbf{R} - \mathbf{P}$

$= -2\begin{pmatrix}1 & 7\\0 & -3\end{pmatrix} + \frac{1}{3}\begin{pmatrix}-9 & 6\\-3 & 12\end{pmatrix} - \begin{pmatrix}-2 & 48\\10 & \end{pmatrix}$

$= \begin{pmatrix}-2 & -14\\0 & 6\end{pmatrix} + \begin{pmatrix}-3 & 2\\-1 & 4\end{pmatrix} - \begin{pmatrix}-2 & 4\\10 & -8\end{pmatrix}$

$= \begin{pmatrix}-2-3+2 & -14+2-4\\0-1-10 & 6+4+8\end{pmatrix}$

$= \begin{pmatrix}-3 & -16\\-11 & 18\end{pmatrix}$

2. $\frac{1}{2}\mathbf{P} - \mathbf{R} + 3\mathbf{Q}$

$= \frac{1}{2}\begin{pmatrix}-2 & 48\\10 & \end{pmatrix} - \begin{pmatrix}-9 & 6\\-3 & 12\end{pmatrix} + 3\begin{pmatrix}1 & 7\\0 & -3\end{pmatrix}$

$= \begin{pmatrix}-1 & 2\\5 & -4\end{pmatrix} - \begin{pmatrix}-9 & 6\\-3 & 12\end{pmatrix} + \begin{pmatrix}3 & 21\\0 & -9\end{pmatrix}$

$= \begin{pmatrix}-1+9+3 & 2-6+21\\5+3+0 & -4-12-9\end{pmatrix}$

$= \begin{pmatrix}11 & 17\\8 & -25\end{pmatrix}$

D

1. $2\begin{pmatrix}4\\y\end{pmatrix}+\begin{pmatrix}x\\8\end{pmatrix}=\begin{pmatrix}10\\18\end{pmatrix}$

$\begin{pmatrix}8\\2y\end{pmatrix}+\begin{pmatrix}x\\8\end{pmatrix}=\begin{pmatrix}10\\18\end{pmatrix}$

$8+x=10$ $\qquad$ $2y+8=18$

$x=2$ $\qquad$ $2y=10$

$y=5$

2. $3\begin{pmatrix}4 & x\\y & 2\end{pmatrix}-3\begin{pmatrix}6 & -2x\\7 & -8\end{pmatrix}=\begin{pmatrix}-6 & 18\\6y & 30\end{pmatrix}$

$\begin{pmatrix}12 & 3x\\3y & 6\end{pmatrix}-\begin{pmatrix}18 & -6x\\21 & -24\end{pmatrix}=\begin{pmatrix}-6 & 18\\6y & 30\end{pmatrix}$

$3x+6x=18$ $\qquad$ $3y-21=6y$

$9x=18$ $\qquad$ $3y=-21$

$x=2$ $\qquad$ $y=-7$

3. $\frac{1}{3}\begin{pmatrix}x & 12\\6 & 9\end{pmatrix}-4\begin{pmatrix}1 & 2\\0 & 5\end{pmatrix}=\begin{pmatrix}1 & -4\\y & -17\end{pmatrix}$

$\frac{1}{3}\begin{pmatrix}x & 12\\6 & 9\end{pmatrix}-\begin{pmatrix}4 & 8\\0 & 20\end{pmatrix}=\begin{pmatrix}1 & -4\\y & -17\end{pmatrix}$

$\frac{1}{3}x-4=1$ $\qquad$ $\frac{1}{3}(6)-0=y$

$\frac{1}{3}x=5$ $\qquad$ $2-0=y$

$x=15$ $\qquad$ $y=2$

4. $\begin{pmatrix}x\\-1\\3\end{pmatrix}-3\begin{pmatrix}5\\0\\2\end{pmatrix}=\frac{1}{5}\begin{pmatrix}15\\-5\\y\end{pmatrix}$

$\begin{pmatrix}x\\-1\\3\end{pmatrix}-\begin{pmatrix}15\\0\\6\end{pmatrix}=\frac{1}{5}\begin{pmatrix}15\\-5\\y\end{pmatrix}$

$x-15=\frac{1}{5}(15)$ $\qquad$ $3-6=\frac{1}{5}y$

$x-15=3$ $\qquad$ $\frac{1}{5}y=-3$

$x=18$ $\qquad$ $y=-15$

5. $-2(5 \quad x \quad 3)-\frac{1}{4}(8 \quad -4 \quad 12)=3(-4 \quad 5 \quad y)$

$(-10 \quad -2x \quad -6)-(2 \quad -1 \quad 3)=(-12 \quad 15 \quad 3y)$

$-2x+1=15$ $\qquad$ $-6-3=3y$

$-2x=14$ $\qquad$ $3y=-9$

$x=-7$ $\qquad$ $y=-3$

4.5

A

1. $\begin{pmatrix}2 & 1 & -3\\4 & 5 & 1\end{pmatrix}\begin{pmatrix}-4\\7\end{pmatrix}$

Peringkat: $(2\times 3)(2\times 1)$

Tidak sama

$\therefore$ Tidak boleh didarab

2. $\begin{pmatrix}-4\\-3\end{pmatrix}(5 \quad -2)$

Peringkat: $(2\times 1)(1\times 2)$

Sama

$\therefore$ Boleh didarab

Peringkat matriks yang terhasil $=2\times 2$

3. $(-5 \quad 2)\begin{pmatrix}0 & 4\\-1 & 3\end{pmatrix}$

Peringkat: $(1\times 2)(2\times 2)$

Sama

$\therefore$ Boleh didarab

Peringkat matriks yang terhasil $=1\times 2$

B

1. $(-4 \quad 3)\begin{pmatrix}1\\5\end{pmatrix}=(-4(1)+3(5))$

$=(-4+15)$

$=(11)$

2. $\begin{pmatrix}2\\-3\end{pmatrix}(5 \quad 4)=\begin{pmatrix}2\times 5 & 2\times 4\\-3\times 5 & -3\times 4\end{pmatrix}$

$=\begin{pmatrix}10 & 8\\-15 & -12\end{pmatrix}$

3. $(2 \quad -1 \quad 4)\begin{pmatrix}1\\3\\-2\end{pmatrix}=(2(1)+(-1)(3)+4(-2))$

$=(2-3-8)$

$=(-9)$

4. $(-3 \quad 4)\begin{pmatrix}0 & -5\\2 & 1\end{pmatrix}=(-3(0)+4(2) \quad -3(-5)+4(1))$

$=(8 \quad 19)$

5. $\begin{pmatrix}5 & 1\\-3 & 0\end{pmatrix}\begin{pmatrix}4\\2\end{pmatrix}=\begin{pmatrix}5(4)+1(2)\\-3(4)+0(2)\end{pmatrix}$

$=\begin{pmatrix}22\\-12\end{pmatrix}$

6. $\begin{pmatrix}-6 & 2\\4 & 3\end{pmatrix}\begin{pmatrix}1 & -2\\7 & 5\end{pmatrix}$

$=\begin{pmatrix}-6(1)+2(7) & -6(-2)+2(5)\\4(1)+3(7) & 4(-2)+3(5)\end{pmatrix}$

$=\begin{pmatrix}8 & 22\\25 & 7\end{pmatrix}$

7. $\begin{pmatrix}5 & -3\\-4 & 2\end{pmatrix}\begin{pmatrix}2 & -1\\3 & 6\end{pmatrix}$

$=\begin{pmatrix}5(2)+(-3)(3) & 5(-1)+(-3)(6)\\-4(2)+2(3) & -4(-1)+2(6)\end{pmatrix}$

$=\begin{pmatrix}1 & -23\\-2 & 16\end{pmatrix}$

8. $\begin{pmatrix} -1 & 3 \\ 2 & 5 \\ 4 & 0 \end{pmatrix}\begin{pmatrix} -3 & 4 \\ 1 & 2 \end{pmatrix}$

$= \begin{pmatrix} -1(-3)+3(1) & -1(4)+3(2) \\ 2(-3)+5(1) & 2(4)+5(2) \\ 4(-3)+0(1) & 4(4)+0(2) \end{pmatrix}$

$= \begin{pmatrix} 6 & 2 \\ -1 & 18 \\ -12 & 16 \end{pmatrix}$

C

1. $\begin{pmatrix} 3 \\ x \end{pmatrix}(y \quad 4) = \begin{pmatrix} 18 & 12 \\ -12 & -8 \end{pmatrix}$

$\begin{pmatrix} 3y & 3(4) \\ xy & 4x \end{pmatrix} = \begin{pmatrix} 18 & 12 \\ -12 & -8 \end{pmatrix}$

$4x = -8 \qquad 3y = 18$

$x = -2 \qquad y = 6$

2. $\begin{pmatrix} 2x \\ -1 \end{pmatrix}(6 \quad -2) = \begin{pmatrix} 3 & -1 \\ -6 & y \end{pmatrix}$

$\begin{pmatrix} 12x & -4x \\ -6 & 2 \end{pmatrix} = \begin{pmatrix} 3 & -1 \\ -6 & y \end{pmatrix}$

$12x = 3 \qquad y = 2$

$x = \frac{1}{4}$

3. $(x \quad 1)\begin{pmatrix} 2 & -1 \\ -3 & 4 \end{pmatrix} = (5 \quad y)$

$(2x - 3 \quad -x + 4) = (5 \quad y)$

$2x - 3 = 5 \qquad -x + 4 = y$

$2x = 8 \qquad y = -4 + 4$

$x = 4 \qquad = 0$

4. $(-2 \quad 4 \quad 0)\begin{pmatrix} x & -1 \\ -3 & y \\ 1 & -5 \end{pmatrix} = (-8 \quad 4)$

$(-2x - 12 + 0 \quad 2 + 4y + 0) = (-8 \quad 4)$

$-2x - 12 = -8 \qquad 2 + 4y = 4$

$-2x = 4 \qquad 4y = 2$

$x = -2 \qquad y = \frac{1}{2}$

5. $\begin{pmatrix} 2 & 3 \\ -1 & 1 \end{pmatrix}\begin{pmatrix} 6 & 3 \\ 0 & -2 \end{pmatrix} = \begin{pmatrix} x & y \\ -6 & -5 \end{pmatrix}$

$\begin{pmatrix} 2(6)+3(0) & 2(3)+3(-2) \\ -1(6)+1(0) & -1(3)+1(-2) \end{pmatrix} = \begin{pmatrix} x & y \\ -6 & -5 \end{pmatrix}$

$\begin{pmatrix} 12 & 0 \\ -6 & -5 \end{pmatrix} = \begin{pmatrix} x & y \\ -6 & -5 \end{pmatrix}$

$x = 12, y = 0$

6. $\begin{pmatrix} 0 & -2 \\ y & 1 \end{pmatrix}\begin{pmatrix} 5 & 3 \\ 4 & -2 \end{pmatrix} = \begin{pmatrix} x & 4 \\ 14 & 4 \end{pmatrix}$

$\begin{pmatrix} 0(5)+(-2)(4) & 0(3)+(-2)(-2) \\ 5y + 1(4) & 3y + 1(-2) \end{pmatrix} = \begin{pmatrix} x & 4 \\ 14 & 4 \end{pmatrix}$

$0 - 8 = x \qquad 5y + 4 = 14$

$x = -8 \qquad 5y = 10$

$y = 2$

7. $\begin{pmatrix} x & 1 \\ -2 & 3 \end{pmatrix}\begin{pmatrix} 2 & 1 \\ 4 & y \end{pmatrix} = \begin{pmatrix} 10 & 8 \\ 8 & 13 \end{pmatrix}$

$\begin{pmatrix} 2x + 1(4) & x + y \\ -2(2) + 3(4) & -2 + 3y \end{pmatrix} = \begin{pmatrix} 10 & 8 \\ 8 & 13 \end{pmatrix}$

$2x + 4 = 10 \qquad -2 + 3y = 13$

$2x = 6 \qquad 3y = 15$

$x = 3 \qquad y = 5$

8. $\begin{pmatrix} -1 & 3 \\ 2 & x \end{pmatrix}\begin{pmatrix} y & 3 \\ 2 & 4 \end{pmatrix} = \begin{pmatrix} -7 & 9 \\ 20 & -6 \end{pmatrix}$

$\begin{pmatrix} -y + 3(2) & -3 + 3(4) \\ 2y + 2x & 2(3) + 4x \end{pmatrix} = \begin{pmatrix} -7 & 9 \\ 20 & -6 \end{pmatrix}$

$-y + 6 = -7 \qquad 6 + 4x = -6$

$-y = -13 \qquad 4x = -12$

$y = 13 \qquad x = -3$

4.6

1. $\begin{pmatrix} 4 & -1 & 3 \\ 2 & 0 & -5 \\ 3 & 7 & -2 \end{pmatrix} - \begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix}\begin{pmatrix} 3 & 0 & 5 \\ 2 & 4 & 1 \\ -1 & 2 & 6 \end{pmatrix}$

$= \begin{pmatrix} 4-3 & -1-0 & 3-5 \\ 2-2 & 0-4 & -5-1 \\ 3+1 & 7-2 & -2-6 \end{pmatrix} = \begin{pmatrix} 1 & -1 & -2 \\ 0 & -4 & -6 \\ 4 & 5 & -8 \end{pmatrix}$

2. $3\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}\begin{pmatrix} 3 & -2 \\ 1 & 5 \end{pmatrix} + \begin{pmatrix} 1 & 0 \\ -4 & -8 \end{pmatrix}$

$= \begin{pmatrix} 9 & -6 \\ 3 & 15 \end{pmatrix} + \begin{pmatrix} 1 & 0 \\ -4 & -8 \end{pmatrix}$

$= \begin{pmatrix} 9+1 & -6+0 \\ 3-4 & 15-8 \end{pmatrix} = \begin{pmatrix} 10 & -6 \\ -1 & 7 \end{pmatrix}$

4.7

A

1. $\mathbf{P}^{-1} = \frac{1}{2(4) - 1(7)}\begin{pmatrix} 4 & -1 \\ -7 & 2 \end{pmatrix}$

$= \frac{1}{1}\begin{pmatrix} 4 & -1 \\ -7 & 2 \end{pmatrix}$

$= \begin{pmatrix} 4 & -1 \\ -7 & 2 \end{pmatrix}$

2. $\mathbf{Q}^{-1} = \frac{1}{-5(4) - 8(-3)}\begin{pmatrix} 4 & -8 \\ 3 & -5 \end{pmatrix}$

$= \frac{1}{4}\begin{pmatrix} 4 & -8 \\ 3 & -5 \end{pmatrix}$ atau $\begin{pmatrix} 1 & -2 \\ \frac{3}{4} & -\frac{5}{4} \end{pmatrix}$

3. $\mathbf{R}^{-1} = \frac{1}{4(-3)-(-2)(5)}\begin{pmatrix}-3 & 2\\ -5 & 4\end{pmatrix}$

$= -\frac{1}{2}\begin{pmatrix}-3 & 2\\ -5 & 4\end{pmatrix}$ atau $\begin{pmatrix}\frac{3}{2} & -1\\ \frac{5}{2} & -2\end{pmatrix}$

4. $\mathbf{S}^{-1} = \frac{1}{3(3)-2(6)}\begin{pmatrix}3 & -2\\ -6 & 3\end{pmatrix}$

$= -\frac{1}{3}\begin{pmatrix}3 & -2\\ -6 & 3\end{pmatrix}$ atau $\begin{pmatrix}-1 & \frac{2}{3}\\ 2 & -1\end{pmatrix}$

B

1. $\boldsymbol{B} = \begin{pmatrix}3 & 5\\ 2 & 3\end{pmatrix}^{-1}$

$= \frac{1}{3(3)-5(2)}\begin{pmatrix}3 & -5\\ -2 & 3\end{pmatrix}$

$= \frac{1}{-1}\begin{pmatrix}3 & -5\\ -2 & 3\end{pmatrix}$

$= \begin{pmatrix}-3 & 5\\ 2 & -3\end{pmatrix}$

2. $\boldsymbol{C} = \begin{pmatrix}-7 & -2\\ 6 & 2\end{pmatrix}^{-1}$

$= \frac{1}{-7(2)-(-2)(6)}\begin{pmatrix}2 & 2\\ -6 & -7\end{pmatrix}$

$= -\frac{1}{2}\begin{pmatrix}2 & 2\\ -6 & -7\end{pmatrix}$ atau $\begin{pmatrix}-1 & -1\\ 3 & \frac{7}{2}\end{pmatrix}$

3. $m\begin{pmatrix}-4 & p\\ -3 & 5\end{pmatrix} = \begin{pmatrix}5 & -7\\ 3 & -4\end{pmatrix}^{-1}$

$= \frac{1}{5(-4)-(-7)(3)}\begin{pmatrix}-4 & 7\\ -3 & 5\end{pmatrix}$

$\therefore p = 7, \quad m = \frac{1}{-20+21}$

$= 1$

4. $\frac{1}{k}\begin{pmatrix}8 & -2\\ -3 & m\end{pmatrix} = \begin{pmatrix}1 & 2\\ 3 & 8\end{pmatrix}^{-1}$

$= \frac{1}{1(8)-2(3)}\begin{pmatrix}8 & -2\\ -3 & 1\end{pmatrix}$

$\therefore m = 1, \quad k = 8 - 6$

$= 2$

5. $\frac{1}{2}\begin{pmatrix}4 & -2\\ -13 & h\end{pmatrix} = \begin{pmatrix}h & 2\\ 13 & k\end{pmatrix}^{-1}$

$= \frac{1}{hk-2(13)}\begin{pmatrix}k & -2\\ -13 & h\end{pmatrix}$

$\therefore k = 4, \quad hk - 26 = 2$

$4h = 28$

$h = 7$

4.8

A

1. $-2x + 3y = 13$

$3x - 4y = -18$

$\begin{pmatrix}-2 & 3\\ 3 & -4\end{pmatrix}\begin{pmatrix}x\\ y\end{pmatrix} = \begin{pmatrix}13\\ -18\end{pmatrix}$

$\begin{pmatrix}x\\ y\end{pmatrix} = \frac{1}{-2(-4)-3(3)}\begin{pmatrix}-4 & -3\\ -3 & -2\end{pmatrix}\begin{pmatrix}13\\ -18\end{pmatrix}$

$= \frac{1}{8-9}\begin{pmatrix}-4(13)+(-3)(-18)\\ -3(13)+(-2)(-18)\end{pmatrix}$

$= \frac{1}{-1}\begin{pmatrix}2\\ -3\end{pmatrix}$

$= \begin{pmatrix}-2\\ 3\end{pmatrix}$

$\therefore x = -2, y = 3$

2. $-3x + 5y = -18$

$x - 3y = 10$

$\begin{pmatrix}-3 & 5\\ 1 & -3\end{pmatrix}\begin{pmatrix}x\\ y\end{pmatrix} = \begin{pmatrix}-18\\ 10\end{pmatrix}$

$\begin{pmatrix}x\\ y\end{pmatrix} = \frac{1}{-3(-3)-5(1)}\begin{pmatrix}-3 & -5\\ -1 & -3\end{pmatrix}\begin{pmatrix}-18\\ 10\end{pmatrix}$

$= \frac{1}{9-5}\begin{pmatrix}-3(-18)+(-5)(10)\\ -1(-18)+(-3)(10)\end{pmatrix}$

$= \frac{1}{4}\begin{pmatrix}4\\ -12\end{pmatrix} = \begin{pmatrix}1\\ -3\end{pmatrix}$

$\therefore x = 1, y = -3$

3. $x = 5y - 8 \Rightarrow x - 5y = -8$

$3x - 2y = -11$

$\begin{pmatrix}1 & -5\\ 3 & -2\end{pmatrix}\begin{pmatrix}x\\ y\end{pmatrix} = \begin{pmatrix}-8\\ -11\end{pmatrix}$

$\begin{pmatrix}x\\ y\end{pmatrix} = \frac{1}{1(-2)-(-5)(3)}\begin{pmatrix}-2 & 5\\ -3 & 1\end{pmatrix}\begin{pmatrix}-8\\ -11\end{pmatrix}$

$= \frac{1}{-2+15}\begin{pmatrix}-2(-8)+5(-11)\\ -3(-8)+1(-11)\end{pmatrix}$

$= \frac{1}{13}\begin{pmatrix}-39\\ 13\end{pmatrix} = \begin{pmatrix}-3\\ 1\end{pmatrix}$

$\therefore x = -3, y = 1$

B

Katakan harga sebatang pen ialah RMx dan harga sebiji pemadam ialah RMy.

$2x - 3y = 5$

$3x + 4y = 16$

$\begin{pmatrix}2 & -3\\ 3 & 4\end{pmatrix}\begin{pmatrix}x\\ y\end{pmatrix} = \begin{pmatrix}5\\ 16\end{pmatrix}$

$\begin{pmatrix}x\\ y\end{pmatrix} = \frac{1}{2(4)-(-3)(3)}\begin{pmatrix}4 & 3\\ -3 & 2\end{pmatrix}\begin{pmatrix}5\\ 16\end{pmatrix}$

$= \frac{1}{17}\begin{pmatrix}20+48\\ -15+32\end{pmatrix}$

$= \frac{1}{17}\begin{pmatrix}68\\ 17\end{pmatrix} = \begin{pmatrix}4\\ 1\end{pmatrix}$

$\therefore$ Harga sebatang pen = RM4

Harga sebiji pemadam = RM1

Praktis Formatif: Kertas 1

1. A

$$\begin{pmatrix}6 & 2\\7 & 5\end{pmatrix}+\begin{pmatrix}3 & 7\\6 & 5\end{pmatrix}-\begin{pmatrix}5 & 4\\3 & 9\end{pmatrix}+\begin{pmatrix}1 & 5\\7 & 8\end{pmatrix}$$
$$=\begin{pmatrix}6+3-5+1 & 2+7-4+5\\7+6-3+7 & 5+5-9+8\end{pmatrix}$$
$$=\begin{pmatrix}5 & 10\\17 & 9\end{pmatrix}$$

2. D

$$\mathbf{P}+\begin{pmatrix}-2 & 4\\3 & 2\end{pmatrix}=\begin{pmatrix}3 & 5\\2 & 0\end{pmatrix}$$
$$\mathbf{P}=\begin{pmatrix}3 & 5\\2 & 0\end{pmatrix}-\begin{pmatrix}-2 & 4\\3 & 2\end{pmatrix}$$
$$=\begin{pmatrix}5 & 1\\-1 & -2\end{pmatrix}$$

3. B

$$\begin{pmatrix}14 & 0\\7 & -6\end{pmatrix}-2\mathbf{Q}=5\begin{pmatrix}2 & -\frac{4}{5}\\3 & -4\end{pmatrix}$$
$$2\mathbf{Q}=\begin{pmatrix}14 & 0\\7 & -6\end{pmatrix}-\begin{pmatrix}10 & -4\\15 & -20\end{pmatrix}$$
$$=\begin{pmatrix}4 & 4\\-8 & 14\end{pmatrix}$$
$$\mathbf{Q}=\frac{1}{2}\begin{pmatrix}4 & 4\\-8 & 14\end{pmatrix}$$
$$=\begin{pmatrix}2 & 2\\-4 & 7\end{pmatrix}$$

4. B

$(6\ \ -3\ \ 4)-(2\ \ 5\ \ -1)+3(-2\ \ 3\ \ 7)$
$=(6\ \ -3\ \ 4)-(2\ \ 5\ \ -1)+(-6\ \ 9\ \ 21)$
$=(-2\ \ 1\ \ 26)$

5. C

$$\begin{pmatrix}3\\2\end{pmatrix}-\begin{pmatrix}4\\-5\end{pmatrix}+\frac{1}{3}\begin{pmatrix}-9\\-6\end{pmatrix}$$
$$=\begin{pmatrix}3\\2\end{pmatrix}-\begin{pmatrix}4\\-5\end{pmatrix}+\begin{pmatrix}-3\\-2\end{pmatrix}$$
$$=\begin{pmatrix}-4\\5\end{pmatrix}$$

6. D

$$\begin{pmatrix}-4\\3\end{pmatrix}+\begin{pmatrix}-2\\5\end{pmatrix}+2\begin{pmatrix}-3\\4\end{pmatrix}=\begin{pmatrix}-4\\3\end{pmatrix}+\begin{pmatrix}-2\\5\end{pmatrix}+\begin{pmatrix}-6\\8\end{pmatrix}$$
$$=\begin{pmatrix}-12\\16\end{pmatrix}$$

7. D

$$\begin{pmatrix}5 & 2\\7 & 1\end{pmatrix}+3\begin{pmatrix}4 & 0\\5 & -2\end{pmatrix}-\begin{pmatrix}-2 & 4\\-1 & 5\end{pmatrix}$$
$$=\begin{pmatrix}5 & 2\\7 & 1\end{pmatrix}+\begin{pmatrix}12 & 0\\15 & -6\end{pmatrix}-\begin{pmatrix}-2 & 4\\-1 & 5\end{pmatrix}$$
$$=\begin{pmatrix}19 & -2\\23 & -10\end{pmatrix}$$

8. B

$$\begin{pmatrix}x\\3\end{pmatrix}-4\begin{pmatrix}-1\\5\end{pmatrix}=\begin{pmatrix}6\\y\end{pmatrix}$$
$$\begin{pmatrix}x\\3\end{pmatrix}-\begin{pmatrix}-4\\20\end{pmatrix}=\begin{pmatrix}6\\y\end{pmatrix}$$
$x+4=6$ $\qquad$ $3-20=y$
$x=2$ $\qquad$ $y=-17$

9. B

$$p\begin{pmatrix}4\\-3\end{pmatrix}+\begin{pmatrix}3\\7\end{pmatrix}=\begin{pmatrix}p\\10\end{pmatrix}$$
$-3p+7=10$
$3p=7-10$
$p=-\frac{3}{3}$
$=-1$

10. A

$3(4\ \ p)+q(5\ \ 6)=(27\ \ 24)$
$12+5q=27$ $\qquad$ $3p+6q=24$
$5q=15$ $\qquad$ $3p=24-18$
$q=3$ $\qquad$ $p=2$
$p+q=2+3$
$=5$

11. B

$$3\begin{pmatrix}m & -2\\4 & -3\end{pmatrix}-\frac{1}{2}\begin{pmatrix}-8 & 12\\n & -4\end{pmatrix}=\begin{pmatrix}10 & -12\\8 & -7\end{pmatrix}$$
$3m-\frac{1}{2}(-8)=10$ $\qquad$ $12-\frac{1}{2}n=8$
$3m+4=10$ $\qquad$ $\frac{1}{2}n=4$
$3m=6$ $\qquad$ $n=8$
$m=2$

12. A

$$\begin{pmatrix}3 & -2\\4 & 8\end{pmatrix}-\begin{pmatrix}1 & -6\\-2 & 2\end{pmatrix}=2\begin{pmatrix}1 & 2\\3 & n\end{pmatrix}$$
$8-2=2n$
$2n=6$
$n=3$

13. B

$$\begin{pmatrix}2 & 1\\5 & 4\end{pmatrix}\begin{pmatrix}-1\\3\end{pmatrix}=\begin{pmatrix}-2+3\\-5+12\end{pmatrix}$$
$$=\begin{pmatrix}1\\7\end{pmatrix}$$

14. C

$$\begin{pmatrix}-3 & 5\\4 & -1\end{pmatrix}\begin{pmatrix}1 & 2\\0 & 3\end{pmatrix}$$
$$=\begin{pmatrix}-3+0 & -6+15\\4+0 & 8-3\end{pmatrix}$$
$$=\begin{pmatrix}-3 & 9\\4 & 5\end{pmatrix}$$

15. B

$$(2 \quad -2 \quad 0)\begin{pmatrix} 4 & 2 \\ -2 & 0 \\ 3 & 5 \end{pmatrix}$$
$$= (8 + 4 + 0 \quad 4 + 0 + 0)$$
$$= (12 \quad 4)$$

16. A

$$\begin{pmatrix} 4 & \frac{1}{6} \end{pmatrix}\begin{pmatrix} 0 & -3 \\ 12 & 6 \end{pmatrix} = (0 + 2 \quad -12 + 1)$$
$$= (2 \quad -11)$$

17. D

$$(9 \quad 3)\begin{pmatrix} x \\ -6 \end{pmatrix} = (27)$$
$$9x - 18 = 27$$
$$9x = 45$$
$$x = 5$$

18. C

$$(2p \quad 5)\begin{pmatrix} 3 \\ -4 \end{pmatrix} = (16)$$
$$6p - 20 = 16$$
$$6p = 36$$
$$p = 6$$

19. B

$$\begin{pmatrix} -4 \\ 3 \end{pmatrix}(2x \quad 5) = \begin{pmatrix} 24 & -20 \\ -18 & 15 \end{pmatrix}$$
$$-4(2x) = 24$$
$$-8x = 24$$
$$x = -3$$

20. C

$$\begin{pmatrix} 4 \\ -2 \end{pmatrix}\begin{pmatrix} -1 & 0 \\ 1 & 5 \end{pmatrix}$$

$2 \times 1 \quad 2 \times 2$

↑ ↑

Tidak sama

∴ Maka, pasangan matriks ini tidak boleh didarab.

21. D

$$\begin{pmatrix} p & q \\ r & s \end{pmatrix}^{-1} = \frac{1}{ps - qr}\begin{pmatrix} s & -q \\ -r & p \end{pmatrix}$$
$$= \frac{1}{2}\begin{pmatrix} -2 & 1 \\ 6 & -4 \end{pmatrix}$$

∴ $p = -4$, $q = -1$, $r = -6$, $s = -2$

22. A

$$\begin{pmatrix} 5 & 6 \\ 7 & 10 \end{pmatrix}\begin{pmatrix} 6.50 \\ 9 \end{pmatrix} = \begin{pmatrix} x \\ y \end{pmatrix}$$

Praktis Formatif: Kertas 2

1. (a) $m\begin{pmatrix} 2 & -3 \\ n & 5 \end{pmatrix} = \begin{pmatrix} 5 & 3 \\ -4 & 2 \end{pmatrix}^{-1}$

$$= \frac{1}{5(2) - 3(-4)}\begin{pmatrix} 2 & -3 \\ 4 & 5 \end{pmatrix}$$
$$= \frac{1}{10 + 12}\begin{pmatrix} 2 & -3 \\ 4 & 5 \end{pmatrix}$$
$$= \frac{1}{22}\begin{pmatrix} 2 & -3 \\ 4 & 5 \end{pmatrix}$$

∴ $m = \frac{1}{22}$, $n = 4$

(b) $\begin{pmatrix} 5 & 3 \\ -4 & 2 \end{pmatrix}\begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 26 \\ -12 \end{pmatrix}$

$$\begin{pmatrix} x \\ y \end{pmatrix} = \frac{1}{22}\begin{pmatrix} 2 & -3 \\ 4 & 5 \end{pmatrix}\begin{pmatrix} 26 \\ -12 \end{pmatrix}$$
$$= \frac{1}{22}\begin{pmatrix} 2(26) + (-3)(-12) \\ 4(26) + 5(-12) \end{pmatrix}$$
$$= \frac{1}{22}\begin{pmatrix} 88 \\ 44 \end{pmatrix} = \begin{pmatrix} 4 \\ 2 \end{pmatrix}$$

∴ $x = 4$, $y = 2$

2. (a) $\mathbf{M} = \begin{pmatrix} 4 & 2 \\ 5 & 3 \end{pmatrix}^{-1}$

$$= \frac{1}{4(3) - 2(5)}\begin{pmatrix} 3 & -2 \\ -5 & 4 \end{pmatrix}$$
$$= \frac{1}{12 - 10}\begin{pmatrix} 3 & -2 \\ -5 & 4 \end{pmatrix}$$
$$= \frac{1}{2}\begin{pmatrix} 3 & -2 \\ -5 & 4 \end{pmatrix} \text{ atau } \begin{pmatrix} \frac{3}{2} & -1 \\ -\frac{5}{2} & 2 \end{pmatrix}$$

(b) $\begin{pmatrix} 4 & 2 \\ 5 & 3 \end{pmatrix}\begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 2 \\ 4 \end{pmatrix}$

$$\begin{pmatrix} x \\ y \end{pmatrix} = \frac{1}{2}\begin{pmatrix} 3 & -2 \\ -5 & 4 \end{pmatrix}\begin{pmatrix} 2 \\ 4 \end{pmatrix}$$
$$= \frac{1}{2}\begin{pmatrix} 3(2) + (-2)(4) \\ -5(2) + 4(4) \end{pmatrix}$$
$$= \frac{1}{2}\begin{pmatrix} -2 \\ 6 \end{pmatrix}$$
$$= \begin{pmatrix} -1 \\ 3 \end{pmatrix}$$

∴ $x = -1$, $y = 3$

3. (a) $\begin{pmatrix} 4 & -3 \\ 5 & -2 \end{pmatrix}^{-1} = \frac{1}{4(-2) - (-3)(5)}\begin{pmatrix} -2 & 3 \\ -5 & 4 \end{pmatrix}$

$$= \frac{1}{-8 + 15}\begin{pmatrix} -2 & 3 \\ -5 & 4 \end{pmatrix}$$
$$= \frac{1}{7}\begin{pmatrix} -2 & 3 \\ -5 & 4 \end{pmatrix} \text{ atau } \begin{pmatrix} -\frac{2}{7} & \frac{3}{7} \\ -\frac{5}{7} & \frac{4}{7} \end{pmatrix}$$

(b) $\begin{pmatrix}4 & -3\\5 & -2\end{pmatrix}\begin{pmatrix}x\\y\end{pmatrix}=\begin{pmatrix}15\\17\end{pmatrix}$

$$\begin{pmatrix}x\\y\end{pmatrix}=\frac{1}{7}\begin{pmatrix}-2 & 3\\-5 & 4\end{pmatrix}\begin{pmatrix}15\\17\end{pmatrix}$$

$$=\frac{1}{7}\begin{pmatrix}-2(15)+3(17)\\-5(15)+4(17)\end{pmatrix}$$

$$=\frac{1}{7}\begin{pmatrix}21\\-7\end{pmatrix}$$

$$=\begin{pmatrix}3\\-1\end{pmatrix}$$

$\therefore x = 3, y = -1$

4. (a) $\begin{pmatrix}4 & 6\\3 & 5\end{pmatrix}^{-1}=\frac{1}{4(5)-6(3)}\begin{pmatrix}5 & -6\\-3 & 4\end{pmatrix}$

$$=\frac{1}{20-18}\begin{pmatrix}5 & -6\\-3 & 4\end{pmatrix}$$

$$=\frac{1}{2}\begin{pmatrix}5 & -6\\-3 & 4\end{pmatrix}\text{ atau }\begin{pmatrix}\frac{5}{2} & -3\\-\frac{3}{2} & 2\end{pmatrix}$$

(b) Katakan RMx ialah harga sebiji betik dan RMy ialah harga sebiji jambu batu.

$$4x + 6y = 38$$
$$3x + 5y = 30$$
$$\begin{pmatrix}4 & 6\\3 & 5\end{pmatrix}\begin{pmatrix}x\\y\end{pmatrix}=\begin{pmatrix}38\\30\end{pmatrix}$$

$$\begin{pmatrix}x\\y\end{pmatrix}=\frac{1}{2}\begin{pmatrix}5 & -6\\-3 & 4\end{pmatrix}\begin{pmatrix}38\\30\end{pmatrix}$$

$$=\frac{1}{2}\begin{pmatrix}5(38)-6(30)\\-3(38)+4(30)\end{pmatrix}$$

$$=\frac{1}{2}\begin{pmatrix}10\\6\end{pmatrix}$$

$$=\begin{pmatrix}5\\3\end{pmatrix}$$

$\therefore$ Sebiji betik berharga RM5 dan sebiji jambu batu berharga RM3.

5. (a) $x + y = 9$
$6x + 4y = 44$

(b) $\begin{pmatrix}1 & 1\\6 & 4\end{pmatrix}\begin{pmatrix}x\\y\end{pmatrix}=\begin{pmatrix}9\\44\end{pmatrix}$

$$\frac{1}{4-6}\begin{pmatrix}4 & -1\\-6 & 1\end{pmatrix}\begin{pmatrix}x\\y\end{pmatrix}=\begin{pmatrix}-2 & \frac{1}{2}\\3 & -\frac{1}{2}\end{pmatrix}\begin{pmatrix}9\\44\end{pmatrix}$$

$$\begin{pmatrix}x\\y\end{pmatrix}=\begin{pmatrix}-18+22\\27-22\end{pmatrix}$$

$$\begin{pmatrix}x\\y\end{pmatrix}=\begin{pmatrix}4\\5\end{pmatrix}$$

$\therefore x = 4, y = 5$

6. Katakan RMx ialah harga bagi satu kupon makanan dan RMy ialah harga bagi satu kupon minuman.

$$3x + 4y = 27$$
$$2x + 5y = 25$$
$$\begin{pmatrix}3 & 4\\2 & 5\end{pmatrix}\begin{pmatrix}x\\y\end{pmatrix}=\begin{pmatrix}27\\25\end{pmatrix}$$

$$\frac{1}{15-8}\begin{pmatrix}5 & -4\\-2 & 3\end{pmatrix}\begin{pmatrix}x\\y\end{pmatrix}=\frac{1}{7}\begin{pmatrix}5 & -4\\-2 & 3\end{pmatrix}\begin{pmatrix}27\\25\end{pmatrix}$$

$$\begin{pmatrix}1 & 0\\0 & 1\end{pmatrix}\begin{pmatrix}x\\y\end{pmatrix}=\frac{1}{7}\begin{pmatrix}5 & -4\\-2 & 3\end{pmatrix}\begin{pmatrix}27\\25\end{pmatrix}$$

$$\begin{pmatrix}x\\y\end{pmatrix}=\begin{pmatrix}\frac{135}{7}-\frac{100}{7}\\-\frac{54}{7}+\frac{75}{7}\end{pmatrix}$$

$$=\begin{pmatrix}5\\3\end{pmatrix}$$

$\therefore$ Harga bagi satu kupon makanan = RM5
Harga bagi satu kupon minuman = RM3

7. Katakan bilangan kanak-kanak = x dan bilangan orang dewasa = y dalam kumpulan itu.

$$x + y = 50$$
$$10x + 30y = 600$$
$$\begin{pmatrix}1 & 1\\10 & 30\end{pmatrix}\begin{pmatrix}x\\y\end{pmatrix}=\begin{pmatrix}50\\600\end{pmatrix}$$

$$\begin{pmatrix}x\\y\end{pmatrix}=\frac{1}{1(30)-1(10)}\begin{pmatrix}30 & -1\\-10 & 1\end{pmatrix}\begin{pmatrix}50\\600\end{pmatrix}$$

$$=\frac{1}{20}\begin{pmatrix}30(50)+(-1)(600)\\-10(50)+1(600)\end{pmatrix}$$

$$=\frac{1}{20}\begin{pmatrix}900\\100\end{pmatrix}$$

$$=\begin{pmatrix}45\\5\end{pmatrix}$$

Maka, bilangan kanak-kanak ialah 45 orang dan bilangan orang dewasa ialah 5 orang.

FOKUS KBAT

(a) $x + y = 12$
$7x + 4y = 72$

(b) $\begin{pmatrix}1 & 1\\7 & 4\end{pmatrix}\begin{pmatrix}x\\y\end{pmatrix}=\begin{pmatrix}12\\72\end{pmatrix}$

$$\frac{1}{4-7}\begin{pmatrix}4 & -1\\-7 & 1\end{pmatrix}\begin{pmatrix}x\\y\end{pmatrix}=\begin{pmatrix}-\frac{4}{3} & \frac{1}{3}\\\frac{7}{3} & -\frac{1}{3}\end{pmatrix}\begin{pmatrix}12\\72\end{pmatrix}$$

$$\begin{pmatrix}x\\y\end{pmatrix}=\begin{pmatrix}-16+24\\28-24\end{pmatrix}$$

$$\begin{pmatrix}x\\y\end{pmatrix}=\begin{pmatrix}8\\4\end{pmatrix}$$

$\therefore x = 8, y = 4$

JAWAPAN

BAB 5: UBAHAN

5.1

A

1.

x	2	4	6	8
y	6	12	15	20
$\frac{y}{x^2}$	$\frac{6}{2^2}=\frac{3}{2}$	$\frac{12}{4^2}=\frac{3}{4}$	$\frac{15}{6^2}=\frac{5}{12}$	$\frac{20}{8^2}=\frac{5}{16}$

y tidak berubah secara langsung dengan x^2.
y does not vary directly as x^2.

2.

x	1	2	3	4
y	3	24	81	192
$\frac{y}{x^3}$	$\frac{3}{1^3}=3$	$\frac{24}{2^3}=3$	$\frac{81}{3^3}=3$	$\frac{192}{4^3}=3$

y berubah secara langsung dengan x^3.
y varies directly as x^3.

3.

x	9	16	25	36
y	6	8	10	12
$\frac{y}{\sqrt{x}}$	$\frac{6}{\sqrt{9}}=2$	$\frac{8}{\sqrt{16}}=2$	$\frac{10}{\sqrt{25}}=2$	$\frac{12}{\sqrt{36}}=2$

y berubah secara langsung dengan $\sqrt{x}$.
y varies directly as $\sqrt{x}$.

B

1. (i) $y \propto x$
(ii) $y = kx$

2. (i) $A \propto l^2$
(ii) $A = kl^2$

3. (i) $V \propto r^3$
(ii) $V = kr^3$

4. (i) $E \propto \sqrt{F}$
(ii) $E = k\sqrt{F}$

5. (i) $F \propto \sqrt{G}$
(ii) $F = k\sqrt{G}$

C

1. (a) $y = kx$
$36 = k(8)$
$k = \frac{9}{2}$
$\therefore y = \frac{9}{2}x$

(b) $y = \frac{9}{2}(12)$
$= 54$

2. (a) $p = kq$
$4 = k\left(\frac{1}{6}\right)$
$k = 24$
$\therefore p = 24q$

(b) $12 = 24q$
$q = \frac{12}{24}$
$= \frac{1}{2}$

3. (a) $18 = k(64)^{\frac{1}{2}}$
$18 = 8k$
$k = \frac{9}{4}$
$\therefore y = \frac{9}{4}(x-5)^{\frac{1}{2}}$

(b) $y = \frac{9}{4}(149-5)^{\frac{1}{2}}$
$= \frac{9}{4} \times 12$
$= 27$

4. (a) $P = kQ^3$
$128 = k(8)^3$
$k = \frac{128}{8^3}$
$= \frac{1}{4}$
$\therefore P = \frac{1}{4}Q^3$

(b) $6.75 = \frac{1}{4}Q^3$
$Q^3 = 27$
$Q = \sqrt[3]{27}$
$= 3$

5. (a) $y = kx^2$
$\frac{4}{5} = k\left(\frac{1}{9}\right)$
$k = \frac{36}{5}$
$\therefore y = \frac{36}{5}x^2$

(b) $p = \frac{36}{5} \times 5^2$
$= 180$

6. (a) $V = k\sqrt{W}$

$26 = k\sqrt{169}$

$k = 2$

$\therefore V = 2\sqrt{W}$

(b) $m = 2 \times \sqrt{81}$

$= 2 \times 9$

$= 18$

D

(a) $A \propto r^2$

$A = kr^2$

$44.1 = k \times 10.5^2$

$k = \dfrac{44.1}{10.5^2}$

$= 0.4$

$\therefore A = 0.4r^2$

(b) $A = 0.4 \times 21^2$

$= 176.4 \text{ cm}^2$

5.2

A

1.

x	1	2	3	4
y	16	8	4	2
x^2y	$1^2(16)$ $= 16$	$2^2(8)$ $= 32$	$3^2(4)$ $= 36$	$4^2(2)$ $= 32$

y tidak berubah secara songsang dengan x^2.

y does not vary inversely as x^2.

2.

x	1	2	3	4
y	27	3	2	1
x^3y	$1^3(27)$ $= 27$	$2^3(3)$ $= 24$	$3^3(2)$ $= 54$	$4^3(1)$ $= 64$

y tidak berubah secara songsang dengan x^3.

y does not vary inversely as x^3.

3.

x	4	9	16	25
y	30	20	15	12
$\sqrt{x}y$	$\sqrt{4}\,(30)$ $= 60$	$\sqrt{9}\,(20)$ $= 60$	$\sqrt{16}\,(15)$ $= 60$	$\sqrt{25}\,(12)$ $= 60$

y berubah secara songsang dengan $\sqrt{x}$.

y varies inversely as $\sqrt{x}$.

B

1. (i) $s \propto \dfrac{1}{v}$ (ii) $s = \dfrac{k}{v}$

2. (i) $M \propto \dfrac{1}{N^3}$ (ii) $M = \dfrac{k}{N^3}$

3. (i) $L \propto \dfrac{1}{j^2}$ (ii) $L = \dfrac{k}{j^2}$

4. (i) $y \propto \dfrac{1}{\sqrt{x}}$ (ii) $y = \dfrac{k}{\sqrt{x}}$

5. (i) $w \propto \dfrac{1}{\ell^3}$ (ii) $w = \dfrac{k}{\ell^3}$

C

1. (a) $y = \dfrac{k}{x}$

$\dfrac{1}{2} = \dfrac{k}{8}$

$k = 4$

$\therefore y = \dfrac{4}{x}$

(b) $5 = \dfrac{4}{x}$

$x = \dfrac{4}{5}$

2. (a) $k = pr = 27$

$\therefore p = \dfrac{27}{r}$

$= \dfrac{27}{9}$

$= 3$

(b) $\dfrac{1}{3} = \dfrac{27}{r}$

$r = 27 \times 3$

$= 81$

3. (a) $y = \dfrac{k}{x^3}$

$\dfrac{3}{4} = \dfrac{k}{4^3}$

$k = \dfrac{3}{4} \times 64$

$= 48$

$\therefore y = \dfrac{48}{x^3}$

(b) $y = \dfrac{48}{6^3}$

$= \dfrac{48}{216}$

$= \dfrac{2}{9}$

4. (a) $m = \dfrac{k}{\sqrt{n}}$

$5 = \dfrac{k}{\sqrt{2\ 500}}$

$k = 5 \times 50$

$= 250$

$\therefore m = \dfrac{250}{\sqrt{n}}$

(b) $10 = \frac{250}{\sqrt{n}}$

$\sqrt{n} = \frac{250}{10}$

$= 25$

$n = 25^2$

$= 625$

5. (a) $t = \frac{k}{w^2}$

$3 = \frac{k}{2^2}$

$k = 3 \times 4$

$= 12$

$\therefore t = \frac{12}{w^2}$

(b) $75 = \frac{12}{r^2}$

$r^2 = \frac{12}{75}$

$= \frac{4}{25}$

$r = \sqrt{\frac{4}{25}}$

$= \frac{2}{5}$ atau 0.4

6. $4 = \frac{k}{2^3}$

$k = 4 \times 8$

$= 32$

$y = \frac{32}{x^3}$

$p = \frac{32}{3^3}$

$= \frac{32}{27}$

$= 1\frac{5}{27}$

D

$t \propto \frac{1}{p^2}$

$t = \frac{k}{p^2}$

$6 = \frac{k}{4.5^2}$

$k = 121.5$

$\therefore t = \frac{121.5}{p^2}$

$t = \frac{121.5}{3^2}$

$= 13.5$ cm

5.3

A

1. (i) $w \propto xy$
(ii) $w = kxy$

2. (i) $Z \propto \frac{1}{X\sqrt{Y}}$

(ii) $Z = \frac{k}{X\sqrt{Y}}$

3. (i) $e \propto \frac{f}{g}$

(ii) $e = \frac{kf}{g}$

4. (i) $s \propto \frac{t^2}{u}$

(ii) $s = \frac{kt^2}{u}$

5. (i) $y \propto vw^{\frac{1}{2}}$
(ii) $y = kvw^{\frac{1}{2}}$

6. (i) $P \propto \frac{Q}{R^2}$

(ii) $P = \frac{kQ}{R^2}$

7. (i) $x \propto \frac{1}{z\sqrt{y}}$

(ii) $x = \frac{k}{z\sqrt{y}}$

8. (i) $t \propto \frac{u^3}{\sqrt{v}}$

(ii) $t = \frac{ku^3}{\sqrt{v}}$

9. (i) $p \propto qr^3$
(ii) $p = kqr^3$

10. (i) $f \propto \frac{\sqrt{g}}{h^3}$

(ii) $f = \frac{k\sqrt{g}}{h^3}$

B

1. (a) $L = \dfrac{k}{M\sqrt{p}}$

$\dfrac{1}{2} = \dfrac{k}{3\sqrt{64}}$

$k = \dfrac{1}{2} \times 24$

$= 12$

$\therefore L = \dfrac{12}{M\sqrt{p}}$

(b) $L = \dfrac{12}{3\sqrt{49}}$

$= \dfrac{4}{7}$

2. (a) $w = \dfrac{kx^2}{y}$

$15 = \dfrac{k(3^2)}{9}$

$k = 15$

$\therefore w = \dfrac{15x^2}{y}$

(b) $12 = \dfrac{15(4^2)}{m}$

$m = \dfrac{240}{12}$

$= 20$

3. (a) $f = \dfrac{kg^3}{\sqrt{h}}$

$24 = \dfrac{k(2^3)}{\sqrt{36}}$

$k = 24 \times \dfrac{6}{8}$

$= 18$

$\therefore f = \dfrac{18g^3}{\sqrt{h}}$

(b) $162 = \dfrac{18g^3}{\sqrt{9}}$

$g^3 = 162 \times \dfrac{3}{18}$

$= 27$

$g = \sqrt[3]{27}$

$= 3$

D

(a) $t \propto \dfrac{A}{p}$

$t = \dfrac{kA}{p}$

$4 = \dfrac{360k}{8}$

$k = \dfrac{4}{45}$

$\therefore t = \dfrac{4A}{45p}$

(b) $5 = \dfrac{4 \times 675}{45p}$

$p = 12$

Praktis Formatif: Kertas 1

1. C

$g \propto f^3$

2. D

$w \propto p^3$

$w = kp^3$

$12 = k(3)^3$

$k = \dfrac{12}{27}$

$= \dfrac{4}{9}$

$w = \dfrac{4}{9}p^3$

$96 = \dfrac{4}{9}p^3$

$p^3 = 216$

$p = \sqrt[3]{216}$

$= 6$

3. A

$Q \propto \sqrt{P}$

$Q = k\sqrt{P}$

$4 = k\sqrt{\dfrac{1}{9}}$

$k = 12$

$Q = 12\sqrt{P}$

$3 = 12\sqrt{m}$

$\sqrt{m} = \dfrac{3}{12}$

$= \dfrac{1}{4}$

$m = \left(\dfrac{1}{4}\right)^2$

$= \dfrac{1}{16}$

4. B

$I \propto j^3$

$I = kj^3$

$k = \dfrac{I}{j^3}$

5. D

x	1	2	3	4	5
y	2	16	54	128	250
$\frac{y}{x^3}$	$\frac{2}{1^3} = 2$	$\frac{16}{3^3} = 2$	$\frac{54}{3^3} = 2$	$\frac{128}{4^3} = 2$	$\frac{250}{5^2} = 2$

$\therefore y = 2x^3$

6. D

$V \propto \frac{1}{W^2}$

$V = \frac{k}{W^2}$

7. C

$t \propto \frac{1}{\sqrt{s}}$

$t \propto \frac{k}{\sqrt{s}}$

$k = 2 \times \sqrt{100}$

$= 20$

$\therefore t = \frac{20}{\sqrt{s}}$

8. B

$y \propto \frac{1}{x}$

$y = \frac{k}{x}$

$8 = \frac{k}{5}$

$k = 40$

$y = \frac{40}{x}$

$n = \frac{40}{16}$

$= 2.5$

9. A

$p \propto \frac{1}{\sqrt[3]{q}}$

$p = \frac{k}{\sqrt[3]{q}}$

$k = 4 \times \sqrt[3]{\frac{1}{125}}$

$= 4 \times \frac{1}{5}$

$= \frac{4}{5}$

$p = \frac{4}{5 \times \sqrt[3]{q}}$

$= \frac{4}{5 \times \sqrt[3]{512}}$

$= \frac{4}{5 \times 8}$

$= \frac{4}{40}$

$= \frac{1}{10}$

10. C

$t \propto \frac{1}{y}$

$t = \frac{k}{y}$

$165 = \frac{k}{9}$

$= 1\ 485$

$t = \frac{1\ 485}{y}$

$= \frac{1\ 485}{15}$

$= 99$

11. D

$y \propto \frac{1}{3x - 2}$

$y = \frac{k}{3x - 2}$

$2 = \frac{k}{3(3) - 2}$

$k = 2 \times 7$

$= 14$

$y = \frac{14}{3x - 2}$

$-1 = \frac{14}{3x - 2}$

$3x - 2 = -12$

$x = -4$

12. D

$p \propto \frac{q^3}{\sqrt{r}} \Rightarrow p \propto \frac{q^3}{r^{\frac{1}{2}}}$

$\therefore v = 3,\ w = \frac{1}{2}$

13. A

$p = \frac{kq^{\frac{1}{2}}}{r^3}$

$3 = \frac{k(144)^{\frac{1}{2}}}{2^3}$

$k = 2$

$p = \frac{2q^{\frac{1}{2}}}{r^3}$

$= \frac{2(36)^{\frac{1}{2}}}{4^3}$

$= \frac{3}{16}$

14. B

$\frac{yz^2}{x} = 8$

$y = \frac{8x}{z^2}$

$\therefore y$ berubah secara langsung dengan x dan secara songsang dengan kuasa dua x.

15. B

$$P \propto \frac{Q}{\sqrt{R}}$$

$$P = \frac{kQ}{\sqrt{R}}$$

$$k = \frac{k(5)}{\sqrt{9}}$$

$$= \frac{18}{5}$$

$$P = \frac{18Q}{5\sqrt{R}}$$

$$k = \frac{18\left(\frac{5}{3}\right)}{5\sqrt{m}}$$

$$\sqrt{m} = \frac{1}{2}$$

$$m = \left(\frac{1}{2}\right)^2$$

$$= \frac{1}{4}$$

FOKUS KBAT

$$N \propto \frac{A}{P}$$

$$N = \frac{kA}{P}$$

$$12\ 000 = \frac{k \times 72\ 000}{270}$$

$$k = \frac{12\ 000 \times 270}{72\ 000}$$

$$= 45$$

$$N = \frac{45 \times 150\ 000}{270}$$

$$= 25\ 000$$

Maka, bilangan kasut yang dijual ialah 25 000 pasang. (**A**)

JAWAPAN

BAB 6: KECERUNAN DAN LUAS DI BAWAH GRAF

6.1

A

1. (a) Laju $= \frac{30 - 0}{3 - 0}$
$= 10 \text{ m s}^{-1}$

(b) Tempoh masa $= 7 - 3$
$= 4 \text{ s}$

(c) Laju $= \frac{45 - 30}{10 - 7}$
$= \frac{15}{3}$
$= 5 \text{ m s}^{-1}$

2. (a) Laju $= \frac{200 - 40}{8 - 0}$
$= \frac{160}{8}$
$= 20 \text{ m s}^{-1}$

(b) Laju $= \frac{0 - 200}{12 - 8}$
$= \frac{-200}{4}$
$= -50 \text{ m s}^{-1}$
$\therefore$ Laju $= 50 \text{ m s}^{-1}$

(c) Laju purata $= \frac{160 + 200}{12}$
$= \frac{360}{12}$
$= 30 \text{ m s}^{-1}$

3. (a) Tempoh masa $= 40 - 20 = 20$ minit

(b) Jarak $= 75 - 15 = 60$ km

(c) Laju purata $= \frac{75}{\frac{80}{60}} = 75 \times \frac{60}{80}$
$= 56\frac{1}{4} \text{ km j}^{-1}$ atau 56.25 km j^{-1}

B

1. (a) Kadar perubahan laju $= \frac{12 - 0}{4 - 0}$
$= \frac{12}{4}$
$= 3 \text{ m s}^{-2}$

(b) Kadar perubahan laju $= \frac{20 - 12}{20 - 4}$
$= \frac{8}{16}$
$= \frac{1}{2} \text{ m s}^{-2}$
atau 0.5 m s^{-2}

2. (a) Kadar perubahan laju $= \frac{21 - 5}{3 - 0}$
$= \frac{16}{3}$
$= 5\frac{1}{3} \text{ m s}^{-2}$
atau 5.33 m s^{-2}

(b) Tempoh masa $= 7 - 3$
$= 4 \text{ s}$

(c) $\frac{0 - 21}{t - 7} = -7$
$t - 7 = \frac{-21}{-7}$
$= 3$
$t = 10$

3. (a) $\frac{v - 5}{6} = 4$
$v = 4(6) + 5$
$= 29$

(b) Kadar perubahan laju $= \frac{0 - 29}{10 - 6}$
$= -\frac{29}{4}$
$= -7\frac{1}{4} \text{ m s}^{-2}$
atau -7.25 m s^{-2}

6.2

A

1. Luas $= \frac{1}{2}[(10 - 4) + 14] \times 12$
$= \frac{1}{2}(6 + 14) \times 12$
$= 120 \text{ unit}^2$

2. Luas $= \left(\frac{1}{2} \times 8 \times 15\right) + [(20 - 8) \times 15]$
$= 60 + 180$
$= 240 \text{ unit}^2$

3. Luas $= \left[\frac{1}{2}(12 + 20) \times 5\right] + (10 \times 12)$
$= 80 + 120$
$= 200 \text{ unit}^2$

4. Luas $= \left[\frac{1}{2}(4 + 10) \times 5\right] + (7 \times 10) + \left(\frac{1}{2} \times 8 \times 10\right)$
$= 35 + 70 + 40$
$= 145 \text{ unit}^2$

5. Luas $= \left[\frac{1}{2}(6 + 15) \times 4\right] + \left[\frac{1}{2}(10 + 15) \times 4\right] + (7 \times 10)$
$= 42 + 50 + 70$
$= 162 \text{ unit}^2$

B

1. Jarak $= \left[\frac{1}{2}(8 + 15) \times 7\right] + \left(\frac{1}{2} \times 10 \times 15\right)$
$= 80.5 + 75$
$= 155.5 \text{ m}$

2. Jarak $= (12 \times 8) + \left[\frac{1}{2}(8 + 12) \times 8\right]$
$= 96 + 80$
$= 176 \text{ m}$

3. Jarak $= \left[\frac{1}{2}(9 + 18) \times 6\right] + \left[\frac{1}{2}(9 + 15) \times 2\right] + (10 \times 15)$
$= 81 + 24 + 150$
$= 255 \text{ m}$

4. Jarak $= (4 \times 40) + \left[\frac{1}{2}(40 + 60) \times 6\right] + \left(\frac{1}{2} \times 6 \times 60\right)$
$= 160 + 300 + 180$
$= 640 \text{ m}$

5. Jarak $= \left[\frac{1}{2}(8 + 18) \times 4\right] + \left[\frac{1}{2}(8 + 12) \times 4\right] + (8 \times 12) + \left(\frac{1}{2} \times 4 \times 12\right)$
$= 52 + 40 + 96 + 24$
$= 212 \text{ m}$

C

1. (a) $\frac{20 - u}{3} = 3$
$20 - u = 9$
$u = 20 - 9$
$= 11$

(b) Jumlah jarak yang dilalui
$= \left[\frac{1}{2}(11 + 20) \times 3\right] + (5 \times 20) + \left(\frac{1}{2} \times 4 \times 20\right)$
$= 46.5 + 100 + 40$
$= 186.5 \text{ m}$

(c) Kadar perubahan laju $= \frac{0 - 20}{12 - 8}$
$= \frac{-20}{4}$
$= -5 \text{ m s}^{-2}$

2. (a) $\frac{8 - 0}{t} = 2$
$t = \frac{8}{2}$
$= 4$

(b) Jarak $= (6 - 4) \times 8$
$= 16 \text{ m}$

(c) Jumlah jarak yang dilalui
$= \left(\frac{1}{2} \times 4 \times 8\right) + 16 + \left[\frac{1}{2}(8 + 18) \times 6\right]$
$= 16 + 16 + 78$
$= 110 \text{ m}$

3. (a) 16 m s^{-1}

(b) $\left[\frac{1}{2}(16 + 24) \times t\right] + [(12 - t) \times 16] = 232$
$20t + 192 - 16t = 232$
$4t = 40$
$t = 10$

(c) Kadar perubahan laju
$= \frac{0 - 16}{20 - 12}$
$= \frac{-16}{8}$
$= -2 \text{ m s}^{-2}$

4. (a) $\frac{1}{2}(10 + v) \times 6 = 78$
$3(10 + v) = 78$
$10 + v = 26$
$v = 16$

(b) Kadar perubahan laju $= \frac{10 - 16}{6}$
$= \frac{-6}{6}$
$= -1 \text{ m s}^{-2}$

(c) $78 + \left[\frac{1}{2}(10 + 14)(t - 6)\right] + \left[\frac{1}{2}(18 - t) \times 14\right]$
$= 182$
$78 + 12t - 72 + 126 - 7t = 182$
$5t + 132 = 182$
$5t = 50$
$t = 10$

5. (a) Kadar perubahan laju $= \frac{18 - 5}{3}$
$= \frac{13}{3}$
$= 4\frac{1}{3} \text{ m s}^{-2}$
atau 4.33 m s^{-2}

(b) $\left[\frac{1}{2}(u + 18) \times 4\right] + (8 \times u) = 156$
$2u + 36 + 8u = 156$
$10u + 36 = 156$
$10u = 120$
$u = 12$

(c) Jumlah jarak $= \left[\frac{1}{2}(5 + 18) \times 3\right] + 156$
$= 34.5 + 156$
$= 190.5$ m

$\therefore$ Laju purata $= \frac{190.5}{15}$
$= 12.7$ m s^{-1}

Praktis Formatif: Kertas 2

1. (a) (i) 16 m s^{-1}

(ii) Kadar perubahan laju $= \frac{0 - 16}{4}$
$= -4$ m s^{-2}

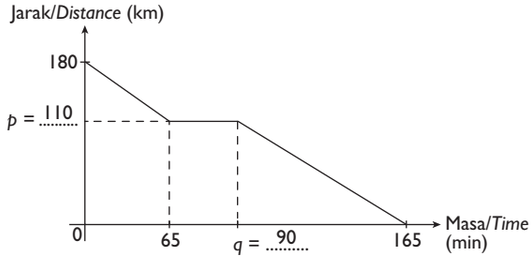
(b) $\frac{1}{2} \times t \times 20 = \frac{1}{2}(8 + 12) \times 16$
$10t = 160$
$t = 16$

2. (a) Laju $= \frac{160 - 120}{1}$
$= 40$ km j^{-1}

(b) Jam 0930,
120 km dari bandar L atau 40 km dari bandar K

(c) Jarak $= 140 - 40$
$= 100$ km

3. (a) (i), (ii)



$p = 180 - 70 = 110$
Tempoh masa dari jam 1000 hingga jam 1130
= 1 jam 30 minit
= 90 minit
$\therefore q = 90$

(b) Jumlah jarak = 180 km
Jumlah masa = 2 jam 45 minit = 2.75 jam
Laju purata $= \frac{180 \text{ km}}{2.75 \text{ j}} = 65.45$ km j^{-1}

4. (a) $30 - 12 = 18$ s

(b) Kadar perubahan laju
$= \frac{0 - 18}{12}$
$= -1\frac{1}{2}$ m s^{-2} atau -1.5 m s^{-2}

(c) $\left[\frac{1}{2}(u + 18) \times 12\right] + 18 \times 18 + \left[\frac{1}{2}(42 - 30) \times 18\right]$
$= 582$
$6u + 108 + 324 + 108 = 582$
$6u + 540 = 582$
$6u = 582 - 540$
$= 42$
$u = 7$

5. (a) 360 cm s^{-1}

(b) Kadar perubahan laju $= \frac{360}{6}$
$= 60$ cm s^{-2}

(c) $\frac{1}{2} \times 6 \times 360 = \frac{1}{2} \times \left[\frac{1}{2}(360 + 600) \times (t - 8)\right]$
$1\,080 = 240 \times (t - 8)$
$t - 8 = \frac{1\,080}{240}$
$= 4.5$
$t = 12.5$

6. (a) Kesha

(b) Tempoh masa $= 36 - 18$
$= 18$ s

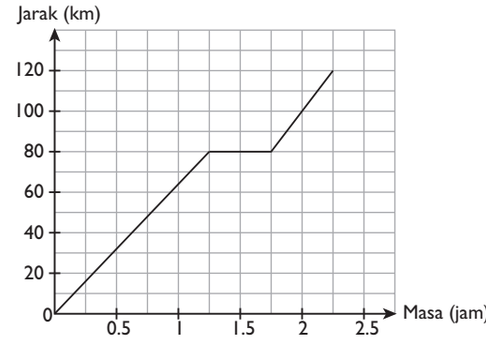
(c) Jarak Jasmine $= 200 - 140$
$= 60$ m

(d) Laju purata $= \frac{200}{40}$
$= 5$ m s^{-1}

FOKUS KBAT

(a) (i) Laju $= \frac{80}{1.25} = 64$ km j^{-1}

(ii)



(b) Masa diambil untuk keseluruhan perjalanan
= 2.25 jam
= 2 jam 15 minit
Masa ketibaan = 2:45 p.m. + 2 jam 15 minit
= 5:00 p.m.

(c) Laju purata $= \frac{120}{2.25}$
$= 53\frac{1}{3}$ km j^{-1} atau 53.33 km j^{-1}

JAWAPAN

BAB 7: KEBARANGKALIAN II

7.1

A

1. $S = \{90, 91, 92, 93, 94, 95, 96, 97\}$
$n(S) = 8$
Katakan A = Peristiwa satu nombor perdana dipilih
$A = \{97\}$
$n(A) = 1$
$P(A) = \frac{1}{8}$

2. $S = \{K, E, B, A, N, G, S, A, A, N\}$
$n(S) = 10$
Katakan X = Peristiwa mendapat huruf A
$n(X) = 3$
$P(X) = \frac{3}{10}$

3. $S = \{R_1, R_2, R_3, R_4, R_5, G_1, G_2, G_3, G_4, Y_1, Y_2, Y_3, Y_4, Y_5, Y_6\}$
$n(S) = 15$
Katakan G = Peristiwa mendapat bola berwarna merah
$n(G) = 5$
$P(G) = \frac{5}{15}$
$= \frac{1}{3}$

B

1. $n(S) = 15$
Bilangan murid perempuan $= 15 - 8$
$= 7$
$P(\text{perempuan}) = \frac{7}{15}$

2. Bilangan murid lelaki $= 75 - 20 - 15$
$= 40$
$n(S) = 75 - 15$
$= 60$
$P(\text{lelaki}) = \frac{40}{60}$
$= \frac{2}{3}$

3. $\frac{x}{12 + 8 + x} = \frac{1}{6}$
$\frac{x}{20 + x} = \frac{1}{6}$
$6x = 20 + x$
$5x = 20$
$x = 4$
Bilangan bola kuning = 4

4. Bilangan murid Cina $= \frac{2}{5} \times 40$
$= 16$
Bilangan murid Iban $= 40 - 18 - 16$
$= 6$
$P(\text{Iban}) = \frac{6}{40}$
$= \frac{3}{20}$

7.2

1. $P(\text{Cip hijau}) = 1 - \frac{1}{3} - \frac{2}{5}$
$= \frac{4}{15}$
Bilangan cip hijau $= \frac{4}{15} \times 90$
$= 24$

2. $P(\text{Guli putih}) = 1 - \frac{2}{3} - \frac{1}{5}$
$= \frac{2}{15}$
Jumlah bilangan guli $= 6 \times \frac{15}{2}$
$= 45$

3. $P(\text{Gagal}) = 1 - \frac{7}{20}$
$= \frac{13}{20}$
Bilangan kali Peter gagal menjaringkan gol
$= \frac{13}{20} \times 60$
$= 39$

4. $P(\text{Epal yang tidak rosak}) = 1 - \frac{2}{5}$
$= \frac{3}{5}$
Bilangan epal yang tidak rosak
$= \frac{3}{5} \times 120$
$= 72$

7.3

1. S = {(3, A), (3, B), (3, D), (3, E), (4, A), (4, B), (4, D), (4, E), (9, A), (9, B), (9, D), (9, E)}
$n(S) = 12$

(a) {(3, A), (3, E), (9, A), (9, E)}

$$\text{Kebarangkalian} = \frac{4}{12} = \frac{1}{3}$$

(b) {(3, B), (3, D), (4, A), (4, B), (4, D), (4, E), (9, B), (9, D)}

$$\text{Kebarangkalian} = \frac{8}{12} = \frac{2}{3}$$

2. $n(S) = 9$

(a) {F, A, O, U, I, E}

$$\text{Kebarangkalian} = \frac{6}{9} = \frac{2}{3}$$

(b) {F, A, V, R, T}

$$\text{Kebarangkalian} = \frac{5}{9}$$

3. $n(S) = 36$

(a) {(1, 3), (2, 2), (3, 1), (1, 6), (2, 5), (3, 4), (4, 3), (5, 2), (6, 1)}

$$\text{Kebarangkalian} = \frac{9}{36} = \frac{1}{4}$$

(b) {(1, 2), (1, 4), (1, 6), (2, 2), (2, 4), (2, 6)}

$$\text{Kebarangkalian} = \frac{6}{36} = \frac{1}{6}$$

4. $n(S) = 25$

(a) {(6, 5), (6, 7), (6, 9), (8, 5), (8, 7), (8, 9)}

$$\text{Kebarangkalian} = \frac{6}{25}$$

(b) {(5, 7), (6, 8), (7, 5), (7, 9), (8, 6), (9, 7)}

$$\text{Kebarangkalian} = \frac{6}{25}$$

Praktis Formatif: Kertas 1

1. B

Gandaan 3 = {3, 6, 9}
n(Gandaan 3) = 3
n(set P) = 10

$$\text{P(Gandaan 3)} = \frac{3}{10}$$

2. B

Jumlah bilangan murid = 60
Bilangan murid lelaki pasukan Q = 18

$$\text{P(murid lelaki pasukan } Q) = \frac{18}{60} = \frac{3}{10}$$

3. A

$$\frac{3}{5} \times \text{Jumlah ahli} = 18$$

Jumlah ahli = 30
Bilangan ahli perempuan = 30 – 18
= 12

4. C

Jumlah bilangan pen = 24 + 12
= 36

$$\text{P(Pen biru)} = \frac{12}{36} = \frac{1}{3}$$

5. D

$$\text{Bilangan peluang} = \frac{2\,485}{10\,000} \times 100 = 24.85 \approx 25$$

6. A

$$\frac{3}{5} \times \text{Jumlah guli} = 9$$

Jumlah guli = 15
Bilangan guli biru = 15 – 9
= 6

7. D

$$\text{Bilangan kad merah} = \frac{2}{5} \times 90 = 36$$

Katakan x ialah bilangan kad merah yang ditambah

$$\frac{2}{3} \times (90 + x) = 36 + x$$

$$60 + \frac{2x}{3} = 36 + x$$

$$\frac{1}{3}x = 24$$

$$x = 72$$

8. D

Bilangan guli merah = 8 + 7
= 15
Jumlah bilangan guli = 8 + 27 + 7 + 3
= 45

$$\text{P(Guli merah)} = \frac{15}{45} = \frac{1}{3}$$

9. D

$$\text{Kebarangkalian} = 1 - \frac{2}{16}$$
$$= \frac{14}{16}$$
$$= \frac{7}{8}$$

10. D

$$\text{Kebarangkalian} = 1 - \frac{4}{12}$$
$$= \frac{8}{12}$$
$$= \frac{2}{3}$$

11. D

$$\text{Kebarangkalian lulus} = 1 - \frac{1}{8}$$
$$= \frac{7}{8}$$

$$\text{Bilangan murid lulus} = \frac{7}{8} \times 48$$
$$= 42$$

12. C

$$\text{P(bukan manik merah)} = 1 - \frac{5}{12}$$
$$= \frac{7}{12}$$

$$\frac{7}{12} \times \text{Jumlah guli} = 21$$
$$\text{Jumlah guli} = 36$$

$$\text{Bilangan manik merah} = 36 - 13 - 8$$
$$= 15$$

$$\text{P(bukan manik putih)} = \frac{13 + 15}{36}$$
$$= \frac{28}{36}$$
$$= \frac{7}{9}$$

13. C

$$\text{P(Melayu)} = \frac{20}{40}$$
$$= \frac{1}{2}$$

$$\text{P(bukan Cina)} = \frac{1}{2} + \frac{1}{5}$$
$$= \frac{7}{10}$$

14. C

Bilangan kotak mengandungi mentol pecah
$= 3 + 7 + 4 + 1 + 3 + 2$
$= 20$

P(Kotak tidak mengandungi mentol pecah)

$$= 1 - \frac{20}{60}$$
$$= \frac{2}{3}$$

15. B

$$\text{Jumlah bilangan ahli} = 90 + 50$$
$$= 140$$

$$\text{P(ahli lelaki)} = 1 - \frac{3}{7}$$
$$= \frac{4}{7}$$

$$\text{Bilangan ahli lelaki} = \frac{4}{7} \times 140$$
$$= 80$$

16. D

$$\frac{3}{4} \times \text{Jumlah pekerja} = 120$$
$$\text{Jumlah pekerja} = 160$$

$$\text{P(pekerja tidak menaiki bas)} = \frac{150}{160}$$
$$= \frac{15}{16}$$

17. D

$$\text{Bilangan kerani} = \frac{1}{5} \times 360$$
$$= 72$$

$$\text{Bilangan guru} = 360 - 72 - 18$$
$$= 270$$

18. B

$S = \{18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41\}$
$n(S) = 24$

A = Nombor perdana
$A = \{19, 23, 29, 37, 41\}$
$n(A) = 6$

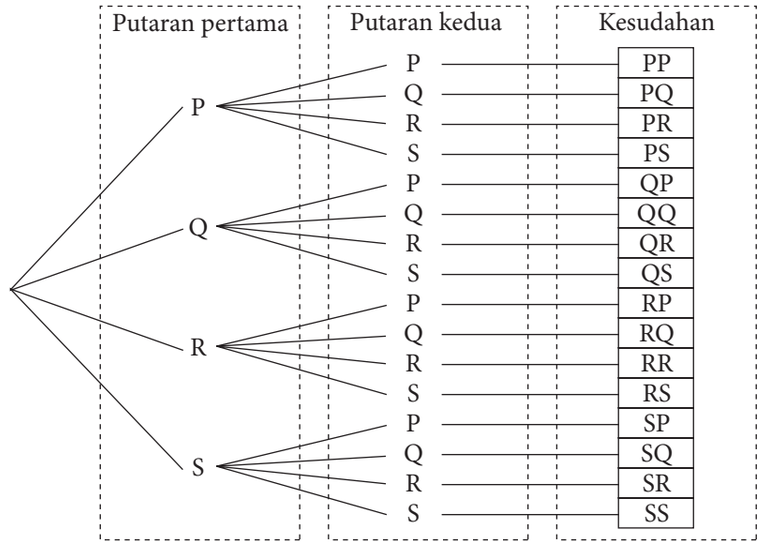
$$\text{P}(A) = \frac{6}{24}$$

P(Bukan nombor perdana)

$$= 1 - \frac{6}{24}$$
$$= \frac{3}{4}$$

Praktis Formatif: Kertas 2

1. (a)



(b) (i) {PP, QQ, RR, SS}

Kebarangkalian = $\frac{4}{16} = \frac{1}{4}$

(ii) {PQ, QP, QQ, QR, QS, RQ, SQ}

Kebarangkalian = $\frac{7}{16}$

2. (a)

		Kesudahan putaran cakera			
		P	**Q**	**R**	**S**
Kesudahan balingan dadu	**1**	(1, P)	(1, Q)	(1, R)	(1, S)
	2	(2, P)	(2, Q)	(2, R)	(2, S)
	3	(3, P)	(3, Q)	(3, R)	(3, S)
	4	(4, P)	(4, Q)	(4, R)	(4, S)
	5	(5, P)	(5, Q)	(5, R)	(5, S)
	6	(6, P)	(6, Q)	(6, R)	(6, S)

(b) (i) {(1, R), (2, R), (3, R), (4, R), (5, R), (6, R)}

Kebarangkalian = $\frac{6}{24} = \frac{1}{4}$

(ii) {(1, Q), (2, P), (2, Q), (2, R), (2, S), (3, Q), (4, P), (4, Q), (4, R), (4, S), (5, Q), (6, P), (6, Q), (6, R), (6, S)}

Kebarangkalian = $\frac{15}{24} = \frac{5}{8}$

3. (a)

Putih	(W)	(1, W)	(2, W)	(3, W)	(4, W)	(5, W)	(6, W)
Hitam	(B)	(1, B)	(2, B)	(3, B)	(4, B)	(5, B)	(6, B)
Kuning	(Y)	(1, Y)	(2, Y)	(3, Y)	(4, Y)	(5, Y)	(6, Y)
		1	2	3	4	5	6

(b) (i) {(1, Y), (2, Y), (3, Y), (4, Y)}

Kebarangkalian = $\frac{4}{18} = \frac{2}{9}$

(ii) {(1, W), (2, W), (3, W), (4, W), (5, W), (6, W), (3, B), (4, B), (5, B), (6, B), (3, Y), (4, Y), (5, Y), (6, Y)}

Kebarangkalian = $\frac{14}{18} = \frac{7}{9}$

4. (a) {(Ahmad, Juan), (Ahmad, Kim), (Ahmad, Lenny), (Ryan, Juan), (Ryan, Kim), (Ryan, Lenny), (Clifford, Juan), (Clifford, Kim), (Clifford, Lenny), (Danny, Juan), (Danny, Kim), (Danny, Lenny)}

(b) {(Clifford, Juan), (Danny, Juan)}

$$\text{Kebarangkalian} = \frac{2}{12}$$
$$= \frac{1}{6}$$

(c) Kebarangkalian bahawa Ahmad dan Ryan bertugas bersama ialah tidak mungkin kerana hanya pasukan yang berlainan bertugas bersama.

5. (a) {(J, 20), (J, 50), (J, 100), (K, 20), (K, 50), (K, 100), (L, 20), (L, 50), (L, 100), (M, 20), (M, 50), (M, 100)}

(b) (i) {(J, 100), (K, 20), (K, 50), (K, 100), (L, 100), (M, 100)}

$$\text{Kebarangkalian} = \frac{6}{12}$$
$$= \frac{1}{2}$$

(ii) {(M, 50)}

$$\text{Kebarangkalian} = 1 - \frac{1}{12}$$
$$= \frac{11}{12}$$

6. (a) {(Q, R), (Q, S), (Q, I), (Q, U), (R, Q), (R, S), (R, I), (R, U), (S, Q), (S, R), (S, I), (S, U), (I, Q), (I, R), (I, S), (I, U), (U, Q), (U, R), (U, S), (U, I)

(b) (i) {(I, Q), (I, R), (I, S), (I, U), (U, Q), (U, R), (U, S), (U, I)}

$$\text{Kebarangkalian} = \frac{8}{20}$$
$$= \frac{2}{5}$$

(ii) {(Q, I), (Q, U), (R, I), (R, U), (S, I), (S, U)}

$$\text{Kebarangkalian} = \frac{6}{20}$$
$$= \frac{3}{10}$$

FOKUS KBAT

(a)

Pakej		Pulau					
		Kapas (K)	Langkawi (L)	Perhentian (P)	Pangkor (Q)	Redang (R)	Tioman (T)
Santai	(S)	(S, K)	(S, L)	(S, P)	(S, Q)	(S, R)	(S, T)
Ekstrem	(E)	(E, K)	(E, L)	(E, P)	(E, Q)	(E, R)	(E, T)
Ekonomi	(N)	(N, K)	(N, L)	(N, P)	(N, Q)	(N, R)	(N, T)
Mewah	(M)	(M, K)	(M, L)	(M, P)	(M, Q)	(M, R)	(M, T)
Romantik	(C)	(C, K)	(C, L)	(C, P)	(C, Q)	(C, R)	(C, T)

(b) (i) {(S, L), (N, L), (C, L), (S, R), (N, R), (C, R)}

$$\text{Kebarangkalian} = \frac{6}{30}$$
$$= \frac{1}{5}$$

(ii) Pulau yang terletak di Selat Melaka ialah Pulau Langkawi dan Pulau Pangkor.
{(E, L), (M, L), (S, Q), (E, Q), (N, Q), (M, Q), (C, Q)}

$$\text{Kebarangkalian} = \frac{7}{10}$$

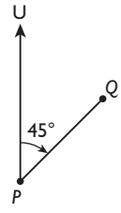
JAWAPAN

BAB 8: BEARING

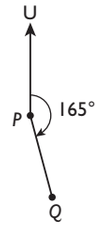
8.1

A

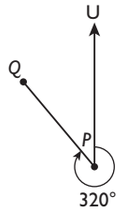
1.



2.



3.



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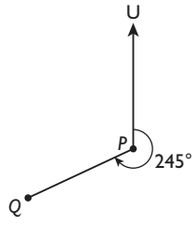
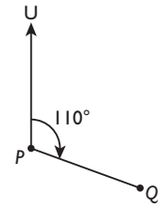
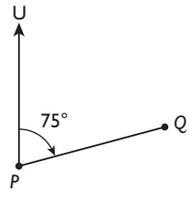


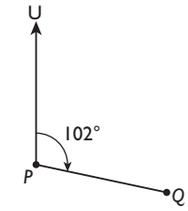
5.



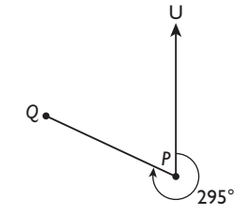
6.



7.

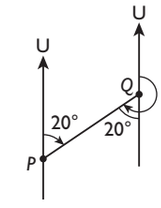


8.



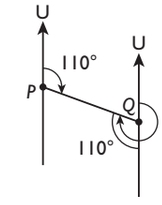
B

1.



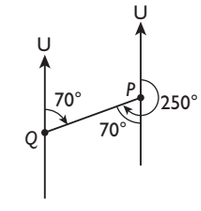
Bearing P dari Q
$= 180° + 20°$
$= 200°$

2.



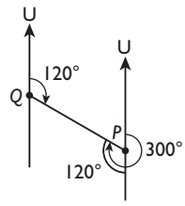
Bearing P dari Q
$= 180° + 110°$
$= 290°$

3.



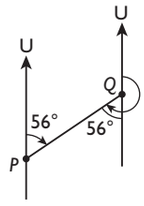
$250° - 180° = 70°$
Bearing P dari $Q = 070°$

4.



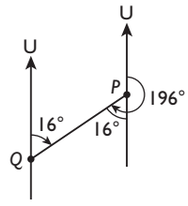
300° – 180° = 120°
Bearing P dari Q = 120°

5.



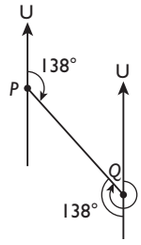
Bearing P dari Q
= 180° + 56°
= 236°

6.



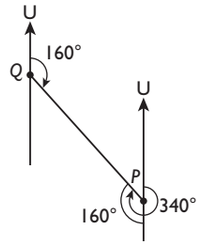
196° – 180° = 16°
Bearing P dari Q = 016°

7.



Bearing P dari Q
= 180° + 138°
= 318°

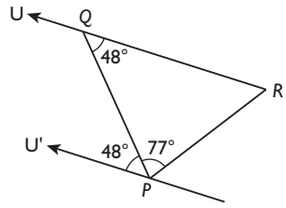
8.



340° – 180° = 160°
Bearing P dari Q = 160°

C

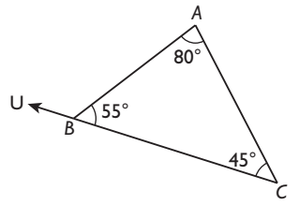
1.



$\angle U'PQ = \angle RQP = 48°$

Bearing R dari P = 48° + 77°
= 125°

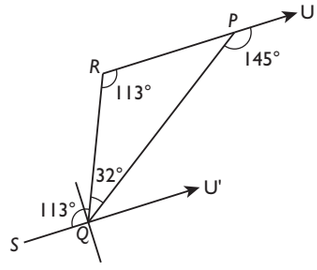
2.



$\angle ACB$ = 180° – 80° – 55°
= 45°

Bearing A dari C = 045°

3.

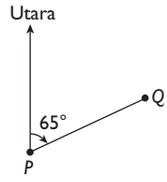


$\angle PRQ$ = 145° – 32° = 113°
$\angle RQS = \angle PRQ$ = 113°

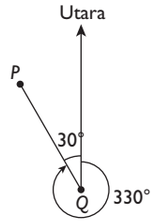
Bearing R dari Q = 180° + 113°
= 293°

Praktis Formatif: Kertas 1

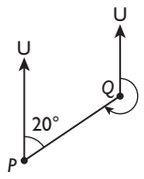
1. B



2. C

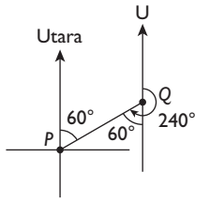


3. A



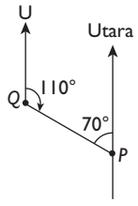
Bearing P dari Q = 180° + 20°
= 200°

4. A



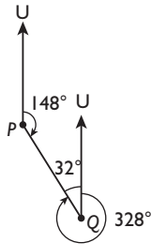
60° + 180° = 240°

5. C



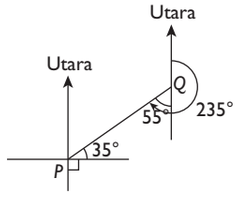
180° – 70° = 110°

6. C



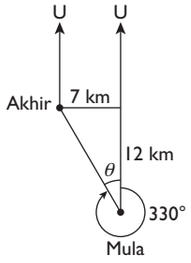
360° – 328° = 32°
Bearing Q dari P = 180° – 32°
= 148°

7. D



90° + 35° = 125°
180° – 125° = 55°
55° + 180° = 235°

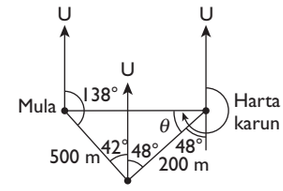
8. D



$\theta = \tan^{-1}\frac{7}{12} = 30°$

Bearing = 360° – 30° = 330°

9. B

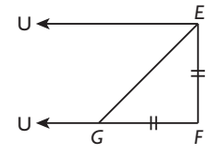


$\tan\theta = \frac{500}{200}$

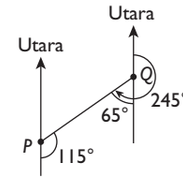
θ = 68° 12′

Bearing = 180° + 68° 12′ + 48°
= 296° 12′

10. C

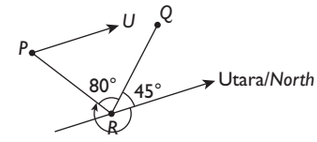


11. C



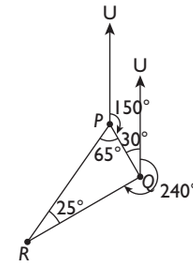
180° – 115° = 65°
Bearing titik P dari titik Q = 65° + 180°
= 245°

12. C



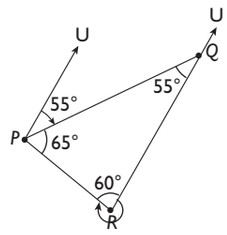
Bearing P dari R = 360° – 80° – 45°
= 235°

13. B



180° – 150° = 30°
$\angle PQR$ = 360° – 240° – 30°
= 90°
$\angle QPR$ = 180° – 90° – 25°
= 65°
Bearing R dari P
= 150° + 65°
= 215°

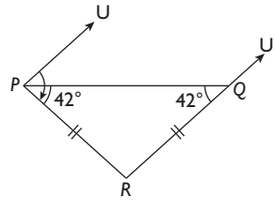
14. D



$\angle PRQ = 180° - 65° - 55°$
$= 60°$

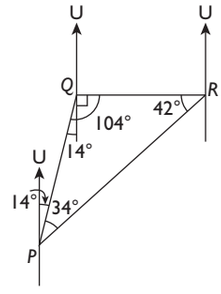
Bearing P dari $R = 360° - 60°$
$= 300°$

15. B



Bearing R dari $P = 42° + 42°$
$= 084°$

16. B



$180° - 42° - 34° = 104°$
$104° - 90° = 14°$

Bearing R dari $P = 14° + 34°$
$= 048°$

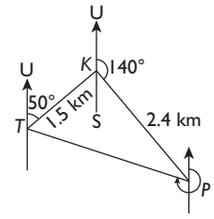
FOKUS KBAT

$\angle UTK = \angle TKS = 50°$
$\angle SKP = 180° - 140° = 40°$
$\angle TKP = 50° + 40° = 90°$

$\tan \angle KTP = \frac{2.4}{1.5}$

$\angle KTP = \tan^{-1} \frac{2.4}{1.5}$
$= 58°$

$\angle UTP = 50° + 58° = 108°$
Bearing T dari $P = 180° + 108°$
$= 288°$ **(C)**



JAWAPAN

BAB 9: BUMI SEBAGAI SFERA

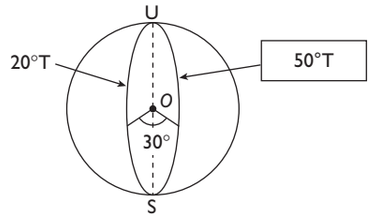
9.1

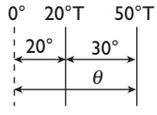
A

1. 74°T
2. 102°T
3. 33°B
4. 118°B
5. 155°B

B

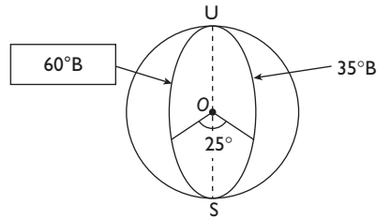
1.

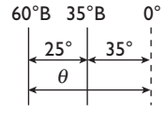




$\theta = 20° + 30°$
$= 50°$

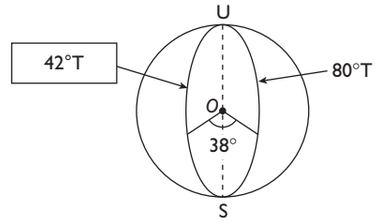
2.

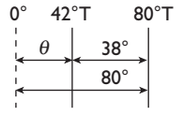




$\theta = 35° + 25°$
$= 60°$

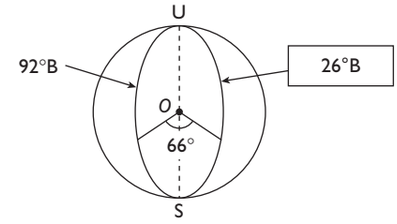
3.

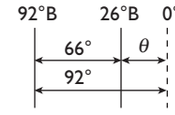




$\theta = 80° - 38°$
$= 42°$

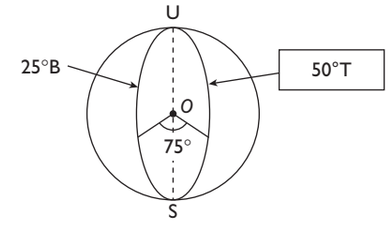
4.

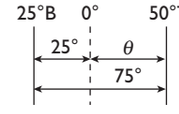




$\theta = 92° - 66°$
$= 26°$

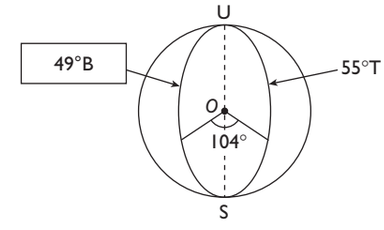
5.

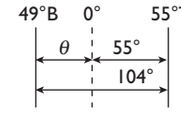




$\theta = 75° - 25°$
$= 50°$

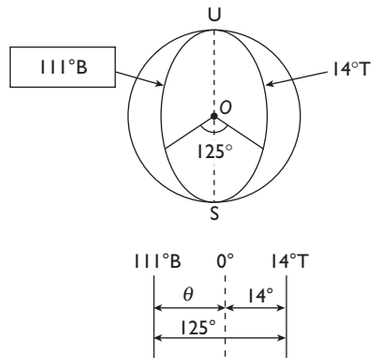
6.





$\theta = 104° - 55°$
$= 49°$

7.



$\theta = 125° - 14°$
$= 111°$

C

1. Longitud $Q = (180° - 120°)T$
$= 60°T$

2. Longitud $Q = (180° - 72°)B$
$= 108°B$

3. Longitud $Q = (180° - 25°)T$
$= 155°T$

4. Longitud $Q = (180° - 69°)B$
$= 111°B$

5. Longitud $Q = (180° - 138°)B$
$= 42°B$

D

1. Beza $= 80° - 14° = 66°$

2. Beza $= 41°20' - 8°50' = 32°30'$

3. Beza $= 25° + 55° = 80°$

4. Beza $= 57°38' + 45°29' = 103°7'$

9.2

A

1. Latitud $P = 30°U$

2. Latitud $P = 55°U$

3. Latitud $P = 46°S$

4. Latitud $P = 71°S$

5. Latitud $P = (90° - 42°)U = 48°U$

B

1. Latitud $P = (110° - 38°)U$
$= 72°U$

2. Latitud $P = (85° - 56°)S$
$= 29°S$

3. Latitud $P = (23° + 20°)U$
$= 43°U$

4. Latitud $P = (65° - 34°)S$
$= 31°$

5. Latitud $P = (100° - 48°)U$
$= 52°U$

C

1. Beza $= 70° - 25° = 45°$

2. Beza $= 120° - 42° = 78°$

3. Beza $= 32°40' - 9°15' = 23°25'$

4. Beza $= 31° + 69° = 100°$

5. Beza $= 56° + 38° = 94°$

6. Beza $= 15°48' + 67°53' = 83°41'$

9.3

A

B (60°U, 12°B)
C (48°S, 64°B)
D (0°, 35°T)
F (48°S, 12°B)
H (48°S, 35°T)
J (60°U, 168°T)
K (48°S, 168°T)

B

1. Latitud $Q = 40°S$
Longitud $Q = (180° - 80°)B$
$= 100°B$
$\therefore$ Kedudukan $Q = (40°S, 100°B)$

2. Latitud $Q = 55°S$
Longitud $Q = (180° - 105°)T$
$= 75°T$
$\therefore$ Kedudukan $Q = (55°S, 75°T)$

3. Latitud $Q = 38°U$
Longitud $Q = (180° - 125°)B$
$= 55°B$
$\therefore$ Kedudukan $Q = (38°U, 55°B)$

4. Latitud Q = Latitud $P = 60°U$
Longitud $Q = (180° - 110°)B$
$= 70°B$
$\therefore$ Kedudukan $Q = (60°U, 70°B)$

5. Latitud Q = Latitud $P = 24°S$
Longitud $Q = (180° - 50°)T$
$= 130°T$
$\therefore$ Kedudukan $Q = (24°S, 130°T)$

9.4

A

1. $\angle POQ = 70° - 50° = 20°$
Jarak $PQ = 20 \times 60$
$= 1\,200$ batu nautika

2. $\angle POQ = 45° + 31° = 76°$
Jarak $PQ = 76 \times 60$
$= 4\,560$ batu nautika

3. $\angle POQ = 68° + 42° = 110°$
Jarak $PQ = 110 \times 60$
$= 6\,600$ batu nautika

B

1. Beza latitud = 14° + 36°
= 50°

Jarak GH = 50 × 60
= 3 000 batu nautika

2. Beza latitud = 75° – 49°
= 26°

Jarak JK = 26 × 60
= 1 560 batu nautika

3. Beza latitud = 80° – 20°
= 60°

Jarak PQ = 60 × 60
= 3 600 batu nautika

4. Beza latitud = 90° – 12°
= 78°

Jarak CD = 78 × 60
= 4 680 batu nautika

5. Beza latitud = 29° + 23°
= 52°

Jarak XY = 52 × 60
= 3 120 batu nautika

C

1. $\angle POQ = \frac{4\,200}{60} = 70°$

Latitud Q = (70° – 55°)S
= 15°S

2. $\angle POQ = \frac{5\,520}{60} = 92°$

Latitud Q = (92° – 65°)U
= 27°U

3. $\angle POQ = \frac{1\,620}{60} = 27°$

Latitud Q = (25° + 27°)U
= 52°U

4. $\angle POQ = \frac{2\,700}{60} = 45°$

Latitud Q = (75° – 45°)U
= 30°U

5. $\angle POQ = \frac{4\,860}{60} = 81°$

Latitud Q = (81° – 63°)S
= 18°S

D

1. Beza longitud = 60° – 35°
= 25°

Jarak PQ = 25 × 60
= 1 500 batu nautika

2. Beza longitud = 50° – 36°
= 14°

Jarak PQ = 14 × 60
= 840 batu nautika

3. Beza longitud = 115° – 46°
= 69°

Jarak PQ = 69 × 60
= 4 140 batu nautika

4. Beza longitud = 57° + 24°
= 81°

Jarak PQ = 81 × 60
= 4 860 batu nautika

5. Beza longitud = 21° + 104°
= 125°

Jarak PQ = 125 × 60
= 7 500 batu nautika

E

1. Beza longitud = $\frac{1\,680}{60}$ = 28°

Longitud D = (72° + 28°)B
= 100°B

2. Beza longitud = $\frac{5\,160}{60}$ = 86°

Longitud D = (86° – 48°)T
= 38°T

3. Beza longitud = $\frac{4\,440}{60}$ = 74°

Longitud D = (100° – 74°)T
= 26°T

4. Beza longitud = $\frac{2\,160}{60}$ = 36°

Longitud D = (76° – 36°)B
= 40°B

5. Beza longitud = $\frac{3\,840}{60}$ = 64°

Longitud D = (50° + 64°)T
= 114°T

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F

1. Beza longitud = 102° – 58°
= 44°

Jarak PQ = 44 × 60 × kos 60°
= 1 320 batu nautika

2. Beza longitud = 100° – 32°
= 68°

Jarak PQ = 68 × 60 × kos 30°
= 3 533.38 batu nautika

3. Beza longitud = 126° – 81°
= 45°

Jarak PQ = 45 × 60 × kos 55°
= 1 548.66 batu nautika

4. Beza longitud = 18° + 48°
= 66°

Jarak PQ = 66 × 60 × kos 15°
= 3 825.07 batu nautika

5. Beza longitud = 36° + 112°
= 148°

Jarak PQ = 148 × 60 × kos 56°
= 4 965.63 batu nautika

G

1. Beza longitud $= \frac{1\ 950}{60 \times \text{kos } 60°}$
= 65°

Longitud Q = (15° + 65°)B
= 80°B

2. Beza longitud $= \frac{4\ 050}{60 \times \text{kos } 60°}$
= 135°

Longitud Q = (135° – 85°)T
= 50°T

3. Beza longitud $= \frac{1\ 800}{60 \times \text{kos } 15°}$
= 31.1° atau 31°3′

Longitud Q = (50° + 31.1°)T
= 81.1°T atau 81°3′T

4. Beza longitud $= \frac{2\ 640}{60 \times \text{kos } 30°}$
= 50.8° atau 50°48′

Longitud Q = (50.8° – 10°)B
= 40.8°B atau 40°48′B

H

1. θ = 180° – (2 × 25°)
= 130°
Jarak terpendek FG
= 130 × 60
= 7 800 batu nautika

2. θ = 180° – 70° – 45°
= 65°
Jarak terpendek PQ
= 65 × 60
= 3 900 batu nautika

3. θ = 180° – 47° – 65°
= 68°
Jarak terpendek CD
= 68 × 60
= 4 080 batu nautika

4. θ = 180° – 48° + 12°
= 144°
Jarak terpendek KL
= 144 × 60
= 8 640 batu nautika

I

1. (a) Beza longitud $= \frac{5\ 070}{60}$ = 84.5°
$\therefore$ θ = 84.5° – 18°
= 66.5° atau 66°30′

(b) Jarak PR = 56 × 60
= 3 360 batu nautika

(c) Jumlah jarak yang dilalui
= Jarak PR + Jarak RV
= 3 360 + (42 × 60 × kos 56°)
= 4 769.17 batu nautika
Jumlah masa yang diambil
$= \frac{4\ 769.17}{800}$
= 5 jam 58 minit

2. (a) Latitud D = 52°S
Longitud D = (180° – 40°)T
= 140°T
Kedudukan D = (52°S, 140°T)

(b) θ = 30° + 52° = 82°
Jarak CD = 82 × 60
= 4 920 batu nautika

(c) Masa yang diambil $= \frac{4\ 920}{750}$
= 6.56 jam

(d) θ = 180° – 52° – 30° = 98°
Jarak terpendek AC = 98 × 60
= 5 880 batu nautika

Praktis Formatif: Kertas 1

1. B

Longitud Q = (180° – 130°)B
= 50°B

2. C

40° – 10° = 30°T
Bandar C berada di timur X dengan beza longitud 40°.

3. C

Beza longitud P dan R
= 40° + 80°
= 120°

Beza longitud P dan Q
= 120° ÷ 5
= 24°
Longitud Q = (40° – 24°)B
= 16°B

4. B

Latitud Q = (55° – 20°)U
= 35°U

5. A

Beza longitud K dan M
= 80° + 70°
= 150°

KL : LM
3 : 2
150° ÷ 5 = 30°

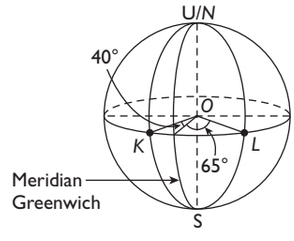
Beza longitud L dan M
= 30° × 2
= 60°

Latitud L = (70° – 60°)S
= 10°S

6. A

30° S

7. D



8. B

Latitud P = (90° – 50°)U
= 40°U
Longitud P = (180° – 30°)B
= 150°B
Kedudukan P = (40°U, 150°B)

9. D

Latitud Q = 30°U
Longitud Q = (120° + 20°)T
= 140°T
Kedudukan Q = (30°U, 140°T)

10. A

Latitud P = (90° × 46°)U
= 44°U
Longitud P = (75° – 15°)B
= 60°B
Kedudukan P = (44°U, 60°B)

11. A

Latitud L = 30°U
Longitud L = 100°T
Kedudukan L = (30°U, 100°T)

12. B

Latitud R = 38°S
Longitud R = (180° – 46°)B
= 134°B
Kedudukan R = (38°S, 134°B)

13. D

Latitud Q = (80° – 45°)U
= 35°U
Longtitud P = (20° + 30°)B
= 50°B
Longitud Q = (180° – 50°)T
= 130°T
Kedudukan Q = (35°U, 130°T)

14. B

Latitud kapal kuning
= 12°U ← Terletak di antara 2°S dan 30°U
Longitud kapal kuning = 125°T
Kedudukan kapal kuning
= (12°U, 125°T)

15. A

$$\text{Beza latitud} = \frac{6\,900}{60}$$
= 115°
Latitud R = (115° – 90°)U
= 25°U

16. D

Beza longitud K dan L
$= \frac{2\ 400}{60}$
$= 40°$
Longitud $L = (40° - 30°)T$
$= 10°T$
Beza latitud L dan M
$= \frac{4\ 200}{60}$
$= 70°$
Latitud $M = (70° - 60°)S$
$= 10°\ S$
Kedudukan $M = (10°S, 10°T)$

17. A

Beza longitud Q dan V
$= \frac{3\ 060}{60}$
$= 51°$
Longitud $V = (51° - 16°)T$
$= 35°T$

18. D

Latitud Q = Latitud R
$= (60° \times 12°)U$
$= 48°U$
Longitud $R = (20° + 50°)T$
$= 70°T$
Kedudukan $R = (48°U, 70°T)$

Praktis Formatif: Kertas 2

1. (a) Latitud $K = 40°U$
Longitud $K = (180° - 15°)B$
$= 165°B$
Kedudukan bagi $K = (40°U, 165°B)$

(b) Beza longitud $= \frac{3\ 360}{60}$
$= 56°$
Longitud bagi $F = (56° - 15°)B$
$= 41°B$

(c) Jarak $JH = 56 \times 60 \times \text{kos } 40°$
$= 2\ 573.91$ batu nautika

(d) Beza longitud $KJ = 165° - 41°$
$= 124°$
Jarak $KJ = 124 \times 60 \times \text{kos } 40°$
$= 5\ 699.37$ batu nautika
Jarak $JF = 40 \times 60$
$= 2\ 400$ batu nautika
Jumlah jarak $= 5\ 699.37 + 2\ 400$
$= 8\ 099.37$ batu nautika
Jumlah masa $= \frac{8\ 099.37}{600}$
$= 13.5$ jam

2. (a) (i) $54°U$
(ii) Latitud $Q = 0°$
Longitud $Q = (110° - 84°)T$
$= 26°T$
$\therefore$ Kedudukan bagi $Q = (0°, 26°T)$

(b) Beza latitud $= \frac{3\ 720}{60}$
$= 62°$
Latitud $M = (62° - 54°)S$
$= 8°S$

(c) Jarak $PR = 110 \times 60 \times \text{kos } 54°$
$= 3\ 879.38$ batu nautika

(d) Laju purata $= \frac{3\ 720}{60}$
$= 620$ knot

3. (a) Longitud $C = (180° - 35°)T$
$= 145°T$

(b) Beza longitud $= 35° + 70°$
$= 105°$
Jarak $AB = 105 \times 60 \times \text{kos } 46°$
$= 4\ 376.35$ batu nautika

(c) Katakan O ialah pusat bumi.
$\angle POQ = \frac{4\ 080}{60}$
$= 68°$
Latitud $D = (68° - 46°)S$
$= 22°S$

(d) Jumlah jarak $= 4\ 376.35 + 4\ 080$
$= 8\ 456.35$ batu nautika
Jumlah masa $= \frac{8\ 456.3}{550}$
$= 15.38$ jam

4. (a) Longitud $R = (180° - 60°)T$
$= 120°T$

(b) Katakan beza longitud di antara V dan $R = q°$
$q \times 60 \times \text{kos } 30° = 2\ 550$
$q = \frac{2\ 550}{60 \times \text{kos } 30°}$
$= 49°$
$\therefore$ Longitud $V = (120° - 49°)T$
$= 71°T$

(c) Beza latitud $= 180° - 30° - 50°$
$= 100°$
Jarak terpendek $PQ = 60 \times 100$
$= 6\ 000$ batu nautika

(d) (i) Beza latitud = 50° + 30°
= 80°

Jarak RQ = 80 × 60
= 4 800 batu nautika

(ii) Jumlah jarak = 2 550 + 4 800
= 7 350 batu nautika

Jumlah masa = $\frac{7\,350}{650}$
= 11.3 jam

5. (a) Longitud V = (180° – 40°)B
= 140°B

(b) $\angle POR = \frac{3\,000}{60}$
= 50°

Latitud R = (50 – 25)°S
= 25°S

(c) Jarak terpendek dari P ke V
= (65 + 65) × 60
= 130 × 60
= 7 800 batu nautika

(d) (i) Jarak PQ
= (40 + 30) × 60 × kos 25°
= 3 806.5 batu nautika

(ii) Jumlah jarak = 3 000 + 3 806.5
= 6 806.5 batu nautika

Laju purata = $\frac{6\,806.5}{11.5}$
= 591.9 knot

6. (a) Kedudukan bagi J = (65°S, 25°B)

(b) Beza latitud = 180° – 55° – 55°
= 70°

Jarak terpendek = 70° × 60
= 4 200 batu nautika

(c) Jarak JK = (25° + 110°) × 60 × kos 65°
= 135° × 60 × kos 65°
= 3 423.21 batu nautika

(d) Katakan x = Jumlah jarak dari G ke R

$720 = \frac{x}{6.25}$

x = 4 500 batu nautika

Beza latitud = 4 500 ÷ 60
= 75°

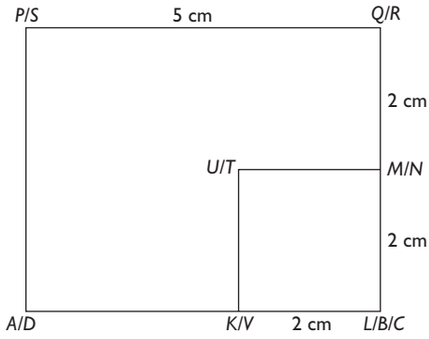
Latitud R = 75° – 55°
= 20°S

JAWAPAN

BAB 10: PELAN DAN DONGAKAN

10.1

1.



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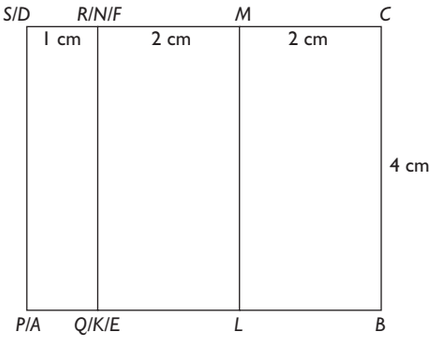
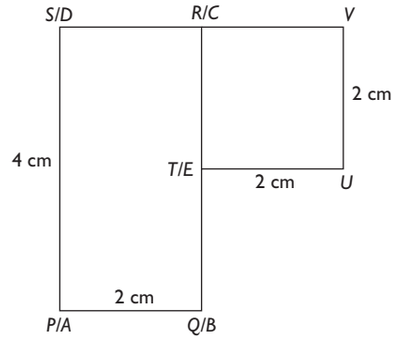


10.2

1. (i)



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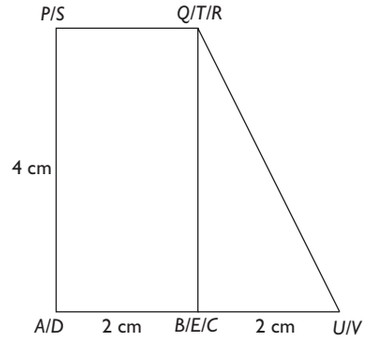

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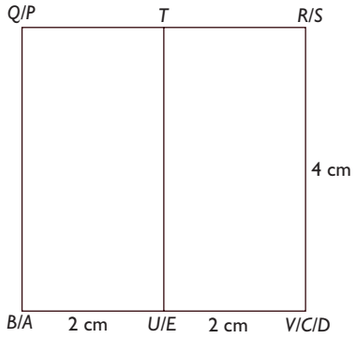

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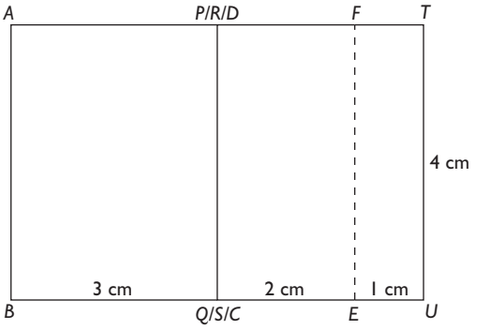

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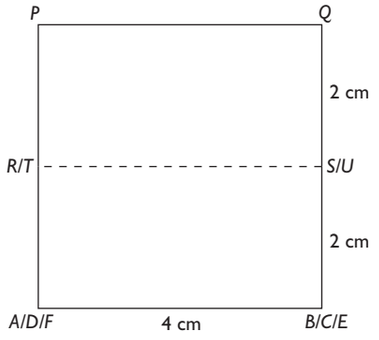

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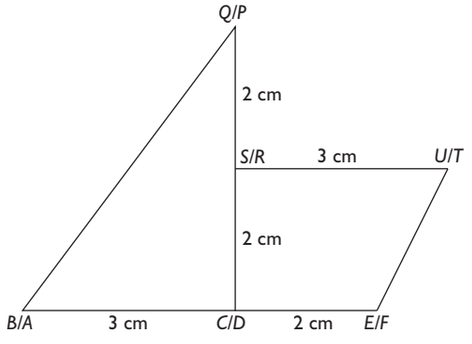

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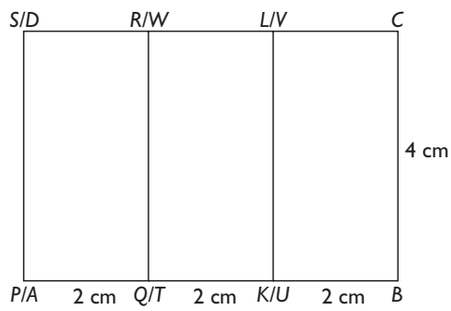

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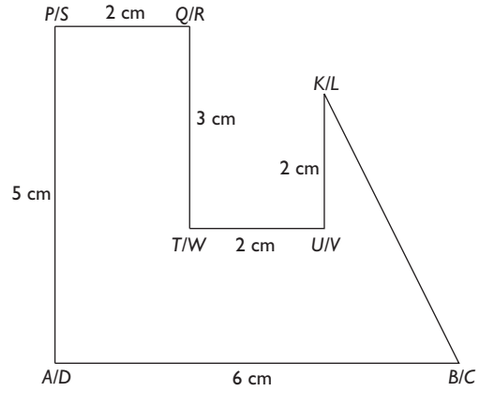

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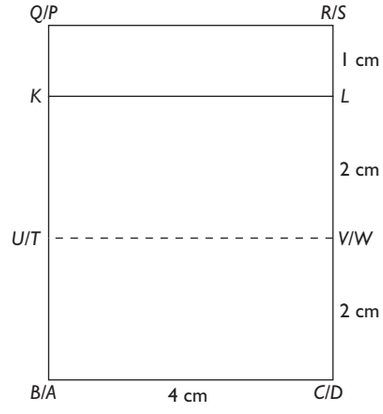

Praktis Formatif: Kertas 2

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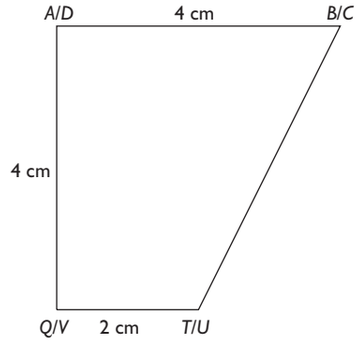

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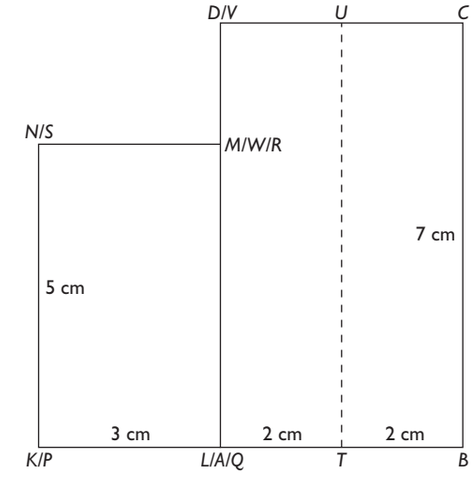

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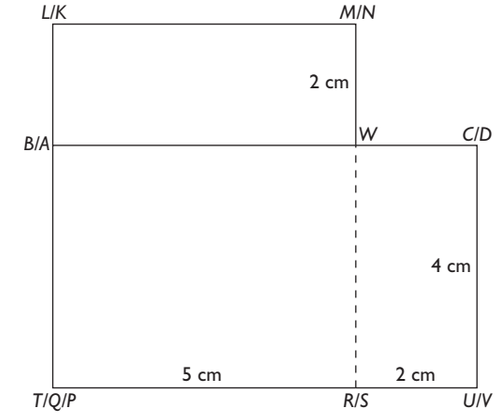

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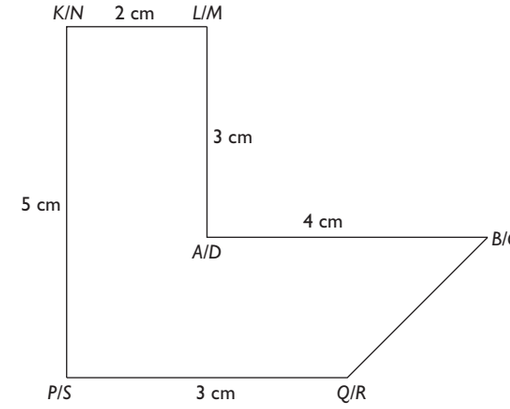

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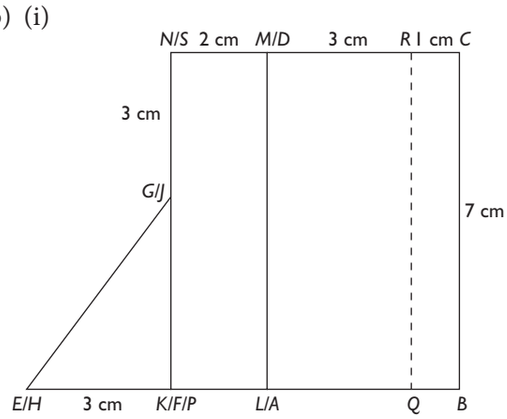

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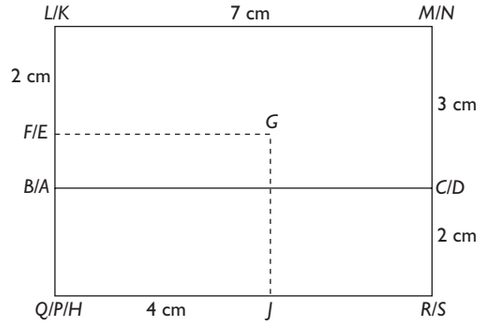
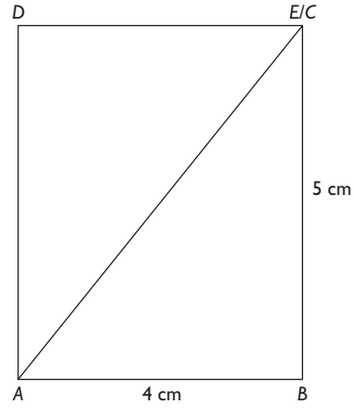


3. (a)



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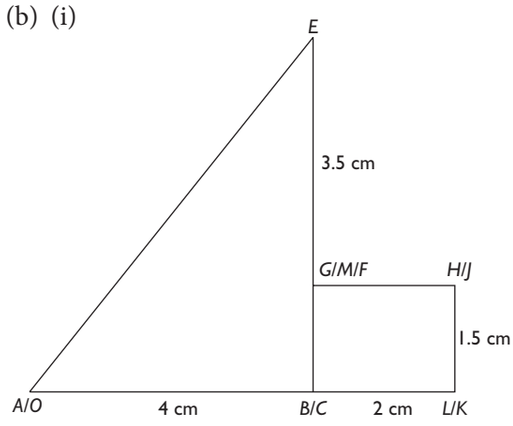

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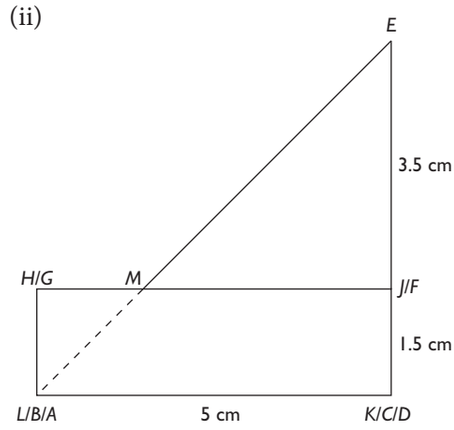
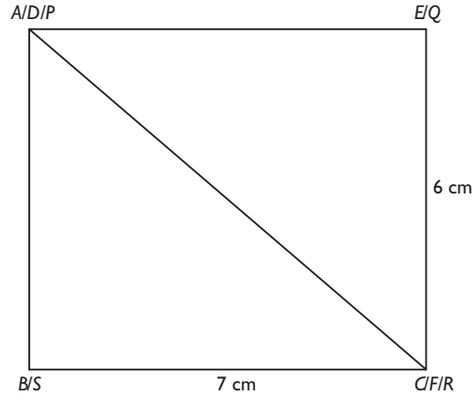
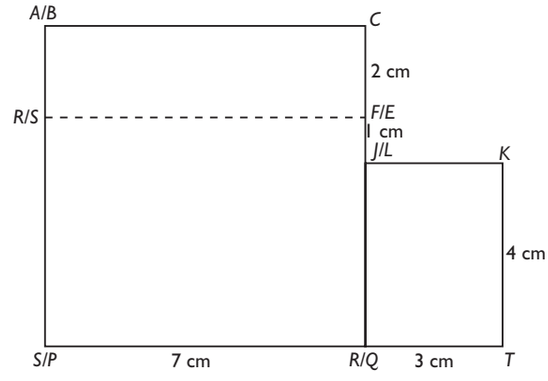


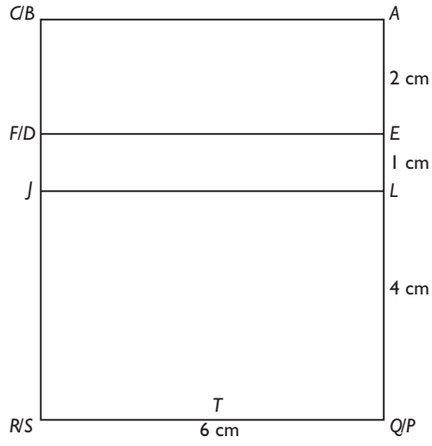
4. (a)



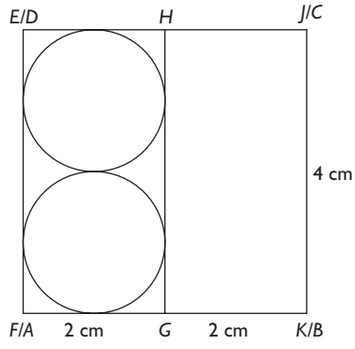
(b) (i)



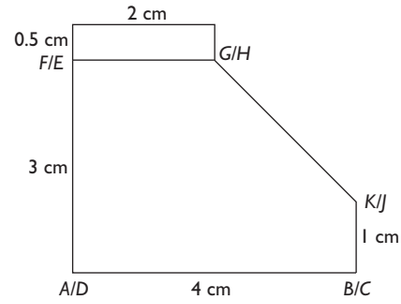
(ii)



5. (a) (i)



(ii)



(b) Panjang $GK = \sqrt{2^2 + 2^2}$

$= \sqrt{8}$

$= 2.83$ cm

JAWAPAN

KERTAS MODEL SPM

KERTAS 1

1. C

$(62\,100 + 7\,320) \times 3$
$= 69\,420 \times 3$
$= 208\,260$
$= 2.0826 \times 10^5$

2. B

$\frac{5.13}{3} + 1.61 \times 4$
$= 1.71 + 6.44$
$= 8.15$
$= 8.2$ (dua angka bererti)

3. C

$5(5^2 + 2 \times 5)$
$= 5^3 + 2 \times 5^3$
$= 1200_5$

4. D

Bilangan kertas berwarna
$= 3.5 \text{ kg} \div 7 \times 10^{-3} \text{ g}$
$= 3\,500 \text{ g} \div 7 \times 10^{-3} \text{ g}$
$= 500\,000$
$= 5 \times 10^5$

5. A

$\underline{3}14_5$
Nilai bagi digit $3 = 3 \times 5^2$
$= 3 \times 25$
$= 75_{10}$

6. C

Sudut pedalaman poligon 18 sisi
$= \frac{(18 - 2) \times 180}{18}$
$= 160°$

Sudut pedalaman oktagon sekata
$= \frac{(8 - 2) \times 180}{18} = 135°$
$m = 160 - 135 = 25$

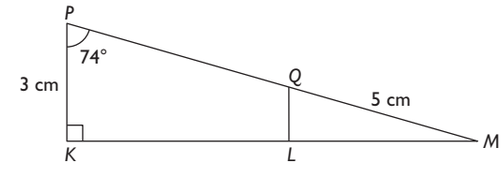
7. A

$\angle KML = \frac{180° - 32°}{2}$
$= \frac{148°}{2}$
$= 74°$

$\angle KMN = 180° - 74°$
$= 106°$
$\angle KRQ$ (refleks) $= 360° - 55°$
$= 305°$

Hasil tambah sudut pedalaman
$= (6 - 2) \times 180°$
$= 720°$
$x + y = 720 - 305 - 100 - 115 - 106$
$= 94$

8. A



$\cos 74° = \frac{3}{PM}$
$PM = 10.88$ cm
$PQ = 10.88 - 5$
$= 5.88$ cm

9. B

10. B

Faktor skala $= \frac{6}{4}$
$= \frac{3}{2}$
Panjang $PV = \frac{3}{2} \times 4$
$= 6$ cm
Panjang $SV = 6 \text{ cm} - 4 \text{ cm}$
$= 2$ cm

11. A

$\angle TRS = 180° - 60° = 120°$
$\angle QST = \frac{180° - 120°}{2} = 30°$
$\tan \angle QST = \tan 30°$
$= 0.5774$

12. B

$y = \cos x$
$\cos 0 = 1$
$\cos 90° = 0$ ← $a = 90°$
$\cos 180° = -1$ ← $b = 180°$
$\cos 270° = 0$ ← $c = 270°$
$\cos 360° = 1$ ← $d = 360°$
$a + b = 90° + 180°$
$= 270°$

13. B

$\angle UTV$

14. B

$\tan 35° = \frac{3}{PR}$

$PR = 4.28$

Sudut dongakan S dari P

$= \tan^{-1}\frac{2}{4.28}$

$= 25° 1'$

15. A

$\tan 50° 12' = 1.2$

$\tan 70° 36' = 2.84$

$\tan 50° 12' = \frac{BS}{500 + QR}$

$500 + QR = \frac{RS}{1.2}$ .... ①

$\tan 70° 36' = \frac{RS}{QR}$

$QR = \frac{RS}{2.84}$ .... ②

② ke dalam ①:

$500 + \frac{RS}{2.54} = \frac{RS}{1.2}$

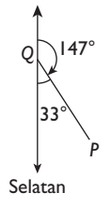
$\frac{RS}{1.2} - \frac{RS}{2.84} = 500$

$0.48RS = 500$

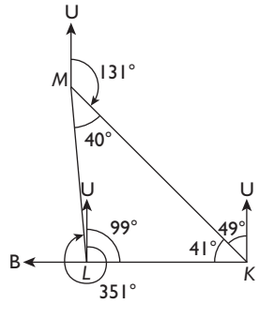
$RS = 1\,039$

$\approx 1\,040$ m

16. A



17. D



$180° - 131° = 49°$

$90° - 49° = 41°$

$180° - 40° - 41° = 99°$

Bearing M dari $L = 360° - 9°$

$= 351°$

18. B

$50° - 20° = 30°$

19. C

Jarak XY

$= (130 - 10) \times 60 \times \text{kos } 60$

$= 120 \times 60 \times \text{kos } 60$

$= 3\,600$ batu nautika

20. D

$16p^4 - 1 = 4^2p^4 - 1$

$= (4p^2 + 1)(4p^2 - 1)$

$= (4p^2 + 1)(2^2p^2 - 1)$

$= (4p^2 + 1)(2p - 1)(2p + 1)$

21. A

$\frac{3x - 2}{5} = \frac{x + 1}{2}$

$2(3x - 2) = 5(x + 1)$

$6x - 4 = 5x + 5$

$x = 9$

22. B

Luas trapezium

$= \frac{1}{2} \times (x - 3 + x + 1) \times (x + 2)$

$= \frac{1}{2} \times (2x - 2) \times (x + 2)$

$= (x - 1)(x + 2)$

$= x^2 + 2x - x - 2$

$= x^2 + x - 2$

23. C

$\frac{n}{3} - \frac{1 - 2nr}{r}$

$= \frac{n}{3} - \frac{3(1 - 2nr)}{3r}$

$= \frac{nr - 3 + 6nr}{3r}$

$= \frac{7nr - 3}{3r}$

24. B

$\left(\frac{1}{\sqrt{2}}\right)^n = 2^5$

$\left(\frac{1}{2^{\frac{1}{2}}}\right)^n = \left(2^{-\frac{1}{2}}\right)^n$

$-\frac{1}{2}n = 5$

$n = -10$

25. A

$$\sqrt{\frac{81s^2}{r^4}} \times (3r^{-2}s)^3$$
$$= \frac{9s}{r^2} \times (27r^{-6}s^3)$$
$$= \frac{243s^4}{r^8}$$

26. B

$$-\frac{2}{3} \le x + 3 \le 5 - \frac{1}{2}x$$

$-\frac{2}{3} \le x + 3$ $\qquad$ $x + 3 \le 5 - \frac{1}{2}x$

$-\frac{11}{3} \le x$ $\qquad$ $\frac{3}{2}x \le 2$

$x \le \frac{4}{3}$

$\therefore -\frac{11}{3} \le x < \frac{4}{3}$

27. B

$\frac{x}{2} - 1 \le x$ $\qquad$ $\frac{1}{3}(x + 4) > x$

$\frac{x}{2} \ge -1$ $\qquad$ $x + 4 > 3x$

$x \ge -2$ $\qquad$ $2x < 4$

$x < 2$

$\therefore x = -2, -1, 0, 1$

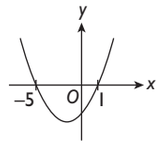
28. C

Jumlah kekerapan = 4 + 6 + 1 + 3 + 5 + 1
= 20

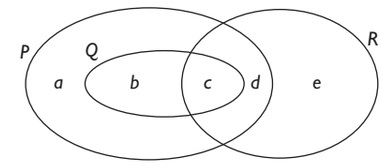
Median = $\frac{20}{2}$
= 10

29. A

$y = x^2 + 4x - 5$
$0 = x^2 + 4x - 5$
$0 = (x - 1)(x + 5)$
$x - 1 = 0$ $\qquad$ $x + 5 = 0$
$x = 1$ $\qquad$ $x = -5$



30. D



$a = 6$, $c = ?$
$a + b + c + d + e = 69$ $\qquad$ $b + c = 24$
$b + c + d + e = 63$ $\qquad$ $c + d + e = 50$
$b + 50 = 63$ $\qquad$ $13 + c = 24$
$b = 13$ $\qquad$ $c = 11$

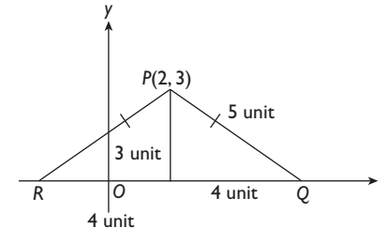
31. C

32. D

$12x - 3y = 15$
$3y = 12x - 15$
$y = 4x - 5$
$2x + \frac{y}{k} = 1$
$\frac{y}{k} = -2x + 1$
$y = -2kx + k$
$4 = -2k$
$k = -2$

33. C

Koordinat $R = (-2, 0)$
Kecerunan PR
$= \frac{3 - 0}{2 - (-2)}$
$= \frac{3}{4}$



34. B

Kebarangkalian duit syiling Jepun
$= 1 - \frac{1}{6} - \frac{2}{5}$
$= \frac{13}{30}$

$\frac{13}{30} \times$ Jumlah duit syiling = 65

Jumlah duit syiling = 150

35. D

Kebarangkalian bukan Pustakawan

$= \frac{20}{40} + \frac{3}{8}$

$= \frac{1}{2} + \frac{3}{8}$

$= \frac{7}{8}$

36. C

$w \propto \frac{x}{y^3}$

$w = \frac{kx}{y^3}$

$5 = \frac{k(80)}{23}$

$k = \frac{5 \times 8}{80}$

$= \frac{1}{2}$

$w = \frac{x}{2y^3}$

$100 = \frac{25}{2y^3}$

$2y^3 = \frac{1}{4}$

$y^3 = \frac{1}{8}$

$y = \sqrt[3]{\frac{1}{8}}$

$= \frac{1}{2}$

37. C

$m \propto z^3$

$m = kz^3$

$40 = k(2)^3$

$k = 5$

$m = 5z^3$

38. B

$T \propto \frac{N}{H}$

$T = \frac{kN}{H}$

$15 = \frac{k(5)}{1}$

$k = 3$

$T = \frac{3N}{H}$

$T = \frac{3(28)}{w}$

$w = \frac{84}{7}$

$= 12$

39. B

$-3 + 6 = n$

$n = 3$

$3m + 2n = 12$

$3m + 2(3) = 12$

$3m = 6$

$m = 2$

40. D

$(-5 \times 2) + (y \times 3) = 11$

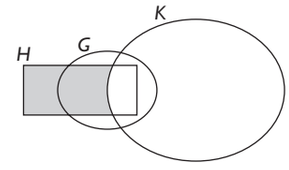
$-10 + 3y = 11$

$3y = 21$

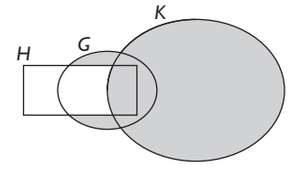
$y = 7$

KERTAS 2

1. (a)



(b)



2.

$3x - 2 = \frac{(x + 1)(x - 1)}{3x}$

$3x(3x - 2) = (x + 1)(x - 1)$

$9x^2 - 6x = x^2 - 1$

$8x^2 - 6x + 1 = 0$

$(4x - 1)(2x - 1) = 0$

$4x - 1 = 0$ atau $2x - 1 = 0$

$4x = 1$ $\quad$ $2x = 1$

$x = \frac{1}{4}$ $\quad$ $x = \frac{1}{2}$

3.

$2m + 3n = 9$ ..... ①

$\frac{m}{3} - n = 2$ ..... ②

② × 6: $2m - 6n = 12$ ..... ③

① − ③: $3n + 6n = 9 - 12$

$9n = -3$

$n = -\frac{1}{3}$

Gantikan $n = -\frac{1}{3}$ dalam ①:

$2m + 3\left(-\frac{1}{3}\right) = 9$

$2m - 1 = 9$

$2m = 10$

$m = 5$

Maka, $m = 5$ dan $n = -\frac{1}{3}$

4. $ML = \sqrt{9^2 + 12^2}$
$= 15$ cm
Isi padu gabungan pepejal
= Isi padu prisma tegak + Isi padu separuh kon
$= \left[\frac{1}{2} \times 9 \times 12 \times 7\right] + \left[\frac{1}{2} \times \frac{1}{3} \times \frac{22}{7} \times \left(\frac{7}{2}\right)^2 \times 15\right]$
$= 378 + 96.25$
$= 474.25 \text{ cm}^3$

5. (a) $\angle DCG$ atau $\angle GCD$

(b) $DG = \sqrt{5^2 - 3^2}$
$= 4$ cm
$CG = \sqrt{3^2 + 10^2}$
$= \sqrt{109}$ cm
Sudut di antara garis CD dengan tapak $BCFE$:
$\tan \angle DCG = \frac{4}{\sqrt{109}}$
$\angle DCG = \tan^{-1} \frac{4}{\sqrt{109}}$
$= 20°58'$ atau $20.96°$

6. (a) $x = -3$

(b) Koordinat titik R ialah $(-3, 0)$.
Bagi pintasan-y, $x = 0$.
Kecerunan $RS = \frac{5}{4}$
$\frac{y - 0}{0 - (-3)} = \frac{5}{4}$
$y = \frac{5}{4}(3)$
$= \frac{15}{4}$
Maka, pintasan-$y = \frac{15}{4}$

(c) Kecerunan PQ, m = Kecerunan RS
$= \frac{5}{4}$
Gantikan $m = \frac{5}{4}$ dan $(-3, 6)$ dalam $y = mx + c$.
$6 = \frac{5}{4}(-3) + c$
$6 = -\frac{15}{4} + c$
$c = \frac{39}{4}$
Maka, persamaan garis lurus PQ:
$y = \frac{5}{4}x + \frac{39}{4}$ atau $4y = 5x + 39$

7. (a) Semua

(b) Implikasi 1:
Jika $p^2 > q^2$, maka $(p + q)(p - q) > 0$.
Implikasi 2:
Jika $(p + q)(p - q) > 0$, maka $p^2 > q^2$.

(c) Kesimpulan:
$n(n + 2)\,[(n + 1)^2 + 1]$, $n = 1, 2, 3, 4, \ldots$

8. (a) $(1)(k) - (-2)(3) = 0$
$k + 6 = 0$
$k = -6$

(b) $\begin{pmatrix} 3 & -2 \\ 4 & -10 \end{pmatrix}\begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} -3 \\ 7 \end{pmatrix}$
$\begin{pmatrix} x \\ y \end{pmatrix} = \frac{1}{3(-10) - (-2)(4)}\begin{pmatrix} -10 & 2 \\ -4 & 3 \end{pmatrix}\begin{pmatrix} -3 \\ 7 \end{pmatrix}$
$= \frac{1}{-22}\begin{pmatrix} -10(-3) + 2(7) \\ -4(-3) + 3(7) \end{pmatrix}$
$= \frac{1}{-22}\begin{pmatrix} 44 \\ 33 \end{pmatrix}$
$= \begin{pmatrix} -2 \\ -\frac{3}{2} \end{pmatrix}$
$\therefore x = -2$, $y = -\frac{3}{2}$ atau $-1\frac{1}{2}$

9. (a) Perimeter seluruh rajah
$= \left(2 \times \frac{22}{7} \times 14\right) + \left(\frac{1}{2} \times 2 \times \frac{22}{7} \times 11\right) + \left(2 \times \frac{22}{7} \times 7\right) + 4 + 4 + 14$
$= 88 + 34\frac{4}{7} + 44 + 22$
$= 188\frac{4}{7}$ cm atau 188.57 cm

(b) Luas kawasan berlorek
$= \left(\frac{1}{2} \times \frac{22}{7} \times 14^2\right) + \left[\left(\frac{1}{2} \times \frac{22}{7} \times 14^2\right) - \left(\frac{1}{2} \times \frac{22}{7} \times 11^2\right)\right]$
$= 308 + \left(308 - 190\frac{1}{2}\right)$
$= 308 + 117\frac{6}{7}$
$= 425\frac{6}{7}$ cm^2 atau 425.86 cm^2

10. (a)

		Kesudahan bola yang dipilih		
		M	**B**	**K**
Kesudahan putaran cakera	**2**	(2, M)	(2, B)	(2, K)
	4	(4, M)	(4, B)	(4, K)
	5	(5, M)	(5, B)	(5, K)
	6	(6, M)	(6, B)	(6, K)
	7	(7, M)	(7, B)	(7, K)
	8	(8, M)	(8, B)	(8, K)

(b) (i) {(6, M), (6, B), (6, K)}

$$\text{Kebarangkalian} = \frac{3}{18} = \frac{1}{6}$$

(ii) {(5, M), (5, B), (5, K), (7, M), (7, B), (7, K), (2, M), (4, M), (6, M), (8, M)}

$$\text{Kebarangkalian} = \frac{10}{18} = \frac{5}{9}$$

11. (a) $11 - 6 = 5$ s

(b) $\frac{16 - v}{6} = \frac{5}{2}$

$16 - v = 15$

$v = 1$

(c) $\text{Jumlah jarak} = \left[\frac{1}{2} \times (16 + 1) \times 6\right] + (5 \times 16) + \left[\frac{1}{2} \times (16 + 30) \times 3\right]$

$= 51 + 80 + 69$

$= 200$ m

12. (a) (i) $(8, 4) \xrightarrow{\mathbf{T}} (10, 1) \xrightarrow{\mathbf{T}} (12, -2)$

(ii) $(8, 4) \xrightarrow{\mathbf{T}} (10, 1) \xrightarrow{\mathbf{S}} (10, -3)$

(b) (i) **W** = Putaran 90° lawan arah jam pada pusat (–2, –1)

(ii) **V** = Pembesaran dengan faktor skala 3 pada pusat $E(-1, 4)$

(c) Luas $EKLM = 3^2 \times$ Luas $ABCD$

$= 9 \times 30$

$= 270$ cm^2

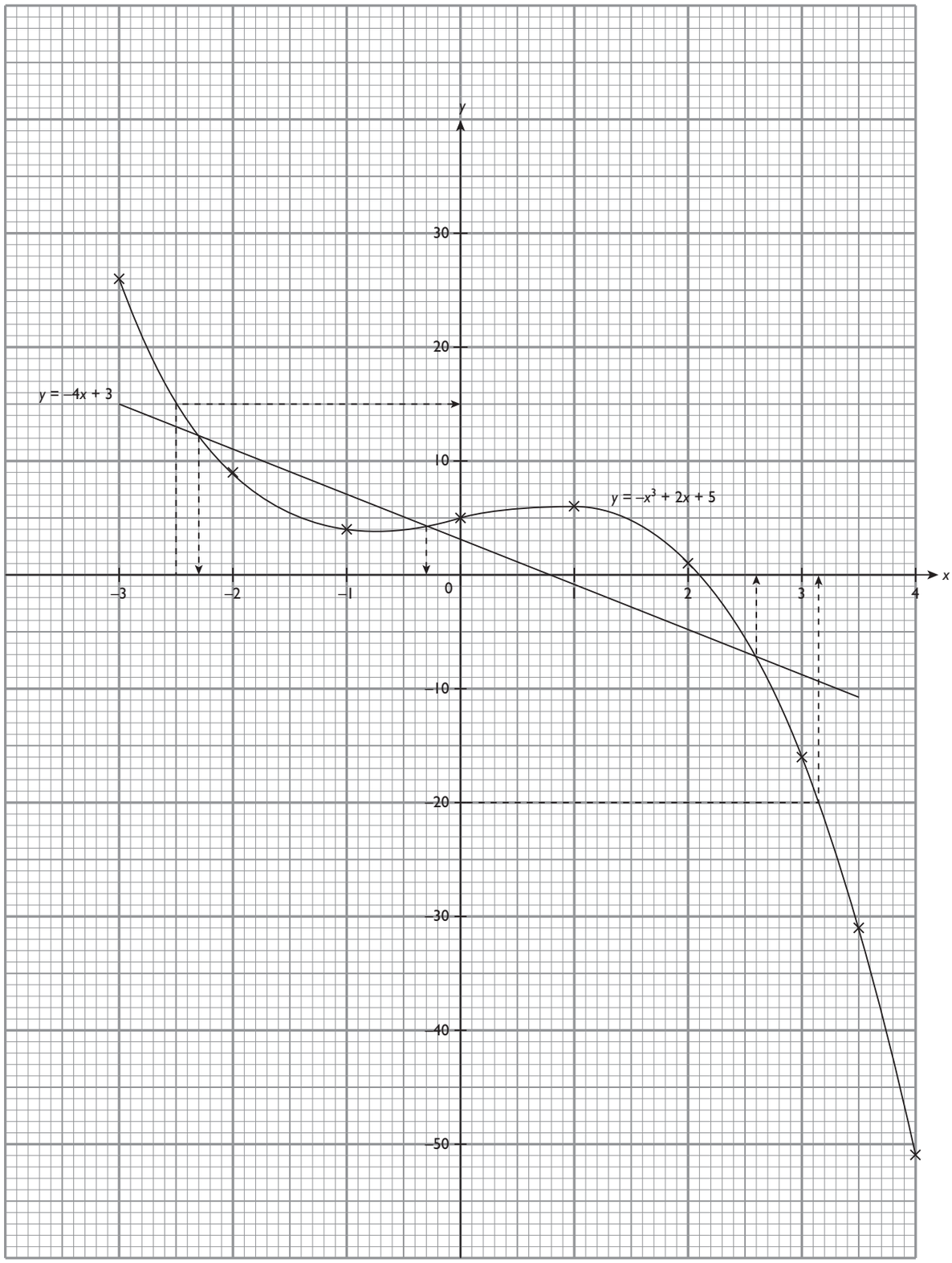
Luas kawasan berlorek $= 270 - 30$

$= 240$ cm^2

13. (a) $y = -x^3 + 2x + 5$

x	–3	–2	–1	0	1	2	3	3.5	4
y	26	9	4	5	6	1	–16	–30.9	–51

(b)



(c) (i) 15
(ii) 3.15

(d) $y = -x^3 + 2x + 5$ ..... ①
$0 = -x^3 + 6x + 2$ ..... ②
① – ②: $y = -4x + 3$
Persamaan garis lurus: $y = -4x + 3$
$x = -2.3, -0.3, 2.6$

14. (a) Min

$$= \frac{(5 \times 62) + (11 \times 67) + (24 \times 72) + (38 \times 77) + (40 \times 82) + (52 \times 87) + (20 \times 92) + (10 \times 97)}{200}$$

$$= \frac{16\ 315}{200}$$

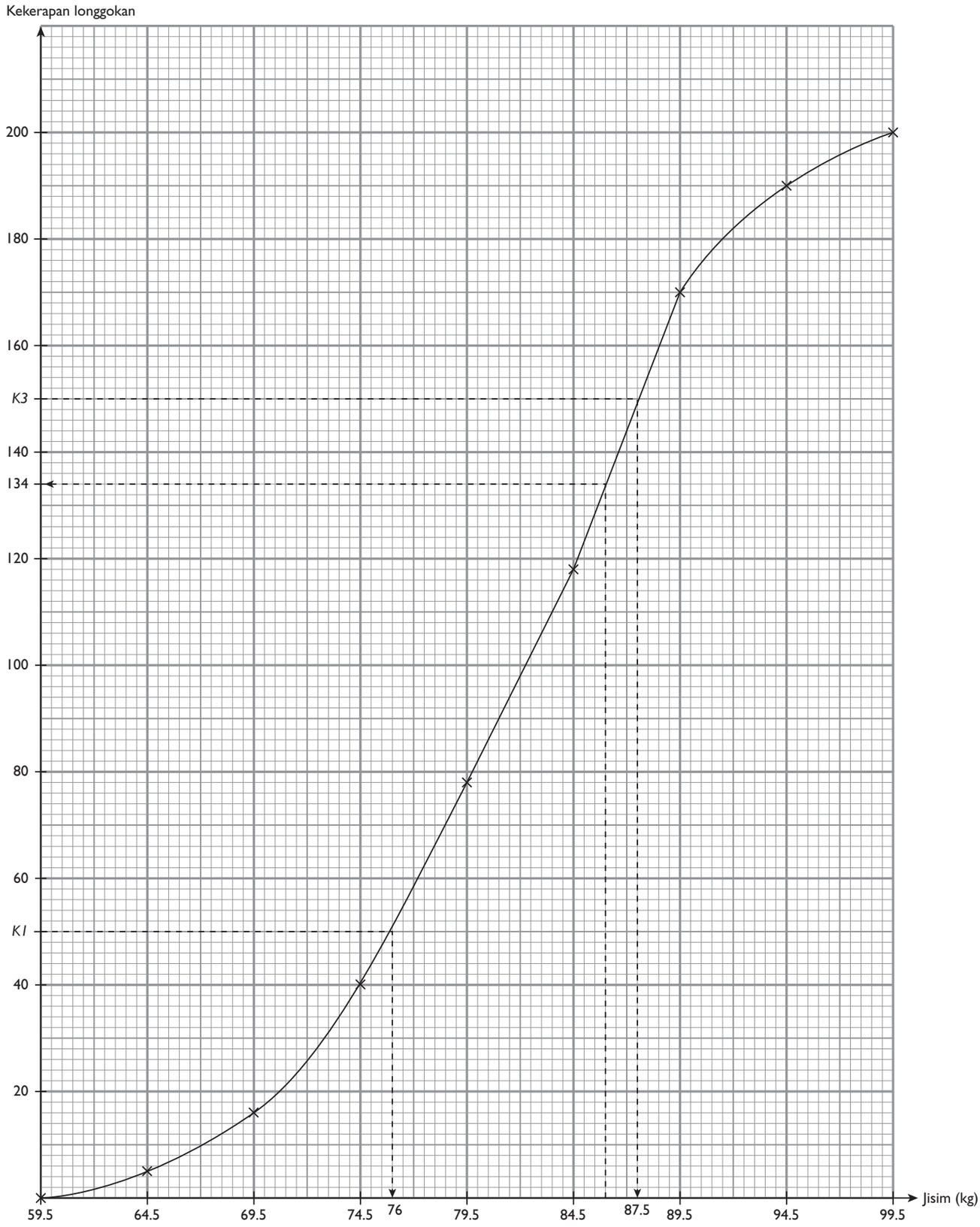
= 81.58 kg

(b)

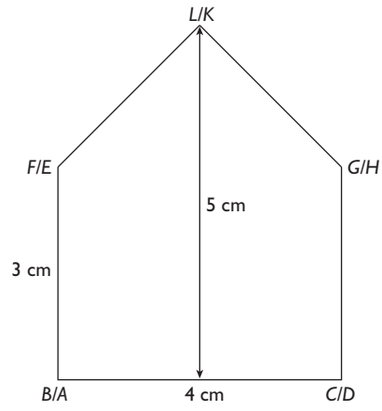
Sempadan atas	Kekerapan longgokan
59.5	0
64.5	5
69.5	16
74.5	40
79.5	78
84.5	118
89.5	170
94.5	190
99.5	200

(c) Rujuk graf di halaman 9.

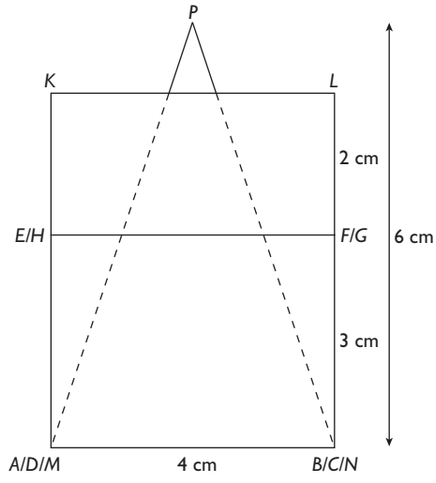
(d) (i) Julat antara kuartil
= kuartil ketiga – kuartil pertama
= 87.5 – 76
= 11.5
(ii) Bilangan pekerja yang mempunyai berat berlebihan
= 200 – 134
= 66


Kekerapan longgokan
200
180
160
K3
140
134
120
100
80
60
K1
40
20
59.5
64.5
69.5
74.5
76
79.5
84.5
87.5
89.5
94.5
99.5
Jisim (kg)

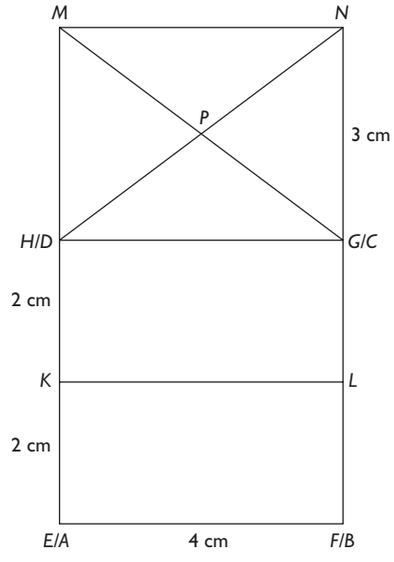
15. (a)



(b) (i)



(ii)



16. (a) Longitud $R = 180° - 35°$
$= 145°\text{T}$
$\therefore$ Kedudukan $R = (40°\text{U}, 145°\text{T})$

(b) Jarak terpendek $QR = 100 \times 60$
$= 6\,000$ batu nautika

(c) (i) Latitud $K = \frac{5\,760}{60} - 40$
$= 96 - 40$
$= 56°\text{S}$

(ii) Masa yang diambil $= \frac{5\,760}{800}$
$= 7.2$ jam
$= 7$ jam 12 minit

Waktu tiba di K:

	0 9	0 0
+	7	1 2
	1 6	1 2

$\rightarrow$ Jam 1612

JAWAPAN

PRAKTIS AWAL SPM

KERTAS 1

1. C

$\angle PKL = \dfrac{(5-2)\times 180°}{5}$
$= 108°$
$\angle PKR = 180° - 108°$
$= 72°$
$\angle QPK = 360° - 105° - 108°$
$= 147°$
$x = 360 - 55 - 72 - 147$
$= 86$

2. D

$y + x = 360° - 90°$
$= 210°$
$y < x$
Bilangan sisi = 10
$x = \dfrac{(10-2)\times 180°}{10}$
$= 144°$
$y = 270° - 144°$
$= 126°$
$126° < 144°$
∴ Maka, bilangan sisi bagi poligon itu ialah 10.

3. B

$\angle TUV$ (refleks) $= 360° - 124°$
$= 236°$
$\angle PQR$(refleks) $= 360° - 162°$
$= 198°$
Hasil tambah sudut pedalaman poligon $PQRUT$
$= (5-2)\times 180°$
$= 3\times 180°$
$= 540°$
$x + y = 540 - 236 - 38 - 198$
$= 68$

4. C

$\angle RSU = 180° - 54°$
$= 126°$
$\angle SUT = \dfrac{180° - 54°}{2}$
$= 63°$
$\angle SUV = 180° - 63°$
$= 117°$
Hasil tambah sudut pedalaman heksagon
$= (6-2)\times 180°$
$= 720°$
$2x = 720 - 123° - 140° - 117° - 126°$
$= 214$
$x = 107$

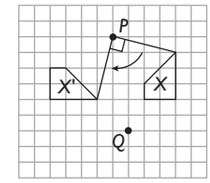
5. C

Sudut pedalaman pentagon sekata
$= \dfrac{(5-2)\times 180°}{5}$
$= 108°$
$x = 108 - 18$
$= 90$
$y = 180 - 56$
$= 124$
$x + y = 90 + 124$
$= 214$

6. C

Faktor skala $= \dfrac{ST}{SU}$
$= \dfrac{2}{6}$
$= \dfrac{1}{3}$

7. A



8. A

$(p+q)^2 - (p+q)(p-q)$
$= (p+q)(p+q) - (p+q)(p-q)$
$= p^2 + pq + pq + q^2 - (p^2 - pq + pq - q^2)$
$= 2pq + 2q^2$

9. C

$4x(x-y) - (2x+y)^2$
$= 4x(x-y) - (2x+y)(2x+y)$
$= 4x^2 - 4xy - (4x^2 + 2xy + 2xy + y^2)$
$= -8xy - y^2$

10. D

$(3p+2)(q-1) + (p-2)(q-2)$
$= 3pq - 3p + 2q - 2 + (pq - 2p - 2q + 4)$
$= 4pq - 5p + 2$

11. D

$\dfrac{1}{m-n} - \dfrac{3m}{m^2-n^2} = \dfrac{1(m+n)}{(m-n)(m+n)} - \dfrac{3m}{m^2-n^2}$
$= \dfrac{m+n-3m}{m^2-n^2}$
$= \dfrac{-2m+n}{m^2-n^2}$

12. B

$$\frac{4pq + 8q}{16 - q^2} \div \frac{8pq}{4 - q}$$
$$= \frac{4pq + 8q}{(4 - q)(4 + q)} \times \frac{4 - q}{8pq}$$
$$= \frac{4q(p + 2)}{8pq(4 + q)}$$
$$= \frac{p + 2}{2p(4 + q)}$$

13. D

$$\frac{5}{6r} \overset{\times 2}{\underset{\times 2}{}} - \frac{10r - 2}{12r}$$
$$= \frac{10 - 10r + 2}{12r}$$
$$= \frac{12 - 10r}{12r}$$
$$= \frac{{}^{1}\cancel{2}(6 - 5r)}{\cancel{12}r \atop 6}$$
$$= \frac{6 - 5r}{6r}$$

14. B

$$\frac{2t^2 + q}{3} = 3(2 + 5q)$$
$$2t^2 + q = 9(2 + 5q)$$
$$2t^2 + q = 18 + 45q$$
$$44q = 2t^2 - 18$$
$$q = \frac{{}^{1}\cancel{2}(t^2 - 9)}{\cancel{44} \atop 22}$$
$$= \frac{t^2 - 9}{22}$$

15. D

$$p = \frac{q^3}{4} + 5$$
$$\frac{q^3}{4} = p - 5$$
$$q^3 = 4p - 20$$
$$q = \sqrt[3]{4p - 20}$$

16. A

$$y = \frac{1}{2} + \frac{x}{5}$$
$$\frac{x}{5} = y - \frac{1}{2}$$
$$x = 5y - \frac{5}{2}$$
$$= \frac{10y - 5}{2}$$

17. B

$$\frac{4x}{3} + 7 = 9$$
$$\frac{4x}{3} = 2$$
$$4x = 6$$
$$x = \frac{6}{4}$$
$$= \frac{3}{2}$$

18. A

$$15 - \frac{4y}{5} = 7$$
$$\frac{4y}{5} = 8$$
$$4y = 40$$
$$y = 10$$

19. A

$$6 - \frac{2x}{3} = 2(x - 4)$$
$$6 - \frac{2x}{3} = 2x - 8$$
$$2x + \frac{2x}{3} = 6 + 8$$
$$\frac{8x}{3} = 14$$
$$8x = 42$$
$$x = \frac{21}{4}$$

20. A

$$p^2 = \left(2^{-3} \times 256^{\frac{3}{4}}\right)^2$$
$$= 2^{-6} \times 256^{\frac{3}{2}}$$
$$= \frac{1}{2^6} \times (\sqrt{256})^3$$
$$= \frac{1}{64} \times 16^3$$
$$= \frac{4\ 096}{64}$$
$$= 64$$

21. C

$$\left(\frac{p^{12} \times (9q^6)^{\frac{1}{2}}}{(p^{15}q^{25})^{\frac{1}{5}}}\right)^3$$
$$= \left(\frac{p^{12} \times 3q^3}{p^3q^5}\right)^3$$
$$= \frac{p^{36} \times 27q^9}{p^9q^{15}}$$
$$= 27q^{27}q^{-6}$$
$$= \frac{27p^{27}}{q^6}$$

22. D

$$\left(3^{10} \times 243\right)^{\frac{1}{5}} \div \left(p^{\frac{1}{4}}\right)^4$$
$$= \frac{3^2 \times \sqrt[5]{243}}{p}$$
$$= \frac{9 \times 3}{p}$$
$$= \frac{27}{p}$$

23. A

$$\frac{f^4g^3 \times (81f^4g^{12})^{\frac{1}{4}}}{f}$$
$$= \frac{f^4g^3 \times 3fg^3}{f}$$
$$= \frac{3f^5g^6}{f}$$
$$= 3f^4g^6$$

24. A

$$6m - 5 \leq 17 + 8m$$
$$-5 - 17 \leq 8m - 6m$$
$$2m \geq -22$$
$$m \geq -1$$

25. D

$$\frac{y}{3} - 9 \geq -11$$
$$\frac{y}{3} \geq -2$$
$$y \geq -6$$
$$1 - 4y > 7$$
$$4y < -6$$
$$y < -\frac{3}{2}$$
$\therefore y = -6, -5, -4, -3, -2$

26. B

$$7 - y \geq 4$$
$$y \leq 3$$
$$\frac{4y}{3} \geq -3$$
$$4y \geq -9$$
$$y \geq -\frac{9}{4}$$
$\therefore y = -2, -1, 0, 1, 2, 3$

27. A

$$6 - 3y \geq 8 + 4y$$
$$7y \leq -2$$
$$y \leq -\frac{2}{7}$$

28. D

Bilangan kek yang dijual pada bulan Julai dan Ogos
$= 560 - 5(40)$
$= 560 - 200$
$= 360$
Bilangan kek yang dijual pada bulan Ogos
$= 360 \div 3 \times 2$
$= 240$

29. C

$$120° + 80° + 3x° + 2x° + 30° = 360°$$
$$5x° = 130$$
$$x = 26$$

Sudut gred D $= 2 \times 26°$
$= 52°$
Bilangan murid yang memperoleh gred D
$= \frac{52}{360} \times 1\,440$
$= 208$

30. B

$$\text{Min} = \frac{7 \times 10 + 15 \times 20 + 6 \times 30 + 5 \times 40 + 3 \times 50}{36}$$
$$= \frac{900}{36}$$
$$= 25$$

KERTAS 2

1.
$$4x - y = -11 \quad \text{..... ①}$$
$$x + 3y = 7 \quad \text{..... ②}$$

① × 3: $12x - 3y = -33$ ..... ③
② + ③: $13x = -26$
$x = -2$

Gantikan $x = -2$ dalam ②.
$-2 + 3y = 7$
$3y = 9$
$y = 3$

$\therefore x = -2, y = 3$

2. Katakan harga bagi 1 kg langsat ialah RMx.
Harga bagi 1 kg rambutan ialah RMy.
$$x + y = 12 \quad \text{..... ①}$$
$$5x - y = 30 \quad \text{..... ②}$$

① + ②: $6x = 42$
$x = 7$

Gantikan $x = 7$ dalam ①.
$7 + y = 12$
$y = 5$
Harga bagi 1 kg rambutan ialah RM5.

3.

$5x + y = 15$ ..... ①
$-x + 4y = -24$ ..... ②

① × 4: $20x + 4y = 60$ ..... ③
② – ③: $-21x = -84$
$x = 4$

Gantikan $x = 4$ dalam ①.
$5(4) + y = 15$
$20 + y = 15$
$y = -5$
$\therefore x = 4, y = -5$

4. Katakan bilangan basikal ialah x dan bilangan basikal roda tiga ialah y.

$2x + 2y = 56$ ..... ①
$2x + 3y = 72$ ..... ②
② – ①: $y = 16$ ..... ③

Gantikan $y = 16$ dalam ①.
$2x + 32 = 56$
$2x = 24$
$x = 12$
$\therefore x = 12, y = 16$

Bilangan basikal ialah 12 buah.
Bilangan basikal roda tiga ialah 16 buah.

5. (a) Katakan x ialah bilangan pusingan lengkap

$$x \times 2 \times \frac{22}{7} \times 10 = 800$$

$$x = \frac{800 \times 7}{2 \times 22 \times 10}$$
$$= 12.73$$

Minimum bilangan pusingan lengkap = 13

(b) Katakan x *i*alah bahagian kek bersaiz besar yang bersamaan dengan dua kek bersaiz kecil.

$$x \times \frac{22}{7} \times \left(\frac{35}{2}\right)^2 = 2 \times \frac{22}{7} \times \left(\frac{21}{2}\right)^2$$

$$x = \frac{2 \times \frac{22}{7} \times \left(\frac{21}{2}\right)^2}{\frac{22}{7} \times \left(\frac{35}{2}\right)^2}$$

$$= \frac{18}{25}$$

6. (a) Luas kawasan berlorek
= Luas $OPQR$ – Luas OAB

$$= \left(\frac{3}{4} \times \frac{22}{7} \times 10^2\right) - \left(\frac{1}{4} \times \frac{22}{7} \times 8^2\right)$$
$$= 235.71 - 50.29$$
$$= 185.42 \text{ cm}^2$$

(b) Perimeter kawasan berlorek
$= PQR + RO + OA + AB + BO + OP$

$$= \left(\frac{270}{360} \times 2 \times \frac{22}{7} \times 10\right) + 10 + 8 + \left(\frac{90}{360} \times 2 \times \frac{22}{7} \times 8\right) + 8 + 10$$
$$= 47.14 + 18 + 12.57 + 18$$
$$= 95.71 \text{ cm}$$

7. Isi padu gabungan pepejal

$$= \frac{1}{2}(7)(8 + 10)(12) + \left(\frac{1}{2} \times \frac{22}{7} \times 3.5^2 \times 5\right)$$
$$= 756 + 96.25$$
$$= 852.25 \text{ cm}^3$$

8. Isi padu yang tinggal
= Isi padu kubus – Isi padu kon

$$= (12 \times 12 \times 12) - \left(\frac{1}{3} \times \frac{22}{7} \times 4.5^2 \times 12\right)$$
$$= 1\,728 - 254.57$$
$$= 1\,473.43 \text{ cm}^3$$

9. Isi padu gabungan pepejal
= Isi padu hemisfera + Isi padu silinder

$$= \left(\frac{2}{3} \times \frac{22}{7} \times 7^3\right) + \left(\frac{22}{7} \times 7^2 \times 14\right)$$
$$= 718.67 + 2\,156$$
$$= 2\,874.67 \text{ cm}^3$$