Fully-Worked Solutions

Summative Assessment

Section A

1 **A** Correct

B Correct

C Correct

D Wrong

$$\left(-1\frac{1}{3}\right)^4 = \left(-\frac{4}{3}\right)^4$$
$$= \left(-\frac{4}{3}\right) \times \left(-\frac{4}{3}\right) \times \left(-\frac{4}{3}\right) \times \left(-\frac{4}{3}\right)$$

Answer: **D**

2 $\sqrt[3]{7^2} = (2^7)^{\frac{1}{3}} = 2^{\frac{7}{3}}$

Answer: **C**

3 0.003500

↑↑↑↑

Significant digits

Number of significant figures for the number 0.003500 is 4.

Answer: **C**

4 $\overset{+1}{\curvearrowleft}$

8.167

↑

Second significant figure = 8.2

Answer: **B**

5 **A** Yes

$A = 2$, $n = 8$

$1 \leqslant A < 10$ and n is an integer.

B No

$A = 0.4$

$A < 1$

C No

$A = 37$

$A > 10$

D No

$A = 900$

$A > 10$

Answer: **A**

6 $\underbrace{0.00000472}$

$= 4.72 \times 10^{-6}$

Answer: **A**

7 **A** Correct

B Wrong

C Correct

D Correct

Answer: **B**

8 **A** Wrong

B Correct

C Correct

D Correct

Answer: **A**

9 **A** No

Trapeziums A and X are not similar.

B Yes

Trapeziums B and X are similar.

C No

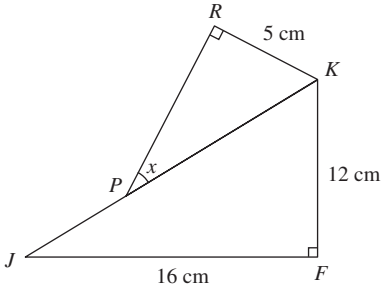
Trapeziums C and X are not similar.

D No

Trapeziums D and X are not similar.

Answer: **B**

10



$JK^2 = 16^2 + 12^2$

$= 400$

$JK = 20$ cm

$KP = 20$ cm $- 7$ cm

$= 13$ cm

$PR^2 = 13^2 - 5^2$

$= 144$

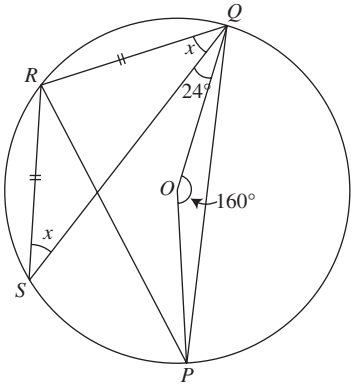
$PR = 12$ cm

$\tan x = \dfrac{KR}{PR}$

$= \dfrac{5}{12}$

Answer: **B**

11



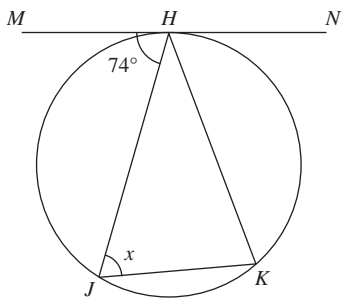
$$\angle OQP = \frac{1}{2} \times (180° - 160°)$$
$$= 10°$$
$$\angle PQS = 24° + 10°$$
$$= 34°$$
$$\angle PRS = 34°$$
$$\angle PRQ = \frac{1}{2} \times 160°$$
$$= 80°$$
$$\angle QRS = 34° + 80°$$
$$= 114°$$
$$x + x + 114° = 180°$$
$$2x + 114° = 180°$$
$$2x = 66°$$
$$x = 33°$$

Answer: **B**

12 **A** Yes
B No
C Yes
D Yes

Answer: **B**

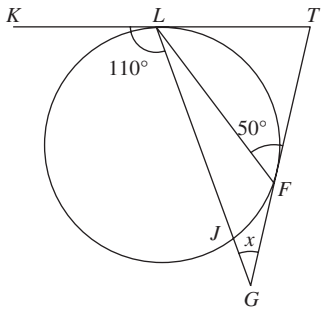
13



$$\angle MHJ = 2 \times \angle JHK$$
$$74° = 2 \times \angle JHK$$
$$\angle JHK = \frac{1}{2} \times 74°$$
$$= 37°$$
$$\angle JKH = \angle JHM$$
$$= 74°$$
$$x + 37° + 74° = 180°$$
$$x + 111° = 180°$$
$$x = 69°$$

Answer: **C**

14



$$FT = LT$$
$$\angle FLT = \angle LFT$$
$$= 50°$$
$$\angle FLG = 180° - 110° - 50°$$
$$= 20°$$
$$x + 20° = 50°$$
$$x = 30°$$

Answer: **B**

15 **A** No
B Yes
C No
D No

Answer: **B**

16 **A** Yes
B No
C No
D No

Answer: **A**

17 **A** Correct
B Correct
C Correct
D Wrong

Answer: **D**

18 Correct
Wrong
Wrong
Wrong

Answer: **A**

19 $5x + 2y = 8$
$$2y = -5x + 8$$
$$y = -\frac{5}{2}x + 4$$

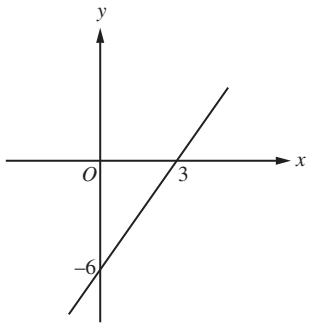
Gradient $= -\frac{5}{2}$

x-intercept $= 4$

Answer: **A**

20 $\frac{x}{3} - \frac{y}{6} = 1$

x-intercept $= 3$
y-intercept $= -6$



Answer: **B**

Section B

1 (a) (i) $625 = 5 \times 5 \times 5 \times 5$
$= 5^4$
$625 = 5^3 \quad (5^4)$

(ii) $\left(-\frac{2}{3}\right)^3 = \left(-\frac{2}{3}\right) \times \left(-\frac{2}{3}\right) \times \left(-\frac{2}{3}\right)$
$= -\frac{8}{27}$
$\left(-\frac{2}{3}\right)^3 = \left(-\frac{8}{27}\right) \quad \frac{8}{27}$

(b) (i) $2^9 \times (2^5)^2 = 2^9 \times 2^{10}$
$= 2^{9+10}$
$= 2^{19}$
$2^9 \times (2^5)^2 = 2^{19}$

(ii) $7^3 \div 7^x = 7^7$
$7^{3-x} = 7^7$
$3 - x = 7$
$x = -4$
$7^3 \div 7^{-4} = 7^7$

2 (a) (i) $400 + 90\,000 = 90\,400$
$= 9.04 \times 10^4$ ✗

(ii) $\frac{3}{5} \times 0.8 \times 10^{-7} = 0.48 \times 10^{-7}$
$= 4.8 \times 10^{-8}$ ✓

(b) Matured value $= P\left(1 + \frac{r}{n}\right)^{nt}$

(i) When $n = 2$,
Matured value $= \text{RM}150\,000\left(1 + \frac{0.048}{2}\right)^{2(5)}$
$= \text{RM}150\,000(1.024)^{10}$
$= \text{RM}190\,147.59$

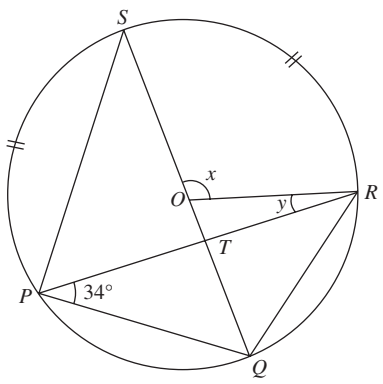
(ii) When $n = 4$,
Matured value $= \text{RM}150\,000\left(1 + \frac{0.048}{4}\right)^{4(5)}$
$= \text{RM}150\,000(1.012)^{20}$
$= \text{RM}190\,415.15$

Compounding frequency	Matured value
Every 6 months	RM190 415.15
Every quarter of the year	RM190 325.46
	RM190 147.59

3 (a) (i) Scale
= 7 cm : 14 cm
= 1 : 2

(ii) Scale
= 28 cm : 14 cm
= 2 : 1
$= 1 : \frac{1}{2}$

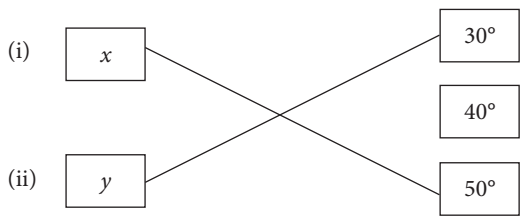
(b)



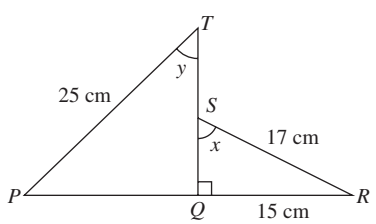
(i) $\angle QPS = 90°$
$\angle RPS = 90° - 34°$
$= 56°$
$x = 2 \times 56°$
$= 112°$
TRUE

(ii) $\angle PQS = \angle RPS$
$= 56°$
$\angle PSQ = 90° - 56°$
$= 34°$
$\angle PRQ = 34°$
$\angle RQS = 56°$
$\angle ORQ = 56°$
$y + 34° = 56°$
$y = 22°$
FALSE

4 (a)



(b)



(i) $QS^2 = 17^2 - 15^2$

$= 64$

$QS = 8$ cm

$\tan x = \frac{QR}{QS}$

$= \frac{15}{8}$

(ii) $\sin y = \frac{4}{5}$

$\frac{PQ}{25} = \frac{4}{5}$

$PQ = \frac{4}{5} \times 25$

$= 20$ cm

$QT^2 = 25^2 - 20^2$

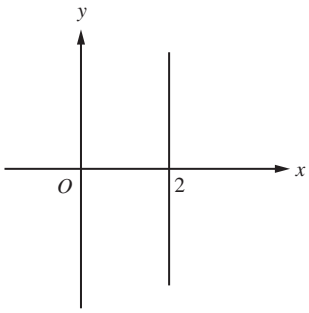
$= 225$

$QT = 15$ cm

$ST = 15$ cm $- 8$ cm

$= 7$ cm

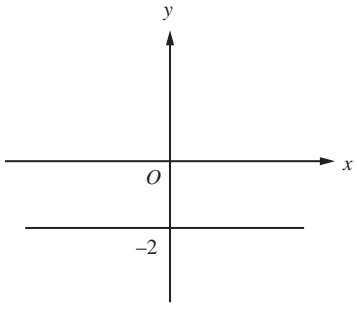
5 (a) (i)



Equation of straight line:

$x = 2$ ✓ $y = 2$ ☐

(ii)



Equation of straight line:

$x = -2$ ☐ $y = -2$ ✓

(b)

$y = 2x + 3$	$y = 10 - 3x$
$-\frac{1}{2}y = 3 - x$	$x + 3y = 9$

$y = 2x + 3$

$m = 2$

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

$-y = 6 - 2x$

$y = 2x - 6$

$m = 2$

$y = 10 - 3x$

$m = -3$

$x + 3y = 9$

$3y = -x + 9$

$y = -\frac{1}{3}x + 3$

$m = -\frac{1}{3}$

Straight lines $y = 2x + 3$ and $-\frac{1}{2}y = 3 - x$ are parallel.

Section C

1 (a) (i) $81^{\frac{3}{4}} \times 8^{\frac{2}{3}} \times 6^{-2}$

$= (3^4)^{\frac{3}{4}} \times (2^3)^{\frac{2}{3}} \times 6^{-2}$

$= 3^3 \times 2^2 \times 6^{-2}$

$= 27 \times 4 \times \frac{1}{36}$

$= 3$

(ii) $\frac{(15m^3n^{-5})^2 \times (3m^{-1})^{-3}}{10mn^2}$

$= \frac{225m^6n^{-10} \times \frac{1}{27}m^3}{10mn^2}$

$= \frac{5}{6}m^{6+3-1}n^{-10-2}$

$= \frac{5}{6}m^8n^{-12}$

(b) $4\,531.4 - (23.06 + 47.8) \times 5.2$

$= 4\,531.4 - 70.86 \times 5.2$

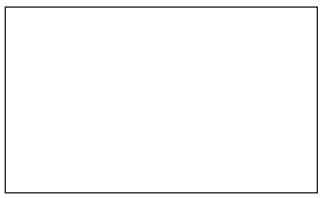
$= 4\,531.4 - 368.472$

$= 4\,162.928$

$= 4\,160$

(correct to three significant figures)

(c)



(i) Perimeter $= 2(6.7 \times 10^4 + 4.8 \times 10^4)$
$= 2(11.5 \times 10^4)$
$= 23 \times 10^4$
$= 2.3 \times 10^5$ m

(ii) Area $= 6.7 \times 10^4 \times 4.8 \times 10^4$
$= 32.16 \times 10^8$
$= 3.216 \times 10^9$ m^2

2 (a) Dividend received from the EPF saving
= RM800 000 × 0.06 × 1
= RM48 000

$$\text{ROI} = \frac{\text{RM48 000}}{\text{RM800 000}} \times 100\%$$
$$= 6\%$$

Return received from shop office rental
= RM3 500 × 12
= RM42 000

$$\text{ROI} = \frac{\text{RM42 000}}{\text{RM800 000}} \times 100\%$$
$$= 5.25\%$$

ROI received from EPF saving is higher than the ROI received from shop office rental.
∴ EPF saving is better.

(b) Loan = RM125 000 − RM5 000
= RM120 000

Total repayment
= RM120 000 + RM120 000 × 0.032 × 8
= RM120 000 + RM30 720
= RM150 720

$$\text{Monthly repayment} = \frac{\text{RM150 720}}{8 \times 12}$$
$$= \text{RM1 570}$$

(c) (i) $\dfrac{12.2 \text{ cm}}{\text{Actual width}} = \dfrac{1}{50}$

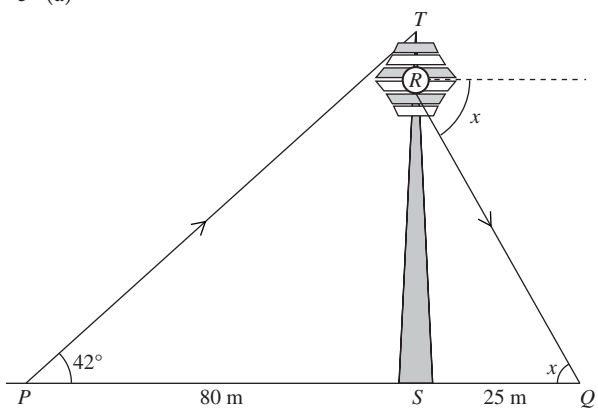
Actual width $= 12.2 \text{ cm} \times 50$
$= 610$ cm
$= 6.1$ m

(ii) Area of the shaded region
$= 2(13.41 \times 0.45 + 5.2 \times 0.76)$
$= 19.973$ m^2

Area of the badminton court $= 13.41 \times 6.1$
$= 81.801$ m^2

Percentage area of the shaded region of the badminton court $= \dfrac{19.973 \text{ m}^2}{81.801 \text{ m}^2} \times 100\%$
$= 24.42\%$

3 (a)



(i) $\dfrac{TS}{80} = \tan 42°$

$TS = 80 \times \tan 42°$
$= 72.03$ m

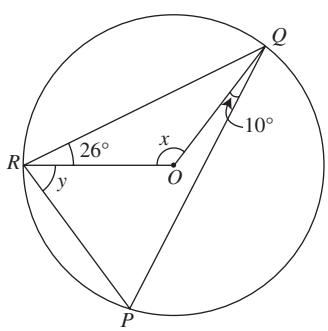
The height of the tower is 72.03 m.

(ii) $RS = 72.03 - 5$
$= 67.03$ m

$$\tan x = \frac{67.03}{25}$$
$$= 2.6812$$
$$x = 69° 33'$$

The angle of depression of point Q from point R is 69° 33'.

(b)



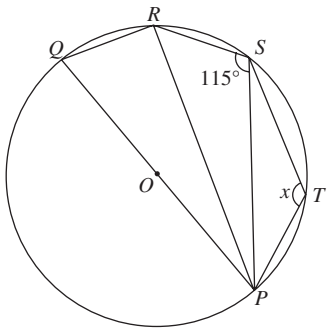
$x = 180° - 26° - 26° = 128°$

$\angle QPR = \dfrac{1}{2} \times 128°$
$= 64°$

$\angle OQR = 26°$

$y + 26° + 26° + 10° + 64° = 180°$
$y + 126° = 180°$
$y = 54°$

(c)



$\angle PRQ = 90°$

$\angle PQR = 180° - 115°$

$= 65°$

$\angle QPR = 90° - 65°$

$= 25°$

$\angle RPS = \angle QPR$

$= 25°$

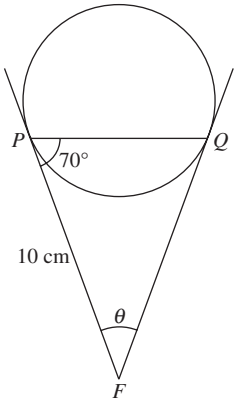
$\angle PRS = 180° - 115° - 25°$

$= 40°$

$x + 40° = 180°$

$x = 140°$

4 (a)



(i) $FP = FQ$

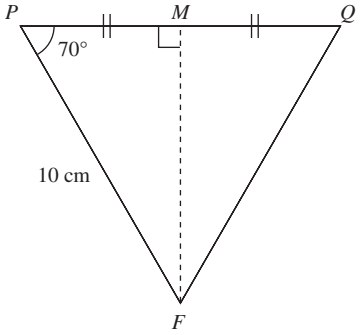
$\angle FQP = 70°$

$\theta + 70° + 70° = 180°$

$\theta + 140° = 180°$

$\theta = 40°$

(ii)



$\frac{PM}{10} = \text{kos } 70°$

$PM = 10 \times \text{kos } 70°$

$= 3.42 \text{ cm}$

$PQ = 2 \times 3.42$

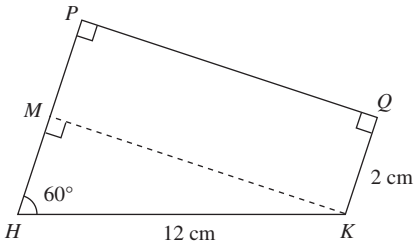
$= 6.84 \text{ cm}$

(b) (i) $p = s$

(ii) $q = u$

(iii) $t = r$

(c)



$\frac{HM}{12} = \cos 60°$

$HM = 12 \times \cos 60°$

$= 6 \text{ cm}$

$HP = HM + MP$

$= 6 \text{ cm} + 2 \text{ cm}$

$= 8 \text{ cm}$

$KM^2 = 12^2 - 6^2$

$= 108$

$KM = 10.39 \text{ cm}$

$PQ = 10.39 \text{ cm}$

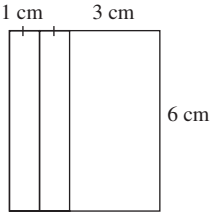
Perimeter of the shaded region

$= \left(\frac{60°}{360°} \times 2 \times 3.142 \times 8\right) + 2 + \left(\frac{120°}{360°} \times 2 \times 3.142 \times 2\right) + 10.39$

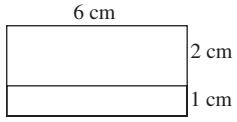
$= 8.379 + 2 + 4.189 + 10.39$

$= 24.96 \text{ cm}$

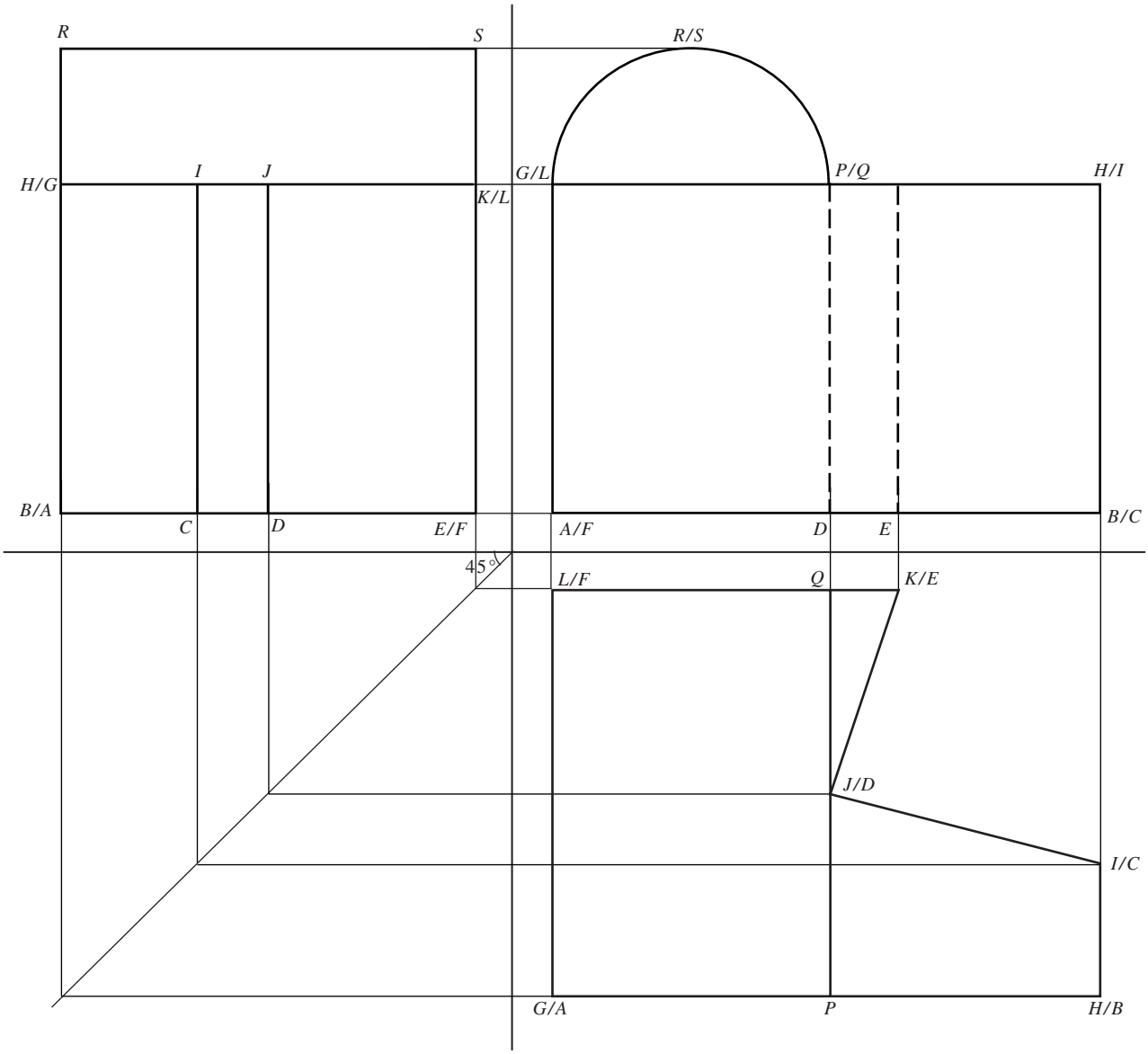
5 (a) (i)



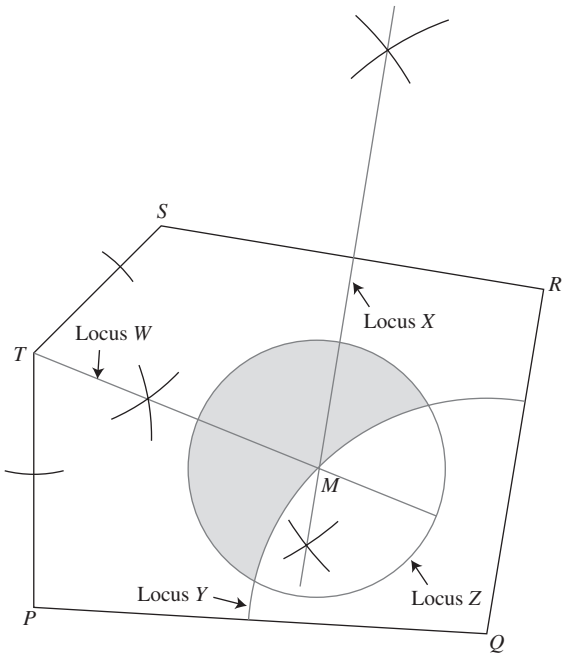
(ii)



(b)



6 (a) (i) & (ii)



(b) (i) Gradient PQ

$$= \frac{10 - 2}{8 - (-4)}$$

$$= \frac{8}{12}$$

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

$$y = \frac{2}{3}x + c$$

When $x = -4$, $y = 2$,

$$2 = \frac{2}{3}(-4) + c$$

$$2 = -\frac{8}{3} + c$$

$$c = 2 + \frac{8}{3}$$

$$= \frac{14}{3}$$

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

$$3y = 2x + 14$$

$$-2x + 3y = 14$$

The equation of the straight line PQ is $-2x + 3y = 14$.

(ii) $-2x + 3y = 14$ ①

$3x + 2y = 31$ ②

① × 3 + ② × 2, $9y + 4y = 42 + 62$

$$13y = 104$$

$$y = 8$$

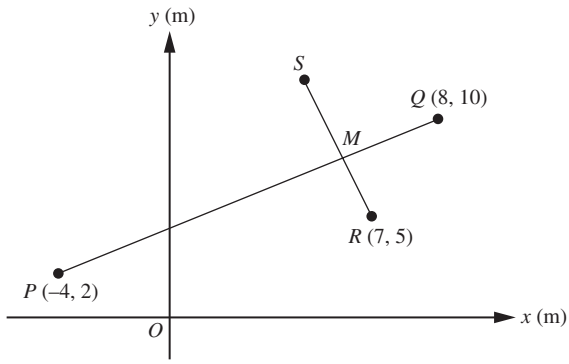
When $y = 8$,

$$-2x + 3(8) = 14$$

$$-2x + 24 = 14$$

$$-2x = -10$$

$$x = 5$$



The coordinates of M are (5, 8).

$$MR = \sqrt{(5 - 7)^2 + (8 - 5)^2}$$

$$= \sqrt{(-2)^2 + 3^2}$$

$$= \sqrt{13}\text{ m}$$

$$PM = \sqrt{(-4 - 5)^2 + (2 - 8)^2}$$

$$= \sqrt{(-9)^2 + (-6)^2}$$

$$= \sqrt{117}\text{ m}$$

$$PR = \sqrt{(-4 - 7)^2 + (2 - 5)^2}$$

$$= \sqrt{(-11)^2 + (-3)^2}$$

$$= \sqrt{130}\text{ m}$$

$PM^2 + MR^2 = 117 + 13$

$=130$

$PR^2 = 130$

$PM^2 + MR^2 = PR^2$

ΔPMR is a right-angled triangle.

$\therefore PQ$ is perpendicular to RS.