## QUICK REVISION (Forms 1 – 3)

### Unit 1 Ratio

**1** Ratio of Jenny's salary to the sum of salaries of Selvarani and Yeong is
$4 : (2 + 3) = 4 : 5$

$$\frac{\text{Jenny's salary}}{\text{Sum of salaries of Selvarani and Yeong}} = \frac{4}{5}$$

$$\frac{4\ 200}{\text{Sum of salaries of Selvarani and Yeong}} = \frac{4}{5}$$

Sum of salaries of Selvarani and Yeong

$$= \frac{5}{4} \times 4\ 200$$

$$= \text{RM}5\ 250$$

**2** $$\frac{\text{June}}{\text{May} + \text{June} + \text{July}} = \frac{65}{182}$$

$$\frac{5}{3+5+k} = \frac{5}{14}$$

$$\frac{5}{k+8} = \frac{5}{14}$$

$$k + 8 = 14$$

$$k = 6$$

**3** (a) Score of team $F$ : Score of team $G$ = 2 : 5

$$\frac{\text{Score of team } F}{\text{Score of team } G} = \frac{2}{5}$$

$$\frac{\text{Score of team } F}{45} = \frac{2}{5}$$

Score of team $F$ = $\frac{2}{5} \times 45$

= 18

(b) Score of team $F$ + Score of team $G$ + Score of team $H$ = 117

$18 + 45 + x = 117$

$x = 54$



## Unit 2 Linear Equations

**1** $z+3=\dfrac{2(1-3z)}{3}$

$3(z+3)=2(1-3z)$

$3z+9=2-6z$

$9z=-7$

$z=-\dfrac{7}{9}$

**2** $\dfrac{7}{3}-3n=-2(3-n)$

$7-9n=-6(3-n)$

$7-9n=-18+6n$

$15n=25$

$n=\dfrac{5}{3}$

**3** $14-3(2-d)=7d+6$

$14-6+3d=7d+6$

$4d=2$

$d=\dfrac{1}{2}$

**4** $\dfrac{2g-3}{4}=3-g$

$2g-3=12-4g$

$6g=15$

$g=\dfrac{5}{2}$

**5** $\dfrac{1}{3}j+2=5$

$\dfrac{1}{3}j=3$

$j=9$

**6** $c+\dfrac{3}{2}d=2$ … (1)

(1) × 4 : $4c+6d=8$ … (2)

$4c-d=22$ … (3)

(2) – (3) : $7d=-14$

$d=-2$

From (3) :

$4c-d=22$

$4c-(-2)=22$

$4c=20$

$c=5$

**7** $\dfrac{1}{2}v-3w=10$

$v-6w=20$ … (1)

$5v+6w=-8$ … (2)

(1) + (2) : $6v=12$

$v=2$

From (2) :

$5(2)+6w=-8$

$6w=-18$

$w=-3$

**8** $r+2s=10$ … (1)

$\dfrac{3}{2}r-s=7$ … (2)

(2) × 2 : $3r-2s=14$ … (3)

(1) + (3) : $4r=24$

$r=6$

From (1) :

$6+2s=10$

$2s=4$

$s=2$

**9** Let the prices of 1 kg of tomatoes and 1 kg of carrots are RM$x$ and RM$y$ respectively.

$3x+2y=18$ … (1)

$5x+4y=32$ … (2)

(1) × 2 : $6x+4y=36$ … (3)

(3) – (2) : $x=4$

From (2) :

$5(4)+4y=32$

$4y=12$

$y=3$

Hence, the prices of 1 kg of tomatoes and 1 kg of carrots are RM4 and RM3 respectively.



## Unit 3 Linear Inequalities

**1** $\frac{5+t}{3} \le 2t+5 < 6+t$

$\frac{5+t}{3} \le 2t+5$

$5+t \le 6t+15$

$-5t \le 10$

$t \ge \frac{10}{-5}$

$t \ge -2$

$2t+5 < 6+t$

$t < 1$

Hence, the integers $t$ that satisfy the inequalities are $-2$, $-1$, 0.

**2** $5(r-1) < 11+r$

$5r-5 < 11+r$

$4r < 16$

$r < 4$

$\frac{r+3}{2} \ge -3$

$r+3 \ge -6$

$r \ge -9$

The range of values of $r$ is $-9 \le r \le 3$.

**3** $-2 < \frac{2u-1}{3} \le 3$

$-2 < \frac{2u-1}{3}$

$-6 < 2u-1$

$-5 < 2u$

$u > -\frac{5}{2}$

$u > -2\frac{1}{2}$

$\frac{2u-1}{3} \le 3$

$2u-1 \le 9$

$2u \le 10$

$u \le 5$

Hence, the integers $u$ that satisfy the inequalities are $-2$, $-1$, 0, 1, 2, 3, 4, 5.

## Unit 4 Algebraic Fractions

**1** $\frac{5v+b}{8b} - \frac{v-4b}{2b}$

$= \frac{5v+b-4(v-4b)}{8b}$

$= \frac{v+17b}{8b}$

**2** $\frac{m}{2q} - \frac{1-m}{q}$

$= \frac{m-2(1-m)}{2q}$

$= \frac{m-2+2m}{2q}$

$= \frac{3m-2}{2q}$

**3** $\frac{x-2}{x^2} - \frac{x+3}{x}$

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

$= \frac{x-2-x^2-3x}{x^2}$

$= \frac{-2-2x-x^2}{x^2}$

**4** $\frac{d-2}{d} - \frac{2(d-3)}{d^2}$

$= \frac{d(d-2)-2(d-3)}{d^2}$

$= \frac{d^2-2d-2d+6}{d^2}$

$= \frac{d^2-4d+6}{d^2}$

**5** $\frac{m+5}{mn} - \frac{m}{n(m+5)}$

$= \frac{(m+5)^2-m^2}{mn(m+5)}$

$= \frac{m^2+10m+25-m^2}{mn(m+5)}$

$= \frac{5(2m+5)}{mn(m+5)}$



## Unit 5 Data Handling

**1** Total number of male tourists
= 40 + 10 + 40
= 90

Total number of female tourists
= 30 + 30 + 50
= 110

$$x = \frac{90}{90+110} \times 360 = 162$$

**2** Angle of sector for buses

$$= \frac{20}{(25+20+30)} \times 360^{\circ}$$

$$= \frac{20}{75} \times 360^{\circ}$$

$$= 96^{\circ}$$

Angle of sector for cars

$$= \frac{30}{75} \times 360^{\circ}$$

$$= 144^{\circ}$$

Difference of angles of sectors between buses and cars
$= 144^{\circ} - 96^{\circ}$
$= 48^{\circ}$

**3** Number of cups of tea sold is $\frac{7}{4}$ of the number of cups of coffee sold, which is

$$\frac{7}{4} \times 40 = 70$$

Angle of sector which represents the number of cups of tea sold

$$= \frac{70}{30+70+40+100} \times 360^{\circ}$$

$$= \frac{70}{240} \times 360^{\circ}$$

$$= 105^{\circ}$$

**4** Let the number of students of school $Q$ be $n$.

$$\frac{n}{30+n+15+20} \times 360^{\circ} = 48^{\circ}$$

$$\frac{n}{n+65} \times 360 = 48$$

$$360n = 48(n+65)$$

$$360n = 48n + 3\,120$$

$$312n = 3\,120$$

$$n = 10$$

Hence, the number of students of school $Q$ is 10.

## Unit 6 Algebraic Formulae

**1** $w = \frac{v}{3+v}$

$$w(3+v) = v$$

$$3w + wv = v$$

$$3w = v - wv$$

$$3w = v(1-w)$$

$$v = \frac{3w}{1-w}$$

**2** $P = \frac{1}{2}\sqrt{\frac{R}{Q}}$

$$P^2 = \frac{R}{4Q}$$

$$R = 4P^2Q$$

**3** $\frac{2m}{n} + 1 = m$

$$2m + n = mn$$

$$n = mn - 2m$$

$$n = m(n-2)$$

$$m = \frac{n}{n-2}$$

**4** $y = \frac{x-2}{x+1}$

$$y(x+1) = x-2$$

$$xy + y = x - 2$$

$$xy - x = -y - 2$$

$$x(y-1) = -y - 2$$

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

$$x = \frac{-(y+2)}{-(1-y)}$$

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

**5** $\frac{1}{w} + \frac{1}{u} = \frac{1}{4}$

$$\frac{1}{u} = \frac{1}{4} - \frac{1}{w}$$

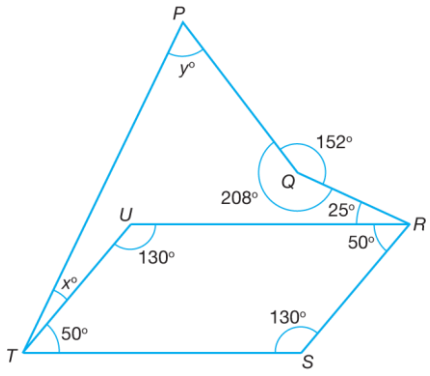
$$\frac{1}{u} = \frac{w-4}{4w}$$

$$\frac{u}{1} = \frac{4w}{w-4}$$

$$u = \frac{4w}{w-4}$$

## Unit 7 Polygons

**1**




Sum of the interior angles of a pentagon

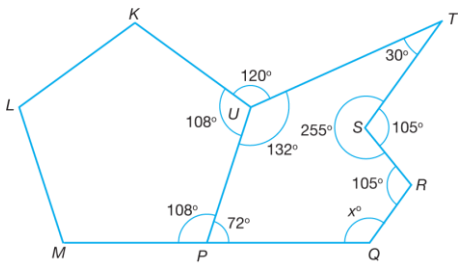
$=(5-2)\times 180^{o}$

$=\ 540^{o}$

$(x+50)+130+75+208+y=540$

$x+y=77$

**2**




Sum of the interior angles of a hexagon

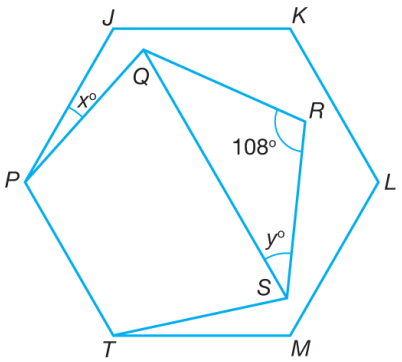
$=(6-2)\times 180^{o}$

$=\ 720^{o}$

$72+x+105+255+30+132=720$

$x=126$

**3**

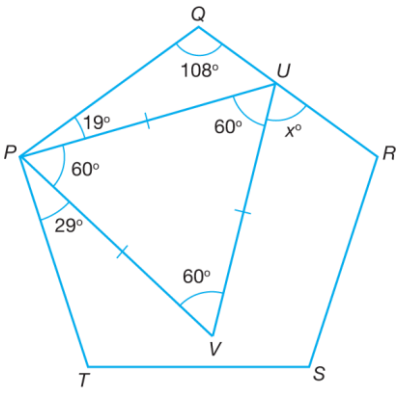



$y=\dfrac{180-108}{2}=36$

$x=120-108=12$

$x+y=36+12=48$

**4**



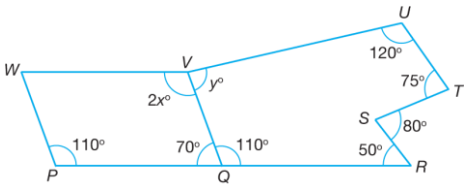

$\angle PUQ=180^{o}-19^{o}-108^{o}=53^{o}$

$QUR$ is a straight line

$x+60+53=180$

$x=67$

**5**




$2x=110$

$x=55$

Sum of the interior angles of a hexagon

$=(6-2)\times 180^{o}=720^{o}$

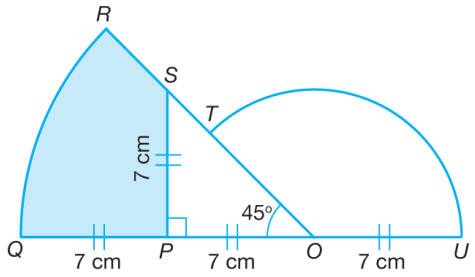
$110+50+(360-80)+75+120+y=720$

$y=85$

$x+y=55+85=140$

**Unit 8 Circles**

**1**




(a) Area of shaded region
= Area of sector $OQR$ – Area of $\Delta OPS$

$$= \frac{45}{360} \times \frac{22}{7} \times 14^2 - \frac{1}{2} \times 7 \times 7$$

$$= 77 - \frac{49}{2}$$

$$= 52\frac{1}{2} \text{ cm}^2$$

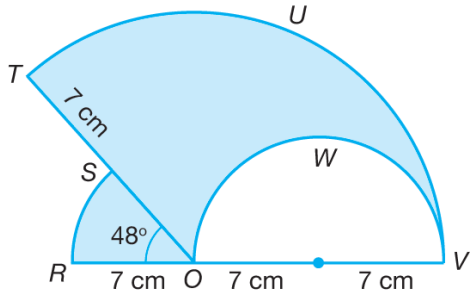
(b) Perimeter of the whole diagram
= 7 + 7 + 7 + Arc length $QR$ + $RT$ + Arc length $TU$

$$= 21 + \frac{45}{360} \times 2 \times \frac{22}{7} \times 14 + 7 + \frac{135}{360} \times 2 \times \frac{22}{7} \times 7$$

$$= 21 + 11 + 7 + 16\frac{1}{2}$$

$$= 55\frac{1}{2} \text{ cm}$$

**2**




(a) Perimeter of the whole diagram
= 7 + 7 + 7 + 7 + Arc length $RS$ + Arc length $TUV$

$$= 28 + \frac{48}{360} \times 2 \times \frac{22}{7} \times 7 + \frac{132}{360} \times 2 \times \frac{22}{7} \times 14$$

$$= 28 + 5\frac{13}{15} + 32\frac{4}{15}$$

$$= 66\frac{2}{15} \text{ cm}$$

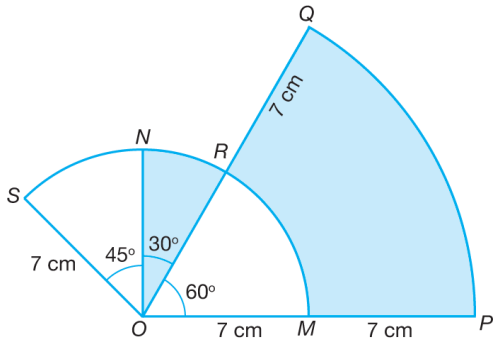
(b) Area of shaded region
= Area of sector $ORS$ + Area of sector $OTUV$ – Area of semicircle $OWC$

$$= \frac{48}{360} \times \frac{22}{7} \times 7^2 + \frac{132}{360} \times \frac{22}{7} \times 14^2 - \frac{1}{2} \times \frac{22}{7} \times 7^2$$

$$= 20\frac{8}{15} + 225\frac{13}{15} - 77$$

$$= 169\frac{2}{5} \text{ cm}^2$$

**3**




(a) Perimeter of the whole diagram
+ 7 + 7 + 7 + 7 + Arc length $SNR$ + Arc length $QP$

$$= 7 + 7 + 7 + 7 + \frac{75}{360} \times 2 \times \frac{22}{7} \times 7 + \frac{60}{360} \times 2 \times \frac{22}{7} \times 14$$

$$= 28 + 9\frac{1}{6} + 14\frac{2}{3}$$

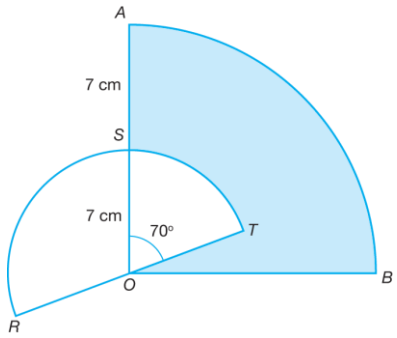
$$= 51\frac{5}{6} \text{ cm}$$

(b) Area of shaded region
= Area of sector $NOR$ + Area of sector $OQP$ – Area of sector $ORM$

$$= \frac{30}{360} \times \frac{22}{7} \times 7^2 + \frac{60}{360} \times \frac{22}{7} \times 14^2 - \frac{60}{360} \times \frac{22}{7} \times 7^2$$

$$= 89\frac{5}{6} \text{ cm}^2$$

**4**




(a) Area of shaded region
= Area of quadrant *OAB* – Area of sector *OST*

$$= \frac{90}{360}\times\frac{22}{7}\times14^2 - \frac{70}{360}\times\frac{22}{7}\times7^2$$

$$= 124\frac{1}{18}\ \text{cm}^2$$

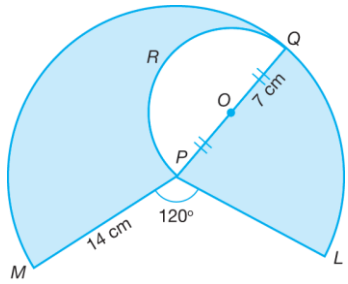
(b) Perimeter of the whole diagram
= 7 + 7 + 14 + Arc length *RS* + Arc length *AB*

$$= 28 + \frac{110}{360}\times2\times\frac{22}{7}\times7 + \frac{1}{4}\times2\times\frac{22}{7}\times14$$

$$= 28 + 13\frac{4}{9} + 22$$

$$= 63\frac{4}{9}\ \text{cm}$$

**5**




(a) Perimeter of the whole diagram
= Arc length *MQL* + 14 + 14

$$= \frac{240}{360}\times2\times\frac{22}{7}\times14 + 28$$

$$= 58\frac{2}{3} + 28$$

$$= 86\frac{2}{3}\ \text{cm}$$

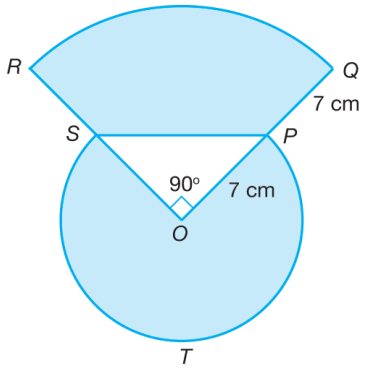
(b) Area of shaded region
= Area of sector *MQL* – Area of semicircle *PRQ*

$$= \frac{240}{360}\times\frac{22}{7}\times14^2 - \frac{1}{2}\times\frac{22}{7}\times7^2$$

$$= 410\frac{2}{3} - 77$$

$$= 333\frac{2}{3}\ \text{cm}^2$$

**6**




(a) Perimeter seluruh rajah
= 7 + 7 + Arc length *RQ* + Arc length *STR*

$$= 14 + \frac{90}{360}\times2\times\frac{22}{7}\times14 + \frac{270}{360}\times2\times\frac{22}{7}\times7$$

= 14 + 22 + 33
= 69 cm

(b) Area of shaded region
= Area of sector *ORQ* – Area of Δ*OSP* + Area of sector *STP*

$$= \frac{90}{360}\times\frac{22}{7}\times14^2 - \frac{1}{2}\times7\times7 + \frac{270}{360}\times\frac{22}{7}\times7^2$$

$$= 245\ \text{cm}^2$$

## Unit 9 Volumes of Solids

**1** Volume of prism + Volume of half-cylinder

$= 379\frac{5}{7}\ \text{cm}^3$

$\frac{1}{2}(6)(8)(t)+\frac{1}{2}\left(\pi j^2 t\right)=\frac{2\ 658}{7}$

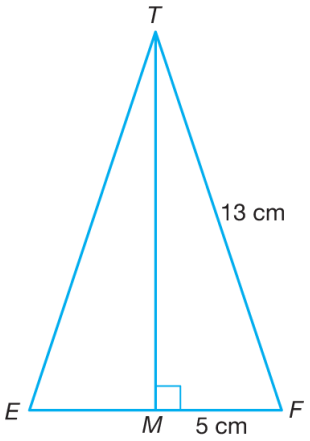
$24t+\frac{1}{2}\times\frac{22}{7}\times(5)^2 t=\frac{2\ 658}{7}$

$24t+\frac{275}{7}t=\frac{2\ 658}{7}$

$\frac{443}{7}t=\frac{2\ 658}{7}$

$t=6$

**2** (a)




$TM=\sqrt{13^2-5^2}=\sqrt{144}=12\ \text{cm}$

(b) Volume of prism + Volume of half-cone

$=\left(\frac{1}{2}\times10\times12\right)\times9+\frac{1}{2}\times\frac{1}{3}\times\frac{22}{7}\times(5)^2(12)$

$=540+157\frac{1}{7}$

$=697\frac{1}{7}\ \text{cm}^3$

**3** Volume of prism – Volume of half-cylinder

$=\frac{1}{2}(4+9)(6)\times10-\frac{1}{2}\times\frac{22}{7}\times2^2\times10$

$=390-62\frac{6}{7}$

$=327\frac{1}{7}\ \text{cm}^3$

## Unit 10 Scale Drawings

**1** (a) $\frac{\text{Size of drawing}}{\text{Size of object}}=\frac{16}{3.2\times10^5}$

$=\frac{16}{320\ 000}$

$=\frac{1}{20\ 000}$

$=1:20\ 000$

(b) $\frac{\text{Size of drawing}}{\text{Size of object}}=\frac{1}{20\ 000}$

$\frac{6}{\text{Actual width}}=\frac{1}{20\ 000}$

Actual width = 120 000 cm

$=\frac{120\ 000}{100\ 000}\ \text{km}$

= 1.2 km

**2** Let the side of the actual square = $x$ cm

Actual area = 225 cm$^2$

$x^2=225$

$x$ = 15 cm

$\frac{\text{Size of drawing}}{\text{Size of object}}=\frac{1}{\frac{1}{4}}=4$

$\frac{\text{Size of drawing}}{15}=4$

Size of drawing = 60 cm

Area of drawing = 60 × 60

= 3 600 cm$^2$



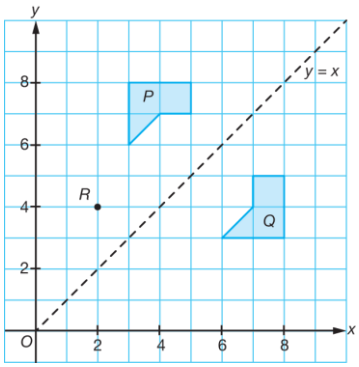
 

## Unit 11 Isometric Transformations

**1** The transformation that maps the point $P(2, 3)$ to point $Q(6, 6)$ is the translation $\begin{pmatrix} 4 \\ 3 \end{pmatrix}$. Hence, imej bagi titik $D(4, 1)$ ialah $D'$ $(8, 4)$.

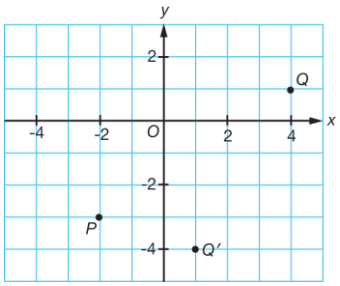
**2** Point $R$ is the image of point $Q$ under the translation $\begin{pmatrix} 3 \\ 4 \end{pmatrix}$. If point $N(-2, 3)$ is the image of point $M$ under the same translation, then the coordinates of point $M$ are $(-5, -1)$.

**3**



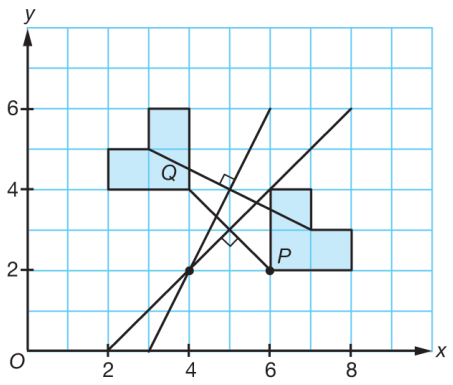

The axis of reflection is $y = x$. The coordinates of point $R$ are $(4, 2)$.

**4**




Point $Q'(1, -4)$ is the image of point $Q(4, 1)$ under a $90^{\circ}$ clockwise rotation about the origin. Hence, the coordinates of the image of the point $P(-2, -3)$ under the same rotation are $(-3, 2)$.

**5**




The centre of rotation is the point of intersection of the two perpendicular bisectors, which is (4, 2).

## Unit 12 Measures of Central Tendencies

**1** (a)

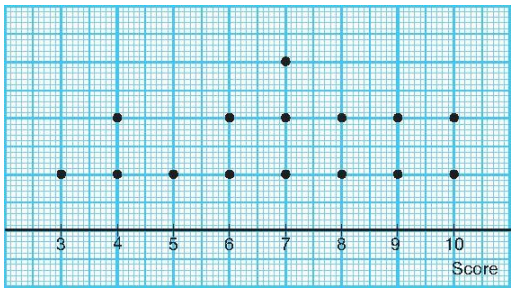
| Stem | Leaf |
|---|---|
| 3 | 7 |
| 4 | 4 6 7 |
| 5 | 0 5 8 9 |
| 6 | 0 1 2 7 7 7 |
| 7 | 0 2 3 4 4 6 7 9 |
| 8 | 2 6 8 |

(b) Mean $= \frac{1\,631}{25} = 65.24$

Mode = 67

Median = 67

**2** (a)




(b) Mean $= \frac{103}{15} = 6.867$

Mode = 7

Median = 7

**3**

| Distance (km) | Frequency ($f$) | $fx$ |
|---|---|---|
| 1 | 9 | 9 |
| 2 | 11 | 22 |
| 3 | 8 | 24 |
| 4 | 7 | 28 |
| 5 | 5 | 25 |
| Sum | 40 | 108 |

(a) Mean distance $= \frac{\sum fx}{\sum f} = \frac{108}{40} = 2.7$ km

(b) Angle of sector of the mode

$= \frac{11}{40} \times 360^{o}$

$= 99^{o}$

## Unit 13: Indices

**1** $\left(p^2n^{-3}\right)^3 \times pn^8$

$= p^6n^{-9} \times pn^8$

$= \frac{p^7}{n}$

**2** $\left(x^{12}y^{-8}\right)^{\frac{1}{4}} \times \frac{z^4}{y^4z^{-1}}$.

$= x^3y^{-2} \times \frac{z^5}{y^4}$

$= \frac{x^3z^5}{y^6}$

**3** $\frac{\left(8m^3y^{-4}\right)^2}{\left(4m^{-2}y^3\right)^3}$

$= \frac{64m^6y^{-8}}{64m^{-6}y^9}$

$= \frac{m^{12}}{y^{17}}$

**4** $\left(5g^4w^{-2}\right)^2 \div \left(gw^{-3}\right)^5$

$= \frac{25g^8w^{-4}}{g^5w^{-15}}$

$= 25g^3w^{11}$

**5** $\frac{9r^6t^4 \times 24r^{-1}t^2}{\left(6rt^{-2}\right)^2}$

$= \frac{9r^5t^6 \times 24}{36r^2t^{-4}}$

$= 6r^3t^{10}$



## Unit 14 Standard Form

**1** (a) 3 080 (b) 600
(c) 24.2 (d) 13 880
(e) 0.00046 (f) 0.0801
(g) 4.1 (h) 1

**2** (a) $(9 \times 10^4) \times (8 \times 10^8)$

$= 72 \times 10^{12}$

$= 7.2 \times 10 \times 10^{12}$

$= 7.2 \times 10^{13}$

(b) $\dfrac{2 \times 10^{14}}{5 \times 10^8}$

$= 0.4 \times 10^6$

$= 4 \times 10^{-1} \times 10^6$

$= 4.0 \times 10^5$

(c) $6.85 \times 10^{-8} + 1.2 \times 10^{-9}$

$= 6.85 \times 10^{-8} + 1.2 \times 10^{-8} \times 10^{-1}$

$= 6.85 \times 10^{-8} + 0.12 \times 10^{-8}$

$= (6.85 + 0.12) \times 10^{-8}$

$= 6.97 \times 10^{-8}$

**3** (a) 1 year $= 365 \times 24 \times 60 \times 60$

$= 31\,536\,000$

$= 3.1536 \times 10^7$ seconds

(b) 1 light year

$= 3.1536 \times 10^7 \times 300\,000$

$= 9.4608 \times 10^{12}$ km

## Unit 15 Consumer Mathematics: Savings and Investments, Credit and Debt

**1** Simple interest

$= \dfrac{2.5}{100} \times 1.25 \times 5\,500$

= RM171.88

**2** $MV = P\left(1 + \dfrac{r}{n}\right)^{nt}$

$= 25\,000\left(1 + \dfrac{0.03}{4}\right)^{4(2)}$

= RM 26 539.97

**3** Dividend = 10 000 × 10 sen × 2

= 200 000 sen

= RM2 000

Profit of shares
= RM3.00 × 10 000
= RM30 000

Profit of investment
= RM2 000 + RM30 000
= RM32 000

**4** Loan = $\dfrac{80}{100} \times 50\,000$ = RM40 000

$P + Prt = 40\,000 + 40\,000 \times 0.03 \times 5$

= RM 46 000

Monthly instalment

$= \dfrac{46\,000}{5 \times 12}$

= RM 766.67

**1** $\angle STQ = 180^o - 115^o = 65^o$

Alternate segment theorem

$x = \angle QST$

$x + 65 + 65 = 180$

Sum of angles in $\Delta\, QST$

$x = 50$

**2** $\angle FJH = 180^o - 110^o = 70^o$

Sum of opposite interior angles in a cyclic quadrilateral is $180^o$.

$\angle LJF = \angle EFL = x$

Alternate segment theorem

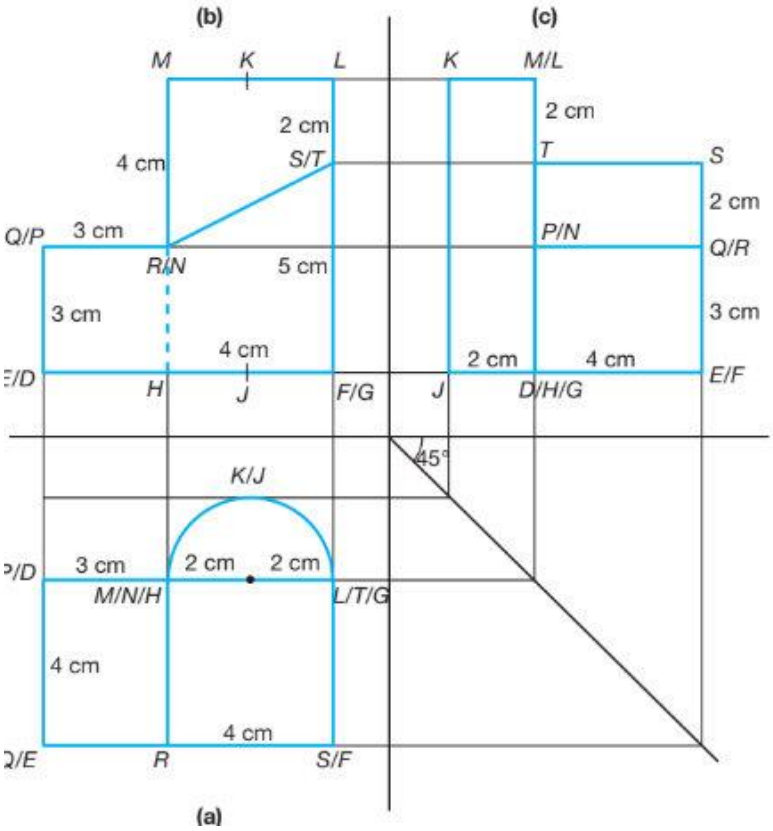
Hence, $x + 70 + 230 = 360$

$x = 60$

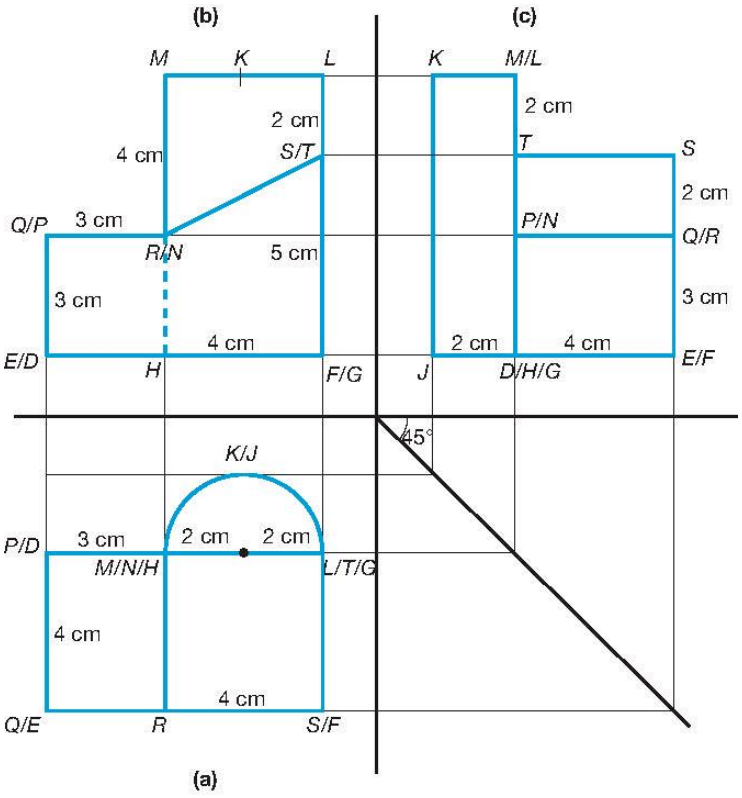


**1**




**2**

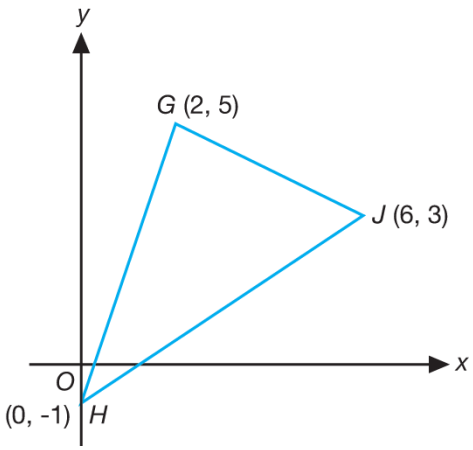




## Unit 18 Straight Lines

**1**




(a) Gradient of $GJ = \frac{3-5}{6-2} = \frac{-2}{4} = -\frac{1}{2}$

Equation of $GJ$ is $y = -\frac{1}{2}x + c$

At the point $G(2, 5)$,

$5 = -\frac{1}{2}(2) + c$

$c = 6$

Hence, the equation of $GJ$ is

$y = -\frac{1}{2}x + 6$

(b) At the $x$-axis, $y = 0$

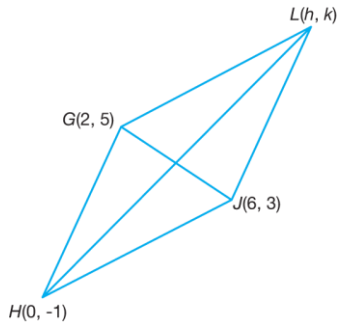
$0 = -\frac{1}{2}x + 6$

$\frac{1}{2}x = 6$

$x = 12$

$x$-intercept = 12

(c)




Midpoint of $HL$ = Midpoint of $GJ$

$\left(\frac{h}{2}, \frac{k-1}{2}\right) = \left(\frac{2+6}{2}, \frac{5+3}{2}\right)$

$\left(\frac{h}{2}, \frac{k-1}{2}\right) = (4, 4)$

Equating of the $x$-coordinates,

$\frac{h}{2} = 4$

$h = 8$

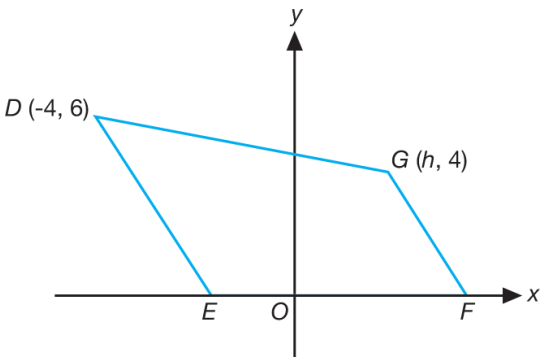
Equating of the $y$-coordinates,

$\frac{k-1}{2} = 4$

$k = 9$

Hence, the coordinates of point $L$ are (8, 9).

**2**




(a) The equation of $DG$ is $x + 3y = 15$.

For point $G(h, 4)$,

$h + 3(4) = 15$

$h = 3$

(b) Let $F$ be point $(p, 0)$.

$m_{GF} = -2$

$\frac{4-0}{3-p} = -2$

$4 = -6 + 2p$

$p = 5$

Hence, the coordinates of point $F$ are (5, 0).

(c) Gradient of $DE$ = Gradient of $GF$ = $-2$

The equation of $DE$ is

$y = -2x + c$

For point $D(-4, 6)$,

$6 = -2(-4) + c$

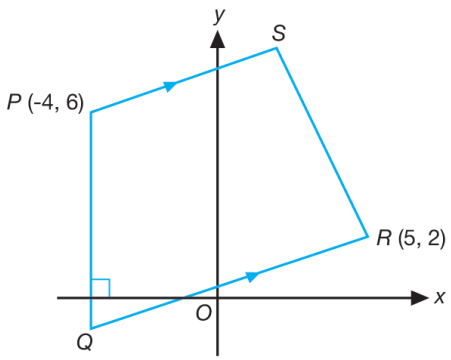
$c = -2$

Hence, the equation of $DE$ is $y = -2x - 2$.



**3**




(a) $m_{QR} = \frac{1}{2}$

$$\frac{2-q}{5-(-4)} = \frac{1}{2}$$

$$4 - 2q = 9$$

$$-2q = 5$$

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

Hence, the coordinates of point $Q$ are $\left(-4, -\frac{5}{2}\right)$.

(b) Equation of $PS$ is $y = \frac{1}{2}x + c$.

For point $P(-4, 6)$,

$$6 = \frac{1}{2}(-4) + c$$

$$c = 8$$

Hence, the equation of $PS$ is

$$y = \frac{1}{2}x + 8$$

$$2y - x = 16$$

(c) Equation of $RS$: $3y + 7x = 41$ … (1)

Equation of $PS$: $2y - x = 16$ … (2)

(2) × 7 : $14y - 7x = 112$ … (3)

(1) + (3) : $17y = 153$

$$y = 9$$

From (1) : $3(9) + 7x = 41$

$$x = 2$$

Hence, the coordinates of point $S$ are (2, 9).

