1. $2\ 20x\ 100\ 50x^2$

$2\ 10x\ 50\ \ 25x^2$

$5\ 5x\ \ 25\ \ 25x^2$ — B_1 *for simplify*

$x\ x\ \ 5\ \ 5x^2$

$5\ 1\ \ 5\ \ 5x$ — B_1 *for simplify*

$x\ 1\ \ 1\ \ x$

$1\ \ 1\ \ 1$

$LCM = 2\times2\times5\times x\times5\times x$ — M_1 *multiplying*

$= 100x^2$ — A_1 *c.a.o*

2. $PQ = Oq - Op$

$\begin{pmatrix}4\\8\end{pmatrix} = Oq - \begin{pmatrix}1\\4\end{pmatrix}$ — M_1 *for substn*

$OQ = \begin{pmatrix}5\\12\end{pmatrix}$ — A_1 *c.a.o*

Magnitude of $Oq = \sqrt{5^2+12^2}$ — M_1 *for substn*

$= 13$ *units* — A_1 *c.a.o*

3. $(-3,5) \Rightarrow x - 3y + 2 = 0$

$x + 2 = 3y$

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

$m = \frac{1}{3}$ — B_1 *for gradient*

Parallel lines have same gradient

using

$y = mx + c$

$5 = \frac{1}{3}x - 3 + c$ — M_1 *for substn*

$6 = c$ — A_1 *c.a.o*

$\therefore$ *equation* $y = \frac{1}{3}x + 6$ — B_1 *for eqn stated*

4. $g(x) = ax^2 - 7$

$g(2) = a(2)^2 - 7 = 5$ — M_1 *for substn*

$4a - 7 = 5$

$4a = 12$

$a = 3$ — A_1 *c.a.o*

$g(x) = 3x^2 - 7$

$g\left(\frac{2}{3}\right) = 3x\left(\frac{2}{3}\right)^2 - 7$ — M_1 *for substn*

$g\left(\frac{2}{3}\right) = 3\times\frac{4}{9} - 7$

$= \frac{4}{3} - \frac{7}{1}$

$= \frac{4-21}{3}$

$g\left(\frac{2}{3}\right) = \frac{17}{3}$ — A_1 *for c.a.o*

5. $y \alpha \frac{1}{x^2}$

$y = \frac{k}{x^2},\ x = 2,\ y = 5$

$5 = \frac{k}{4}$

$k = 20$

$\therefore y = \frac{20}{x^2}$

$80 = \frac{20}{x^2}$

$4 = \frac{1}{x^2}$

$x^2 = \frac{1}{4}$

$x = \pm\frac{1}{2}$ *or* ± 0.5

And,

$y = \frac{20}{5^2}$

$y = \frac{20}{25}$

$y = \frac{4}{5}$ *or* 0.8

6. $Using\ (R.F)^2 = \frac{Map\ Area}{Actual\ Area}$

$(R.F)^2 = \frac{12cm^2}{0.48km^2}$

change $0.48km^2$ *to* cm^2

$(1km)^2 = (100000cm)^2$

$1km^2 = 1\times10^{10}cm^2$

$0.48km^2 \Rightarrow 4.8\times10^9 cm^2$

$(R.F)^2 = \frac{12cm^2}{4.8\times10^9 cm^2}$

$(R.F)^2 = \frac{1}{4\times10^8}$ *taking square root on both side*

$\therefore R.F = \frac{1}{2\times10^4}$

The scale $1:20,000$ — A_1 *c.a.o*

7. $n(N \cap M') = 20$ B_1

$n(\varepsilon) = 50 + 20 + 5$ $B_1 B_1$

$= 75$ A_1

8. $A = P\left(1 + r/100\right)^n$

$396750 = P\left(1 + 15/100\right)^2$ M_1 *for sub*

$396750 = P(1.15)^2$ A_1 *for* $(1.15)^2$ *see*

$P = \dfrac{396750}{(1.15)^2}$ M_1

$P = 300{,}000/=$ A_1 *c.a.o*

Tom's first deposit $= 300{,}000/=$

9. $\frac{1}{2}\log 25 + \log 60 - \frac{1}{3}\log 27$

$\log 5^{2\times 1/2} + \log 60 - \log 3^{3\times 1/3}$ M_1 *indices*

$\log \dfrac{5\times 60}{3}$ M_1 *proper*

$\log 100$ B_1 *for simp*

$\log 10^2$ $\sin ce\ \log_{10}^{10} = 1$

2. A_1 *c.a.o*

B

10. $V = l \times w \times h$ M_1 *multiplying*

$3600 = 20 \times 12 \times h$ M_1 *for sub*

$h = 15cm$ A_1 *c.a.o*

$T.S.A = 2(l \times w) + 2(l \times h) + 2(h \times w)$ *1 M adding up in*

$= 2(20 \times 12) + 2(20 \times 15) + 2(15 \times 12)$

$= 1440cm^2$ A_1 *c.a.o*

SECTION B.

11.(a) $\left(\dfrac{1}{64}\right)^{1/3} \times \left(\dfrac{81}{16}\right)^{-3/4}$ *is indices*

$64 = 2^6, 81 = 3^4, 16 = 2^4$

$\dfrac{1}{2^{6\times 1/3}} \times \dfrac{3^{4\times -3/4}}{2^{4\times -3/4}}$ *indices*

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

$= \dfrac{2^{3+-2}}{3^3}$ *indices*

2	360
2	180
2	90
5	45
3	9
3	3
	1

$360 = 2^3 \times 5^1 \times 3^2$ B_1 *indices sta*

$\log 360 = \log(2^3 \times 5^1 \times 3^2)$ M_1 *comparin*

$\log 360 = 3\log 2 + 1\log 5 + 2\log 3$ M_1 *for use* lo

$= 3 \times 0.3010 + 1 \times 0.6990 + 2(0.4771)$ M_1 *for substi*

$= 2.5562$ A_1 *c.a.o*

Hellen paid cash of

$(1.2million - 5/100 \times 1.2million)$ $M_1 A_1$ *for dis*

$(1.2 - 0.06)$ M_1 *for substi*

$= 1.14millions\ or\ shs.1{,}140{,}000$ A_1 *c.a.o*

Amos paid

$\left(\dfrac{60}{100} \times 1.2million\right) + (0.15 \times 4)$ $M_1 M_1$ *for m*

$0.72million + 0.6million$ $A_1 M_1 A_1$ *corre*

$= 1.32million\ or\ shs.1{,}320{,}000$ A_1 *c.a.o*

Amos paid $1{,}320{,}000 - 1{,}140{,}000$ $M_1 A_1$ *for sub*

$= 180{,}000$ *than Hellen*

13. $BA = BO + OA$

$= -b + a$ B_1 *for* $-b + a$

$AC = AO + OC$

But $OC = OB / BC$

$= b + \frac{2}{3}$ *of* BA M_1 *for correc*

$= b + \frac{2}{3}(a - b)$

$= \dfrac{3b + 2(a - b)}{3}$

$= \frac{1}{3}(b + 2a)$ A_1 *c.a.o for O*

Then $AC = -a + \frac{1}{3}(b + 2a)$ M_1 *for corre*

$= \dfrac{-3a + b + 2a}{3}$

$= \frac{1}{3}(b\ -c\ ) = (a+b)$ A_1 *c.a.o for*

$BD = BO + OD$

$= -b + \frac{3}{5}$ *of* OC M_1 *correct s*

$= -b + \frac{3}{5} \cdot \frac{1}{3}(b + 2a)$

$BD = \dfrac{-5b + b + 2a}{5}$

$BD = \frac{2}{5}(a-2b)$ A_1 *c.a.o*

(*b*) $U \sin g$,

$BD = \frac{2}{5}(a-2b)$

$DE = DO + OE$

But $DO \Rightarrow \frac{-3}{5} \cdot \frac{1}{3}(b+2a)$

$DO \Rightarrow \frac{-1}{5}(b+2a)$ B_1 *DO seen*

correct

$OE \Rightarrow \frac{1}{2}OA = \frac{1}{2}a$

Then

$DE = \frac{-1}{5}(b+2a) + \frac{1}{2}$ M_1 *correct*

substn in DE

$= \frac{-2b-4a+5a}{5}$

$= \frac{1}{5(a-2b)}$ A_1 *c.a.o*

$\sin ce\ DE = kBD$

$\frac{1}{5}(a-2b) = \frac{2}{5}k(a-2b)$

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

Meaning $2DE = BD$ B_1 *DE and*

BD compare

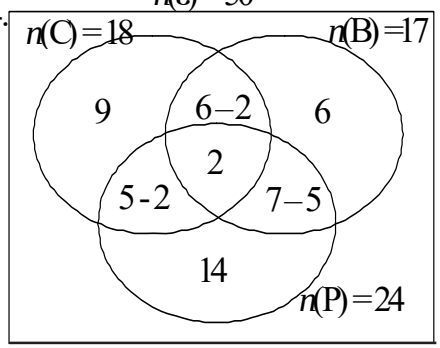
$BD : DE$

$\frac{2}{5}(a-2b) : \frac{1}{5}(a-2b)$

$\frac{2}{5} : \frac{1}{5}$, $2:1$. B_1 *corrrect*

ratio got

14. $n(\varepsilon) = 50$



B_1 *for* $6-2=4$

B_1 *for* $5-2=3$

B_1 *for* $7-2=5$

B_1 *for 2 in centr*

$n(C)\ only = 18-(3+2+4)$

$= 9$ B_1 *for 9 got*

$n(B)\ only = 17-(4+2+5)$

$= 6$ B_1 *for 6 got*

$n(P)\ only = 24-(3+2+5)$

$= 14$ B_1 *for 14 got*

7 *farmers don't grow any of these c*

(*iii*) $\frac{9+6+14}{50}$ M_1 *for adding up*

$\Rightarrow \frac{29}{50}$ *(9+6+14) seen*

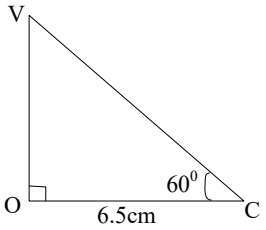
A_1 *c.a.o*

15.

$AC = \sqrt{12^2+5^2}$ M_1 *for correct su*

$= \sqrt{169}$ B_1 *for simplifying*

$AC = 13cm$ A_1 *c.a.o*

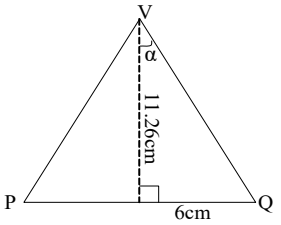


B_1 *for OC correct*

$U \sin g\ \tan 60 = \frac{OV}{6.5}$ M_1 *correct substn*

$OV = 6.5 \tan 60$ B_1 *for simplifying*

$V = 11.26cm(2d.p)$ A_1 *for c.a.o*



$\tan \alpha = \frac{6}{11.26}$ M_1 *for* $\tan \alpha =$

$\alpha = 28.05^o$ B_1 *angle correc*

$\theta = 2\alpha = 56.1^o$ A_1 *c.a.o*

$volume = \frac{1}{3}(12 \times 5) \times 11.26$ M_1 *correct subs*

$= 225.2cm^3$ A_1 *c.a.o*

16. $A \alpha K_1 + R.$

$A = K_1 + K_2 R.$

$240{,}000 = K_1 + 7K_2 \ldots\ldots\ldots\ldots(1)$

$180{,}000 = K_1 + 4K_2 \ldots\ldots\ldots\ldots(2)$

$Eqn_2 - Eqn_1$

$60{,}000 = 3K_2$

$K_2 = 20{,}000$

from eqn 2,

$180{,}000 = K_1 + 4 \times 20{,}000$

$K_1 = 180{,}000 - 80{,}000$

$K_1 = 100{,}000 / =$

They both earn constant of $20{,}000/-$

and $100{,}000/-$

(*ii*) *Equation connecting A and R*

$A = 100{,}000 + 20{,}000R$

B_1 *equatn*

M_1 *correct*

A_1 *c.a.o*

17. (*a*) *Amount* 50^0 *(angle at the same segment)*

$A = 100{,}000 + 20{,}000 \times 5$

$x = 2y = 2 \times 50$

$A = shs.200{,}000$

$= 100^o$ *(angle at the centre is twice the angle at the circumference)*

B_1 $y = 50^0$ *seen*

M_1 *for multiplying*

A_1 *c.a.o*

(*b*) *Area of semi-circle* $= \frac{1}{2}\pi r^2$

$A = \frac{1}{2}\pi r^2$

$308 = \frac{1}{2} \times \frac{22}{7} r^2$

$4312 = 22r^2$

$196 = r^2$

$r = 14cm$

Perimeter of a circle $= \pi D$

$= \frac{22}{7} \times 28$

$= 88cm$

M_1 *for correct substn*

A_1 *c.a.o*

M_1 *for correct substn*

A_1 *c.a.o*

M_1 *for correct substn*

(*c*) $fg(x) = \frac{1}{2(x-3)}$

$fg(1) = \frac{1}{2(1-3)}$

$fg(1) = \frac{1}{-4}$

M_1

A_1 *c.a.o*

$$OC = \frac{1}{2} \times 13$$
$$= 6.5$$

B_1 *for OC correct*

$$U \sin g \ \tan 60 = \frac{OV}{6.5}$$
$$OV = 6.5 \tan 60$$
$$V = 11.26cm(2d.p)$$

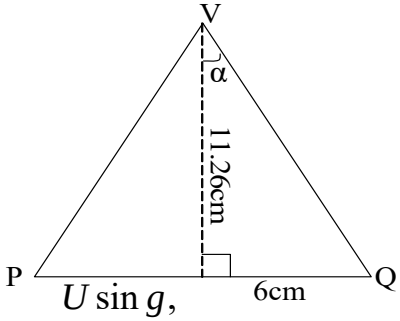
M_1 *correct substn*

B_1 *for simplifying*

A_1 *for c.a.o*

$PQ = AB = 12cm$

Needed the angle PVQ



$U \sin g,$

$$\tan \alpha = \frac{6}{11.26}$$
$$\alpha = 28.05^o$$
$$\theta = 2\alpha = 56.1^o$$
$$volume = \frac{1}{3}(12 \times 5) \times 11.26$$
$$= 225.2cm^3$$

M_1 *for* $\tan \alpha = \frac{6}{11.26}$ *seen*

B_1 *angle correct*

A_1 *c.a.o*

M_1 *correct substn*

A_1 *c.a.o*

$60,000 = 3K_2$ — B_1 *simplifyin g*

$K_2 = 20,000$ — A_1 *c.a.o*

from eqn 2,

$180,000 = K_1 + 4 \times 20,000$ — M_1 *correct substn*

$K_1 = 180,000 - 80,000$

$K_1 = 100,000/=$ — A_1 *c.a.o*

They both earn cons tan *t of* $20,000/-$ *and* $100,000/-$

(*ii*) *Equation connecting A and R*

$A = 100,000 + 20,000R$ — B_1 *equatn written correc*

Amount earned by Tr. of $R = 5$,

$A = 100,000 + 20,000 \times 5$ — M_1 *correct substn*

$A =$ *shs*.200,000 — A_1 *c.a.o*

17.(*a*) $y = 50^0$ (*Angle an the same segment*) — B_1 $y = 50^0$ *seen*

$x = 2y = 2 \times 50$ — M_1 *for multiplying*

$= 100^o$ (*angle at the centre is twice the angle at the circumference*) — A_1 *c.a.o*

(*b*) *Area of semi* $-$ *circle* $= \frac{1}{2}\pi r^2$

$A = \frac{1}{2}\pi r^2$

$308 = \frac{1}{2} \times \frac{22}{7} r^2$ — M_1 *for correct substn*

$4312 = 22r^2$

$196 = r^2$

$r = 14cm$ — A_1 *c.a.o*

Perimeter of a circle $= \pi D$

$= \frac{22}{7} \times 28$ — M_1 *for correct substn*

$= 88cm$ — A_1 *c.a.o*

(*c*) $fg(x) = \frac{1}{2(x-3)}$ — M_1 *for correct substn*

$fg(1) = \frac{1}{2(1-3)}$ — M_1

$fg(1) = \frac{1}{-4}$ — A_1 *c.a.o*