F3 MATHS PP1 TERM 3 2023 MARKING SCHEME

1.

$$\sqrt[3]{\frac{119\times 256}{68\times 7\times 1000}}$$

$$\sqrt[3]{\frac{64}{1000}} = \frac{4}{10}$$

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

2. Share of elder boy $= \frac{4}{9}x$

Share of younger boy $= \frac{2}{5}\left(\frac{5}{9}x\right)$

$$= \frac{2}{9}x$$

Girls share =

$$x - \left(\frac{4}{9}x + \frac{2}{9}x\right)$$

$$= \frac{3}{9}x$$

$$= \frac{1}{3}x$$

% share of younger boy to girls share

$$= \left(\frac{2}{9}x \div \frac{1}{3}x\right)\times 100$$

$$= \frac{2}{9}\times\frac{3}{1}\times 100$$

$$= 66.67\% \, or \, 66\frac{2}{3}\%$$

3. $3^{2(t+1)}+3^{2t}=30$

$3^{2t} \cdot 3^2+3^{2t} =30$

$3^{2t}(3^2+1)=30$

$3^{2t}\times 10=30$

$3^{2t}=3^1$

$2t=1$

$t= ½$

4. $2x + 20 + x-50=180$
   $3x – 30 = 180$
   $3x = \frac{210}{3}$
   $x = 70$
   Each exterior angle $= 70 – 50$
   $= 20^0$
   No. of sides $= \frac{360}{20}$
   $= 18$

5. Commission = 56,000 – 10 000 = Ksh. 46,000	M1
Sales above 100 000 = 500 000 – 100 000 = Ksh. 400 000	M1
Rate of commission $= \frac{46000 \times 100\%}{400\ 000}$ $= 11.5\%$	A1

6. 50,48,46,……

   $T_8 = 50 + 7x (-2)$

   $= 36$

   $S_{20} = \frac{20}{2} (2 \times 50 + (20 – 1) (x – 2)$

   $= 620$

7. (a) $x(x + 4) = 96$

   $x^2 + 4x – 96 = 0$

   $(x-8) (x + 12) = 0$

   $x = 8$

   Length = 12

Width = 8

(b) Perimeter = 2 (8 + 12) = 40m

8. $M_1 = \frac{\Delta y}{\Delta x}$

$= \frac{3 + 6}{2 - 8}$

$= \frac{9}{-6} = \frac{-3}{2}$

$M_1 \times M_2 = -1$

$-\frac{3}{2} \times m_2 = -1$

$M_2 = \frac{2}{3}$

Taking (x,y) and P(2,3)

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

$3y - 9 = 2x - 4$

$3y = 2x + 5$

$y = \frac{2x}{3} + \frac{5}{3}$

9. $PQ = q - p$

$= (3\imath - 2j) - (2\imath + 3j)$

$= 3\imath - 2j - 2\imath - 3j$

$= I - 5j$

$/PQ/ = \sqrt{(1)2 + (-5)2}$

$= \sqrt{26}$

$= 5.099$

10. $12 - 2x > 18x - 8$

$= 20x > -20$

$x < 1$

$18x - 8 \geq -28 - 2x$

$20x \geq -20$

$X \geq -1$

$-1 \leq x < 1$

Integral solutions: 01, 0.

11 $\left[\frac{b}{2}\right]^2 = a.c$

$\left[\frac{-20}{2}\right]^2 = 25k$

$100 = 25\ k$

K = $\frac{100}{25}$

= 4

12

$$AB = \begin{pmatrix} K & 4 \\ 3 & 2 \end{pmatrix}\begin{pmatrix} 1 & 2 \\ 3 & -4 \end{pmatrix} = \begin{pmatrix} K+12 & 2K-16 \\ 9 & -2 \end{pmatrix}$$

-2(K+12) -9 (2K-16)=10

-2K-24-18K+144=10

-20K = -110

∵K=5.5

13 $I = \frac{PRT}{100}$

$\frac{90{,}000 \times 6.5 \times 5}{100 \times 2}$

= sh.29,250

A =(90,000+29,250)

=SH. 119,250

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$$\log \frac{b^2}{a} = \log b^2 - \log a$$

$2(0.48) - 0.30$

$0.96 - 0.30$

$= 0.66$

15. $3x - 180 = 30$ or 330

$3x - 180 = 30$

$3x = 210$

$x = 700$

OR

$3x - 180 = 330$

$3x = 510$

$x = 170^0$

16. Min Area = (19.95((24.95)

= 497.7525

Max. Area = (20.05)(25.05)

= 502.2525

$$\frac{502.2525 - 497.7525}{2}$$

$$\frac{2.25 \times 100}{500} = 0.45\%$$

17. Time of = 2 ½ hrs Flow Volume in 2 ½ hrs = 6.16 x 10 x 2 ½ x 3600 = 554400 cm3 Volume of tank = 3h = 554400 10000 H = 554400 m 30000 = 18.48m	B1 M1 M1 M1 A1	
Volume in per sec. = 6.16 x 10 – 11.6 = 61.6 – 11.6 = 50cm^3 Volume of tank = 1.2 x 30000 x 100 Time = 3600000 sec 50 = 72000 3600 = 20 hrs	M1 A1 M1 M1 A1 (10)	

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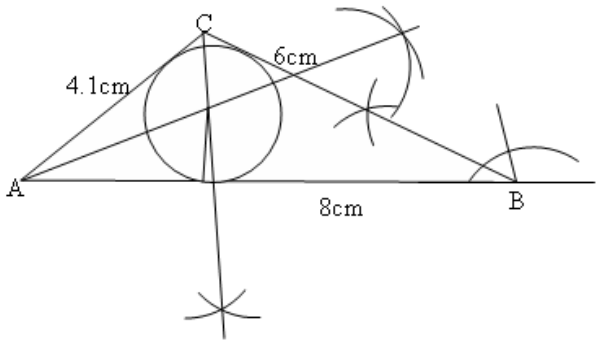

Triangle ABC
AC = 4.1cm
Bisecting <S
Circle
Radius = 1.2cm

Area = ½ x 8 x 6 sin 30^0 - $\frac{22}{7}$ x 1.2^2

= 4 x 6 x 0.5 – 4.5257
= 12 – 4.5257

= 7.4743

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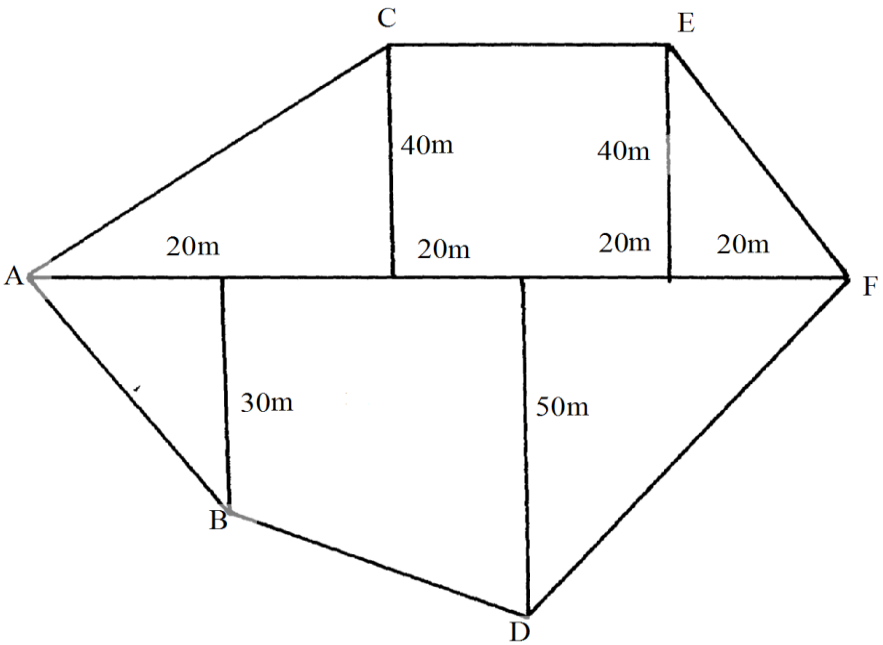


$$\frac{1}{2}\times 40\times 40 = 800$$

$$40\times 40 = 1600$$

$$\frac{1}{2}\times 20\times 40 = 400$$

$$\frac{1}{2}\times 40\times 50 = 1000$$

$$\frac{1}{2}\times (30+50)40 = 1600$$

$$\frac{1}{2}\times 20\times 30 = 300$$

$$Total = 5700m^2$$

$$= 0.57\,Ha.$$

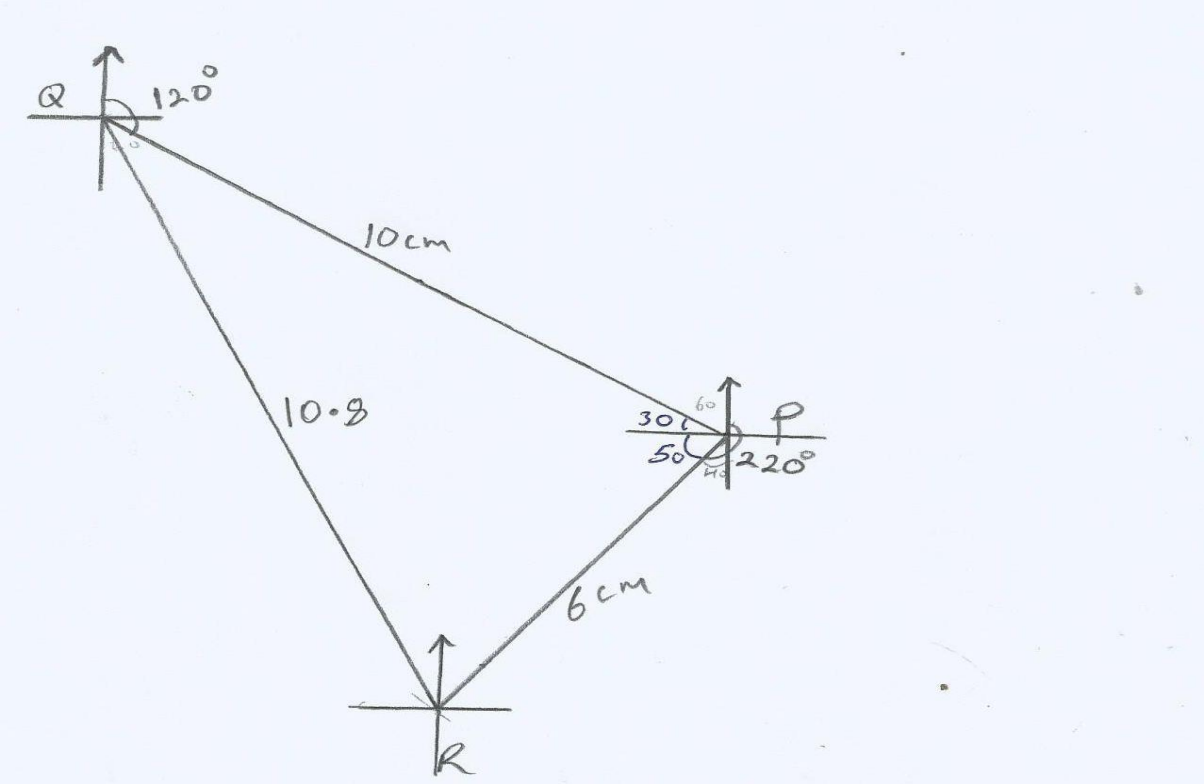
20.

QN	SOLUTION	MKS	COMMENTS
17a)	$\frac{(18,600+7,800)\times 12}{20}$	M1	
	Ksh 15,840	A1	
b i)	$3900\times 2 = 7,800$	M1	(for √ first bracket)
	$3900\times 3 = 11,700$	M1	for √ next three brackets
	$3900\times 4 = 15,600$		
	$3900\times 5 = 19,500$	M1	for √ last bracket)
	$240\times 6 = 1440$		
	Ksh 56,040	A1	
ii)	$56,040 - 12,960$	M1	
	Ksh 43,080	A1	
c)	$26,400 - 3,590$	M1	
	Ksh 22,810	A1	
		10	

21	(a) Sum of arithmetic progression $S_n = \frac{n}{2}(2a + (n-1)d)$ $n = 5$ $560 = \frac{5}{2}(2a + 4d)$ $\frac{2}{5} \times 560 = 2a + 4d$ $224 = 2a + 4d$ $112 = a + 2d \ldots\ldots\ldots\ldots (i)$ Last five terms 41^{st} term is a + 40d 40^{th} term is a + 39d 39^{th} term is a + 38d 38^{th} term is a + 37d 37^{th} term is a + 36d total $5a + 190d = -250 \ldots\ldots (ii).$ Solving (i) and (ii) simultenously; $a + 2d = 112$ $a + 38d = -50$ (−) $-36d = 162$ $d = \frac{162}{-36} = -4.5$ $d = -4.5$	M_1 M_1 M_1 A_1	Formation of each equation Solving two equations simultaneously

	$a+2(-4.5)=112$ $a-9=112$ $a-121$		For common difference
	(b) Last term is a + 40d	A_1	For the first term
	$=121+40(-4.5)$ $=121-180$ $=-59$	M_1 A_1	
	(c) $S_n=\frac{n}{2}(2a+(n-1)d)$ $S_n=\frac{41}{2}(2\times121+(41-1)(-4.5))$ $S_n=\frac{41}{2}(242-180)$ $S_n=\frac{41}{2}(62)$ $S_n=41\times31=1271$	M_1 M_1 A_1	

22.a)



b) i)10.8 x2 = 21.6 km

ii)$040^0 \pm 1$

iii) $153^0 \pm 1$

c) A = ½ a b sinØ

= ½ x 12 x 20 sin 80^0

= 118.18 km^2

23	(a) $BC^2 = 6^2 + 8^2 - 2\times 6\times 8\cos 50$ $= 100 - 61.71$ $BC = \sqrt{38.3912} = 6.19$ cm (b)	M_1 A_1	Accept 47.94^0,47.96^0 depending

	Let $\angle ABC$ be β^0 $\frac{Sin\beta^0}{6} = \frac{Sin50^0}{6.19}$ $Sin\beta^0 = \frac{6\sin 50^0}{6.19}$ $\therefore \beta^0 = 47.95^0$ (c) Let $\angle CAD$ be $\propto^0$ $2.82^2 = 7^2 + 6^2 - 2\times 7\times 6\cos\propto^0$ $\cos\propto^0 = \frac{49 = 36 - 7.9524}{84}$ $\propto^0 = 23.48^0$ (d) Area of ΔACD $= \frac{1}{2}\times 7\times 6\sin 23.48^0$ $= 8.37cm^2$	M_1 M_1 A_1 M_1 M_1 A_1 M_1 A_1	on the method 22.89^0 is possible.

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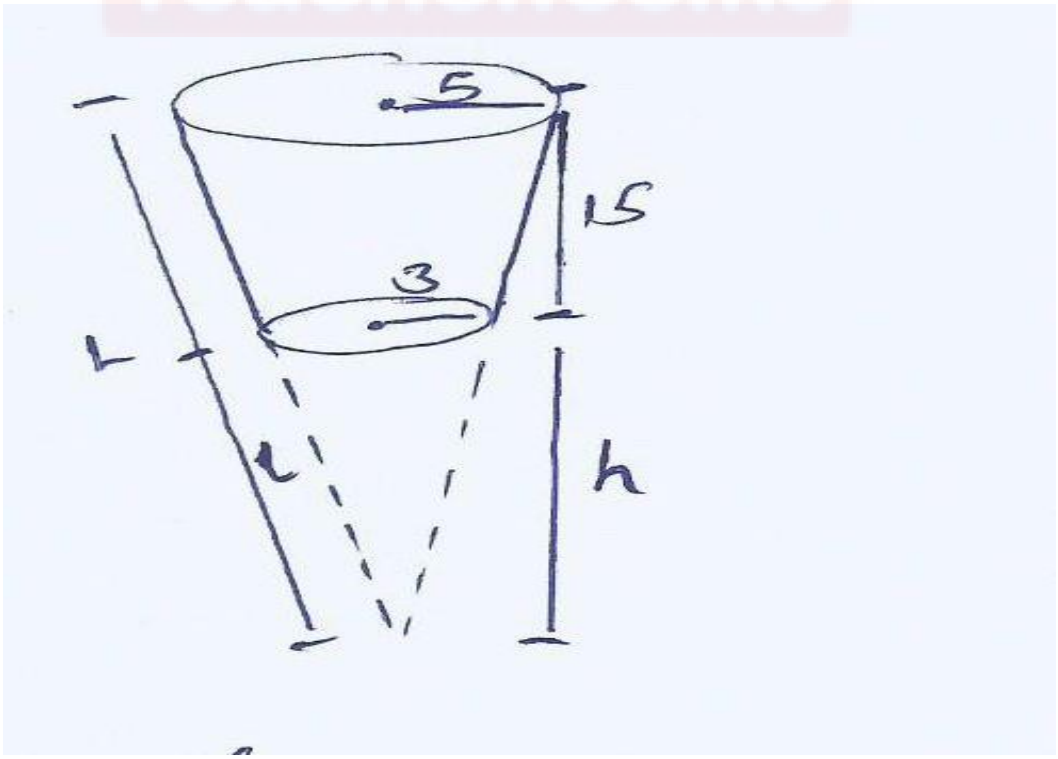


$\frac{h}{15+h} = \frac{6}{10}$

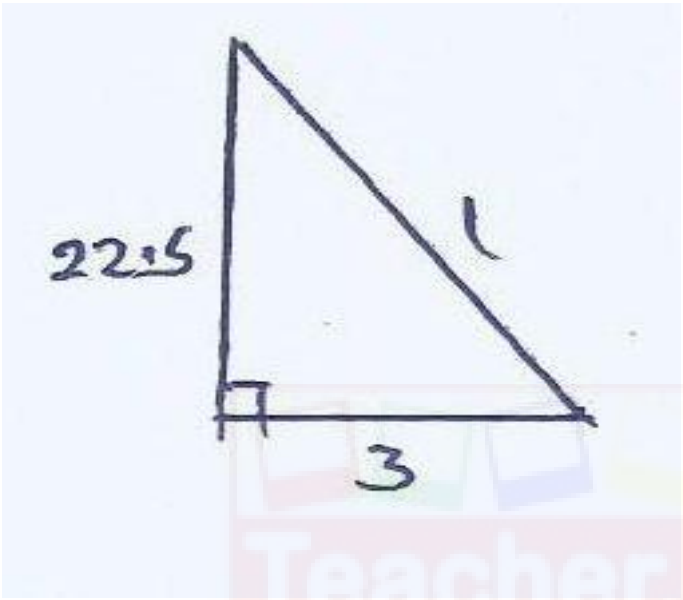
$10h = 90 + 6h$

$4h = 90$

$H = 22.5$

$H = h + 15$

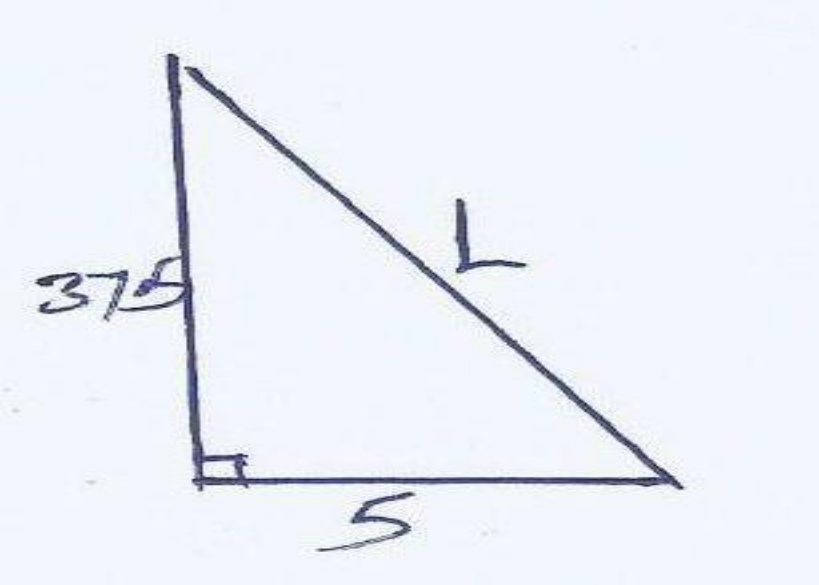
$= 37.5$



$L = \sqrt{22.5^2 + 9}$

$= \sqrt{515.25}$

$= 22.70$



$L = \sqrt{37.5}^2 + 25$

$= \sqrt{1431.25}$

$= 37.83$

S.A = $(\pi RL - \pi rl) + \pi r^2$

= (3.142 x 5 x 37.83 – 3.142 x3 x 22.70) + (3.142.9)

= 380.3391 + 28.278

= 408.6111 cm^2

b) Volume = $\frac{1}{3}$ AH – $\frac{1}{3}$ Ah

= ($\frac{1}{3}$ x 3.142 x 25 x37.5)- $\frac{1}{3}$(3.142 x 9 x 22.5)

= 981.875 – 212.085

= 769.79 cm^3