

F3 MATHS PP1 TERM 3 2023 MARKING SCHEME

1.

$$\begin{aligned} & \sqrt[3]{\frac{119 \times 256}{68 \times 7 \times 1000}} \\ & \sqrt[3]{\frac{64}{1000}} = \frac{4}{10} \\ & = \frac{2}{5} \end{aligned}$$

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

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

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

Girls share =

$$\begin{aligned} & x - \left(\frac{4}{9}x + \frac{2}{9}x \right) \\ & = \frac{3}{9}x \\ & = \frac{1}{3}x \end{aligned}$$

% share of younger boy to girls share

$$\begin{aligned} & = \left(\frac{2}{9}x \div \frac{1}{3}x \right) \times 100 \\ & = \frac{2}{9} \times \frac{3}{1} \times 100 \\ & = 66.67\% \text{ or } 66\frac{2}{3}\% \end{aligned}$$

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

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

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

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

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

$$2t=1$$

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

4. $2x + 20 + x - 50 = 180$

$$3x - 30 = 180$$

$$3x = \frac{210}{3}$$

$$x = 70$$

$$x = 70$$

$$\text{Each exterior angle} = 70 - 50$$

$$= 20^\circ$$

$$\text{No. of sides} = \frac{360}{20}$$

$$= 18$$

$$= 18$$

5.

$$\text{Commission} = 56,000 - 10,000$$

$$= \text{Ksh. } 46,000$$

$$\text{Sales above } 100,000 = 500,000 - 100,000$$

$$= \text{Ksh. } 400,000$$

$$\text{Rate of commission} = \frac{46000 \times 100\%}{400,000}$$

$$= 11.5\%$$

$$= 11.5\%$$

M1

M1

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) $x(x + 4) = 96$

$$x^2 + 4x - 96 = 0$$

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

$$x = 8$$

$$\text{Length} = 12$$

$$\text{Width} = 8$$

$$(b) \text{ Perimeter} = 2(8 + 12) = 40\text{m}$$

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

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

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

$$M_1 \times M_2 = -1$$

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

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

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

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

$$3y - 9 = 2x - 4$$

$$3y = 2x + 5$$

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

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

$$9. \quad PQ = \underset{\sim}{q} - \underset{\sim}{p}$$

$$= (3i - 2j) - (2i + 3j)$$

$$= 3i - 2j - 2i - 3j$$

$$= i - 5j$$

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

$$= \sqrt{26}$$

$$= 5.099$$

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

$$= 20x > -20$$

$$x < 1$$

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

$$20x \geq -20$$

$$x \geq -1$$

$$-1 \leq x < 1$$

Integral solutions: 0, 1.

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

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

$$100 = 25k$$

$$K = \frac{100}{25} \\ = 4$$

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

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

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

$$-20K = -110$$

$$\therefore K = 5.5$$

PRT

13 I = 100

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

$$= \text{sh.} 29,250$$

$$A = (90,000 + 29,250)$$

$$= \text{SH. } 119,250$$

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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

$$3x - 180 = 30$$

$$3x = 210$$

$$x = 70$$

OR

$$3x - 180 = 330$$

$$3x = 510$$

$$x = 170$$

$$16. \text{ Min Area} = (19.95)(24.95)$$

$$= 497.7525$$

$$\text{Max. Area} = (20.05)(25.05)$$

$$= 502.2525$$

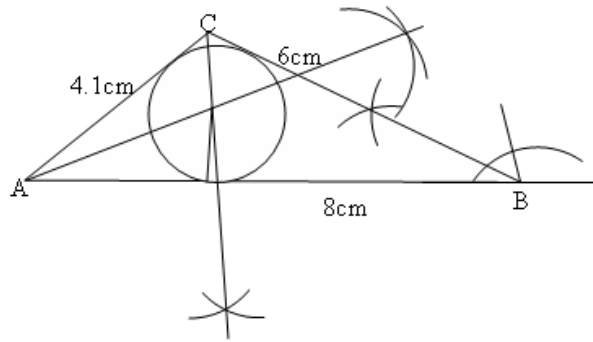
$$\frac{502.2525 - 497.7525}{2}$$

$$\frac{2.25 \times 100}{500}$$

$$= 0.45\%$$

<p>17. Time of = 2 ½ hrs Flow Volume in 2 ½ hrs = $6.16 \times 10 \times 2 \frac{1}{2} \times 3600$ $= 554400 \text{ cm}^3$</p> <p>Volume of tank = $\frac{3h}{10000} = \frac{554400}{10000}$</p> <p>H = $\frac{554400}{30000} \text{ m}$</p> <p>$= 18.48 \text{ m}$</p>	<p>B1</p> <p>M1</p> <p>M1</p> <p>M1</p> <p>A1</p>	
<p>Volume in per sec. = $6.16 \times 10 - 11.6$</p> <p>$= 61.6 - 11.6 = 50 \text{ cm}^3$</p> <p>Volume of tank = $1.2 \times 30000 \times 100$</p> <p>Time = $\frac{3600000}{50} \text{ sec}$</p> <p>$= \frac{72000}{3600}$</p> <p>$= 20 \text{ hrs}$</p>	<p>M1</p> <p>A1</p> <p>M1</p> <p>M1</p> <p>A1</p> <p>(10)</p>	

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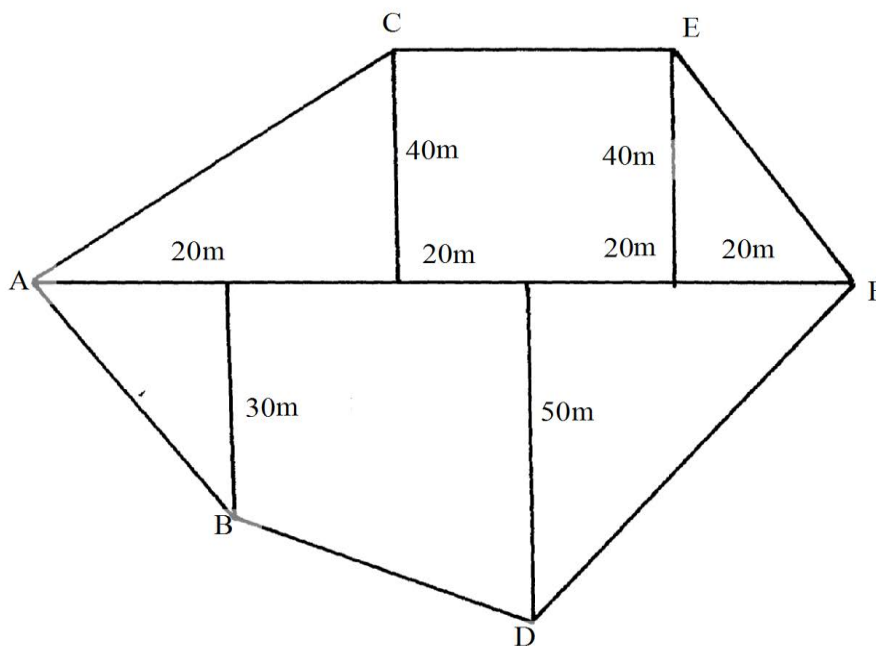
Triangle ABC
 AC = 4.1cm
 Bisecting $\angle C$
 Circle

Radius = 1.2cm

$$\begin{aligned} \text{Area} &= \frac{1}{2} \times 8 \times 6 \sin 30^\circ - \frac{22}{7} \times 1.2^2 \\ &= 4 \times 6 \times 0.5 - 4.5257 \\ &= 12 - 4.5257 \\ &= 7.4743 \end{aligned}$$



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

$$40 \times 40 = 1600$$

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

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

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

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

$$\begin{aligned} \text{Total} &= 5700\text{m}^2 \\ &= 0.57 \text{ Ha.} \end{aligned}$$



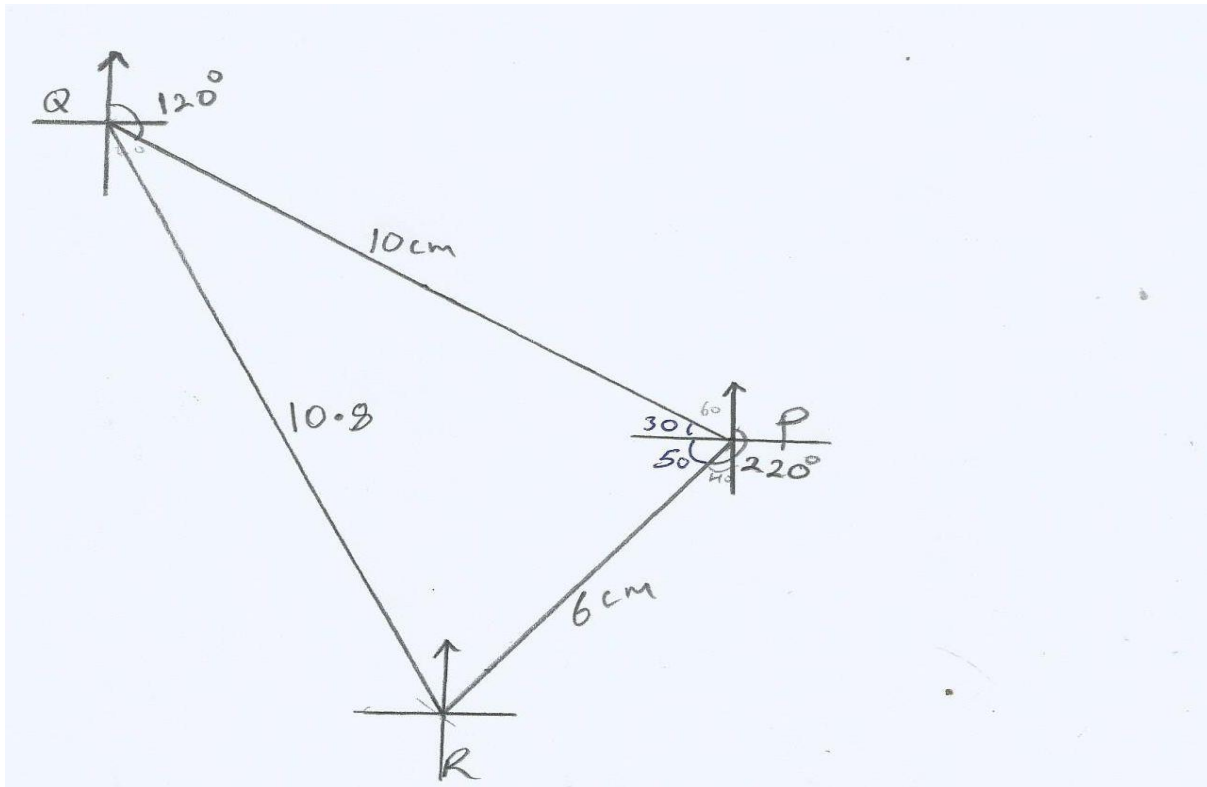
20.

Qn	SOLUTION	MKS	COMMENTS
17a)	$\frac{(18,600 + 7,800) \times 12}{20}$ $\text{Ksh } 15,840$	M1 A1	
b)	$3900 \times 2 = 7,800$ $3900 \times 3 = 11,700$ $3900 \times 4 = 15,600$ $3900 \times 5 = 19,500$ $240 \times 6 = \underline{1,440}$ $\text{Ksh } 56,040$	M1 M1 M1 A1	(for \checkmark first bracket) for \checkmark next three brackets for \checkmark last bracket)
c)	$56,040 - 12,960$ $\text{Ksh } 43,080$	M1 A1	
	$26,400 - 3,590$ $\text{Ksh } 22,810$	M1 A1	
		10	



	$a + 2(-4.5) = 112$ $a - 9 = 112$ $a = 121$ <p>(b)</p> <p>Last term is $a + 40d$</p> $= 121 + 40(-4.5)$ $= 121 - 180$ $= -59$ <p>(c)</p> $S_n = \frac{n}{2}(2a + (n-1)d)$ $S_n = \frac{41}{2}(2 \times 121 + (41-1)(-4.5))$ $S_n = \frac{41}{2}(242 - 180)$ $S_n = \frac{41}{2}(62)$ $S_n = 41 \times 31 = 1271$	<p>For common difference</p> <p>A₁</p> <p>M₁</p> <p>A₁</p> <p>M₁</p> <p>M₁</p> <p>A₁</p>	<p>For the first term</p>
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22.a)



b) i) $10.8 \times 2 = 21.6 \text{ km}$

ii) $040^\circ \pm 1$

iii) $153^\circ \pm 1$

c) $A = \frac{1}{2} a b \sin \theta$

$= \frac{1}{2} \times 12 \times 20 \sin 80^\circ$

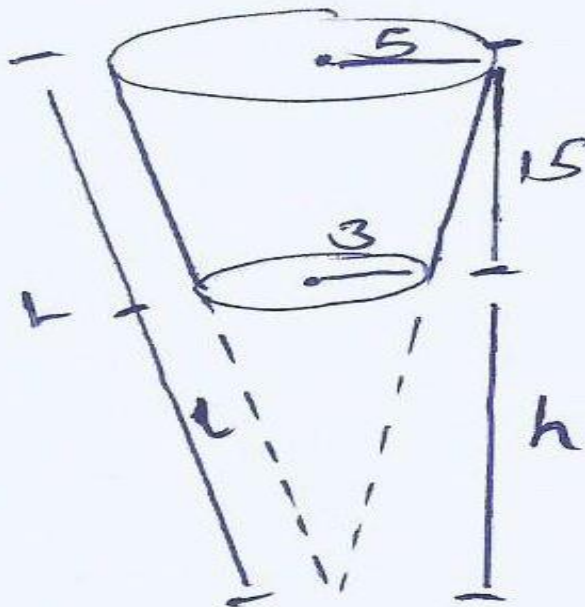
$= 118.18 \text{ km}^2$

23	<p>(a)</p> $BC^2 = 6^2 + 8^2 - 2 \times 6 \times 8 \cos 50$ $= 100 - 61.71$ $BC = \sqrt{38.3912} = 6.19 \text{ cm}$ <p>(b)</p>	<p>M₁</p> <p>A₁</p>	<p>Accept</p> <p>47.94°, 47.96°</p> <p>depending</p>
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<p>Let $\angle ABC$ be β°</p> $\frac{\sin \beta^\circ}{6} = \frac{\sin 50^\circ}{6.19}$ $\sin \beta^\circ = \frac{6 \sin 50^\circ}{6.19}$ $\therefore \beta^\circ = 47.95^\circ$ <p>(c)</p> <p>Let $\angle CAD$ be α°</p> $2.82^2 = 7^2 + 6^2 - 2 \times 7 \times 6 \cos \alpha^\circ$ $\cos \alpha^\circ = \frac{49 - 36 - 7.9524}{84}$ $\alpha^\circ = 23.48^\circ$ <p>(d)</p> <p>Area of $\triangle ACD$</p> $= \frac{1}{2} \times 7 \times 6 \sin 23.48^\circ$ $= 8.37 \text{ cm}^2$	<p>M₁</p> <p>M₁</p> <p>A₁</p> <p>M₁</p> <p>M₁</p> <p>A₁</p> <p>M₁</p> <p>A₁</p>	<p>on the method</p> <p>Teacher.co.ke</p> <p>22.89° is possible.</p>
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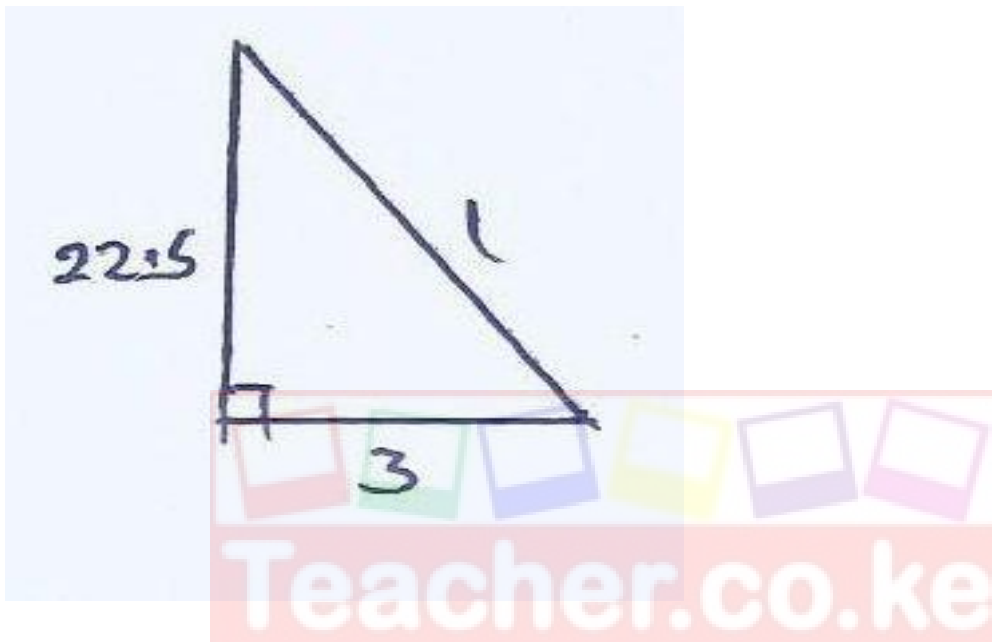
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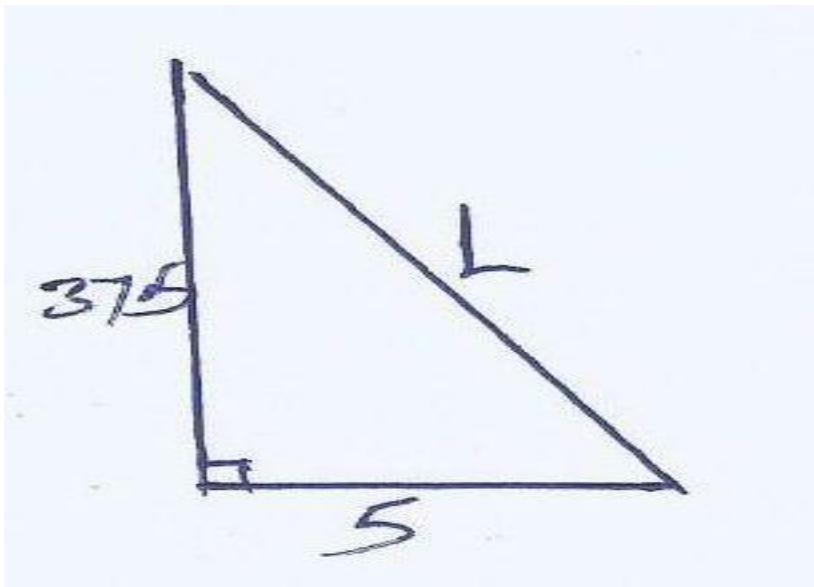
$$\frac{h}{15+h} = \frac{6}{10}$$

$$10h = 90 + 6h$$
$$4h = 90$$
$$H = 22.5$$

$$H = h + 15$$
$$= 37.5$$



$$L = \sqrt{22.5^2 + 9}$$
$$= \sqrt{515.25}$$
$$= 22.70$$



$$\begin{aligned}
 L &= \sqrt{37.5^2 + 25} \\
 &= \sqrt{1431.25} \\
 &= 37.83
 \end{aligned}$$

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

$$\begin{aligned}
 &= (3.142 \times 5 \times 37.83 - 3.142 \times 3 \times 22.70) + (3.142 \times 9) \\
 &= 380.3391 + 28.278 \\
 &= 408.6111 \text{ cm}^2
 \end{aligned}$$

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

$$\begin{aligned}
 &= \left(\frac{1}{3} \times 3.142 \times 25 \times 37.5\right) - \frac{1}{3}(3.142 \times 9 \times 22.5) \\
 &= 981.875 - 212.085 \\
 &= 769.79 \text{ cm}^3
 \end{aligned}$$