

**MATHEMATICS FORM 2**  
**MARKING SCHEME**

1 Evaluate:  $\frac{1}{2} + \frac{1}{3} + \frac{1}{2}$

(2mks)

$$\frac{1}{7} \text{ of } \left( \frac{2}{5} + \frac{1}{24} \right)$$

$$\frac{1}{2} + \frac{1}{3} + \frac{1}{2}$$

$$\frac{1}{7} \text{ of } \left( \frac{2}{5} + \frac{1}{24} \right)$$

$$\frac{1}{2} + \frac{1}{3} = \frac{5}{6}$$

$$\frac{1}{7} \text{ of } \left( \frac{2}{5} + \frac{1}{24} \right) = \frac{1}{7} \times \frac{7}{30} = \frac{1}{30}$$

$$\frac{5}{6} \div \frac{1}{30} = \frac{5}{6} \times \frac{30}{1}$$

$$= 25 + \frac{1}{2} = 25\frac{1}{2}$$

2. Let  $r = 0.1515$

$$100r = 15.1515$$

$$99r = 15.0000$$

$$R = \frac{15}{99} = \frac{5}{33}$$

3. Simplify

$$\frac{ay - ax}{bx - by}$$

$$\frac{a(y-x)}{b(y-x)} = \frac{a}{b} = \frac{-a}{-b}$$

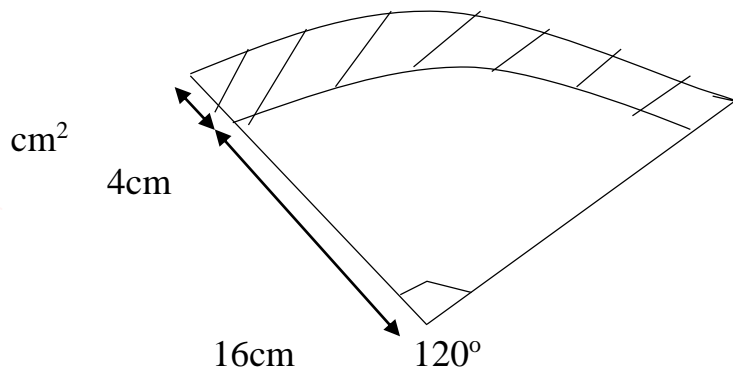
$$\frac{a}{b} = \frac{-a}{-b}$$

4.

T	D	H
15	8	8
24		10
$15/24x$	$8/10x8 = 4 \text{ days}$	

(2mks)

5.



$$A_1 = \frac{120}{360} \pi r^2$$

$$= \frac{120}{360} \times 3.142 \times 20^2 = 418.933$$

$$= 268.117 \text{ cm}^2$$

Area of shaded region. =  $418.933 - 268.117$   
 $= 150.816 \text{ cm}^2$

6.  $2b + 3s = 410$

$3b + 2s = 390$

$4b + 6s = 820$

$9b + 6s = 1170$

$5b + 0 = 350$

$\frac{5b}{5} = \frac{350}{5}$

$b = 70$

$2 \times 70 + 3s = 410$

$140 + 3s = 410$

$3s = 410 - 140$

$\frac{3s}{3} = \frac{270}{3}$

$s = 90$

$S = 90$

Beans = 70 bags

Salt = 90 bag

7a). Let the exterior angle be  $x$

$X + 2x = 180$

$3x = 180$

$X = 60^\circ$

no of sides

$360/60 = 6$

b) Hexagon

8.  $\tan 24^\circ = h/50$

$50 \tan 24^\circ = H$



$$\begin{aligned} \tan 20^\circ &= H/(50+x) \\ (50+x) \tan 20^\circ &= H \\ 18.1999+0.364x &= 22.26 \\ 0.364x &= 22.26-18.199 \\ 0.364x &= 4.061 \\ X &= \frac{4.061}{0.364} \\ &= 11.16\text{m} \end{aligned}$$

$$\begin{aligned} 9. \text{ Volume of water} &= Ah \\ A &= \frac{1}{2}(1 \times 3) \times 30 = 60\text{m}^2 \\ V &= 60\text{m}^2 \times 8\text{m} = 480\text{m}^3 \\ 1\text{m}^3 &= 1000\text{L} \\ 480\text{m}^3 &=? \\ \frac{480\text{m}^3 \times 1000\text{L}}{1\text{m}^3} & \\ &= 480,000\text{L} \end{aligned}$$

$$\begin{aligned} 10. \text{ Total vol} &= 15 \text{ litres} = 15000\text{cm}^3 \\ \text{Total mass} &= 3000\text{g} + (12000 \times 0.8)\text{g} \\ &= 3000\text{g} + 9600\text{g} = 12600\text{g} && \text{M1} \\ \text{Density} &= \frac{M}{V} = \frac{12600}{15000\text{cm}^3} && \text{M1} \\ &= 0.84\text{g/cm}^3 && \text{A1} \end{aligned}$$

$$\begin{aligned} 11. \text{VSF } \frac{4752}{1408} &= 3.375 \\ \text{LSF} &= \sqrt[3]{3.375} = 1.5 && \text{M1} \\ \text{ASF} &= (1.5)^2 \\ \text{Area of larger cylinder} & \\ &= 352 \times 2.25 = 792\text{cm}^2 && \text{A1} \end{aligned}$$

$$12. \left(\frac{1}{2}\right)^x \times \left(\frac{1}{8}\right)^{1-x} = 32$$

$$(2^{-1})^x \times (2^{-3})^{1-x} =$$

$$2^5 - x = (-3) + 3x = 5$$

$$2x = 5 + 3$$

$$x = \frac{8}{2}$$

$$x = 4$$

13.

<p>1. <math>\frac{1}{2} + \frac{1}{8} = \frac{5}{8}</math>  <math>\frac{2}{3} \times \frac{3}{8} = \frac{6}{24}</math>  <math>\frac{24}{6} \times 3200 = \text{Sh.}12,800</math> February salary  <math>\frac{1}{2} \times 12800 = \text{Sh.}6,400</math> School fees</p>	M1	
	A1	
	B1	

14.

<p>2. <math>y &gt; 2</math>  <math>x \geq 0</math>  <math>y \leq -x + 8</math></p>	B1 B1 B1	
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15.  $10,000 \times 82.4 = 824000$  M1

$$10,000 \times \frac{105}{1.4} = 750,000$$
 M1

$$824000 - 750000 =$$

$$\underline{\text{Sh.}74000}$$
 A1

16. L.C.M=12  $24x - 16 - 12x + 6 = 12 - 10x$

$$24x - 12x + 10x = 12 - 6 + 16$$

$$22x = 22$$

$$X = 1$$

**SECTION II**

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17	<p>a)</p> <p style="text-align: right;"> <math>l = 9.85</math>  <math>L = 19.69</math> </p> <p>T.S.A = <math>\pi r^2 + (\pi RL - \pi rL)</math>  <math>= \pi(r^2 + RL - rL)</math>  <math>= \frac{22}{7} (1.75^2 + 3.5^2 \times 19.69 - 1.75 \times 9.85)</math>  <math>= \frac{22}{7} \times 54.18</math>  <math>= 171.1 \text{ cm}^2</math></p> <p>b) Vol = <math>\frac{1}{3} \pi R^2 H - \frac{1}{3} \pi r^2 h</math>  <math>\left. \begin{matrix} H = 20 \\ h = 10 \end{matrix} \right\}</math>  <math>\frac{1}{3} \pi (R^2 H - r^2 h)</math>  <math>\frac{1}{3} \times \frac{22}{7} (3.5^2 \times 20 - 1.75^2 \times 10)</math>  <math>\frac{22}{21} (245 - 30.625)</math>  <math>\frac{22}{21} \times 214.375</math>  <math>224.6 \text{ cm}^3</math></p> <p style="text-align: center;"><i>0.2246 litres</i></p>	<p style="text-align: center;"> <math>\left. \begin{matrix} l = 9.85 \\ L = 19.69 \end{matrix} \right\} 1</math> </p> <p>M1</p> <p>M1</p> <p>M1</p> <p>A1</p> <p>B1</p> <p>M1</p> <p>M1</p> <p>M1</p> <p>A1</p>	
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18a)	<p>i) 10.30  <math>\frac{-9.00}{1.30}</math>          Jane travelled = <math>\frac{3}{2} \times 15 = 22.5</math>          Distance before Tom starts journey          Relative speed = <math>15 + 25 = 40 \text{ km/hr}</math>          T.T.T.M = <math>\frac{17.5}{40}</math></p>	<p>M1</p> <p>M1</p>	
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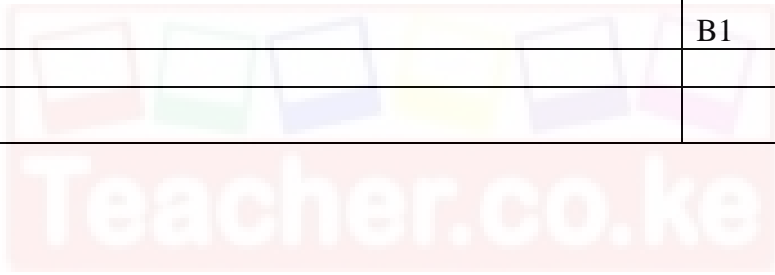
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	$= 0.4375 \text{ hrs}$ $15 \times 0.4375 = 6.5625 \text{ km}$ $22.5 + 6.5625$ $= 29.0625 \text{ km}$	B1	
	ii) They met after 0.4375 hrs $= 0.4375 \times 60$ $= 26 \text{ minutes}$ $10.30$ $+ 26$ $10.56 \text{ am}$	A1	M1
	iii) Jane had travelled 29.0625 km $= 40.00 - 29.0625$ $= 10.9375 \text{ km}$	B1	B1
	b) $\frac{10.9375}{12} = 0.91146 \text{ hrs}$ $0.91146 \text{ hrs} = 55 \text{ minutes}$ Add rest time = 10 minutes $= 65 = 1 \text{ hr } 5 \text{ minutes}$ $10.56$ $+ 1.05$ $12.01 \text{ pm}$		M1
		A1	
		10	

19 a)

$\sqrt{B1}$  scale  
 $\sqrt{B1}$  Point P, S  
 $\sqrt{B1}$  Point Q  
 $\sqrt{B2}$  Point R  
 $\sqrt{B1}$  Point S  
 $\sqrt{2}$   
 $\sqrt{5}$

	b) i) Distance R from P = 13.4cm ± 0.1 But 1 cm rep 20km = 13.4 x 20 = 268km  ii) Bearing of Q from S 034° ± 001°  iii) Distance of Q from S 12.4cm ± 0.1 But 1cm rep 20km = 12.4 x 20 = 248km iv) How far P is north of S = 4.5cm But 1cm rep 20km = 4.5 x 20 = 90km	
		B1
		B1
		B1
		B1



20.

The mark of 100 candidates for mathematics examination were distributed as follows.

marks	No of candidates	Mp(x)	x.f	c.f
30-34	5	32	160	5
35-39	24	37	888	29
40-44	26	42	1092	55
45-49	24	47	1128	79
50-54	13	52	676	92
55-59	6	57	342	98
60-64	2	62	124	100

4410

(a) Calculate

(i) The mean mark

(2mks)

$$\text{Mean} = \frac{\sum fx}{\sum f} = \frac{4410}{100}$$

$$= 44.1$$

(ii) The median

(3mks)

$$L + \frac{\frac{N}{2} - C}{f} i$$

$$39.5 + \frac{(50 - 29) \cdot 5}{26}$$

$$= 39.5 + 4.0385$$

$$= 43.5385$$

=

(b) On the grid provided, draw a histogram.

(3mks)

(c) On the same graph, draw a frequency polygon.

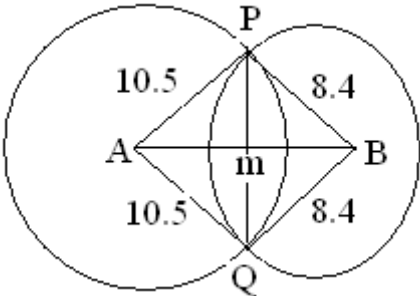
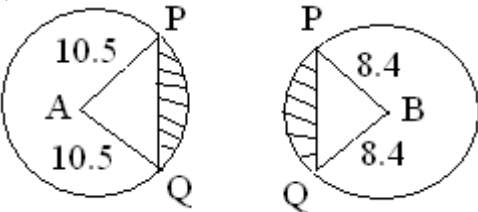
(1mk)

(d) Find the modal mark.

(1mk)

$$\text{modal class} = 40 - 44$$

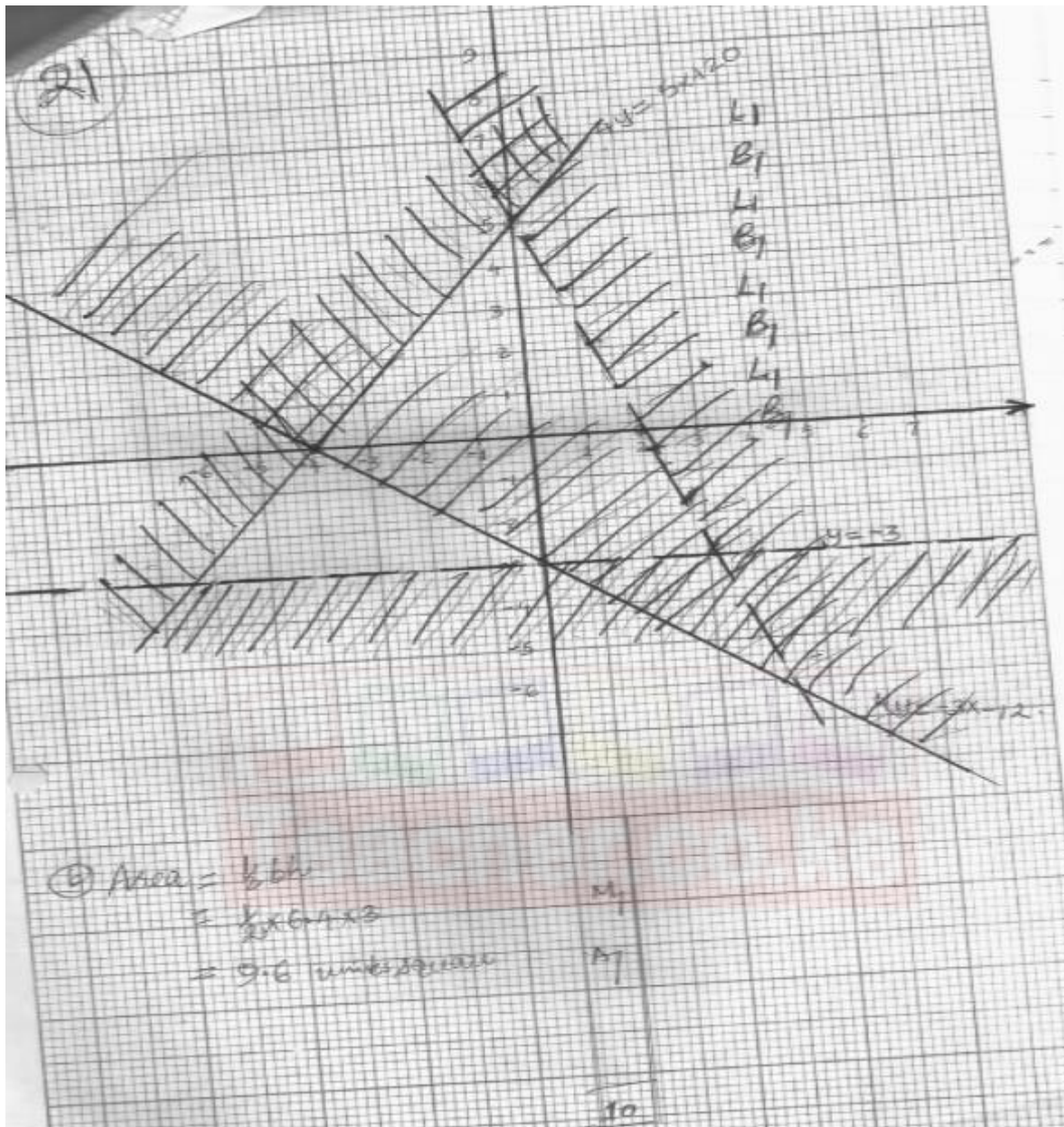


21	<p>a)</p>  <p> <math>\angle PAQ = \angle PAM + \angle QAM</math>  <math>\angle PAM = \sin^{-1} \frac{4.5}{10.5} = 0.4286</math>  <math>\sin^{-1}(0.4286) = 25.38^\circ</math>  <math>\angle QAM = \angle PAM = 25.38</math>  <math>\rightarrow \angle LAP = 25.38 \times 2 = 50.76</math> </p> <p>b) <math>\angle PBQ = \angle PBM + \angle QBM</math>  <math>\angle PBM = \sin^{-1} \frac{4.5}{8.4} = 0.5357</math>  <math>\sin^{-1}(0.5357) = 32.39^\circ</math>  <math>\angle PBM = \angle QBM = 32.39^\circ</math>  <math>\angle PBQ = 32.39^\circ \times 2 = 64.78</math> </p> <p>c)i)</p>  <p>area of segment = area of a section – area of D</p> <p>Taking (i)</p> $= \left[ \frac{50.76}{360} \times 3.14 \times (10.5)^2 \right] - \left[ \frac{1}{2} \times 10.5 \times 10.5 \times \sin 50.76 \right]$ $= 48.84 - 42.69 = 6.15 \text{cm}^2$ <p>Taking (ii)</p> $= \left[ \frac{64.78}{360} \times 3.14 \times (8.4)^2 \right] - \left[ \frac{1}{2} \times 8.4 \times 8.4 \times \sin 64.78 \right]$ $= 39.89 - 31.92 = 7.97 \text{cm}^2$ $= (6.15 + 7.97) \text{cm}^2 = 14.12 \text{cm}^2$	<p>M1</p> <p>A1</p> <p>M1</p> <p>A1</p> <p>M1</p> <p>B1</p> <p>M1M1</p> <p>B1</p> <p>A1</p>	
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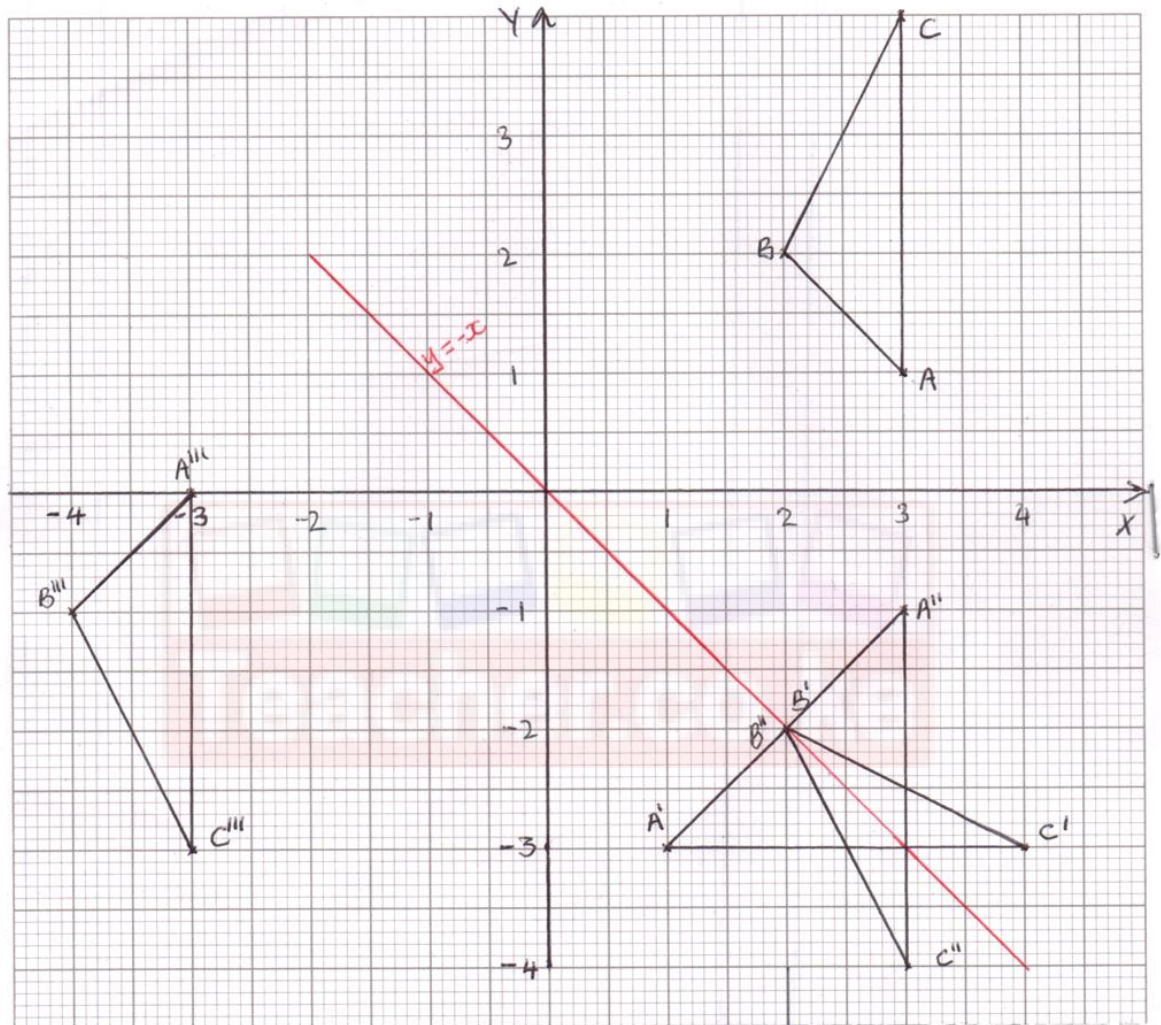
22.a) Kamau	Tatwa	Makau	
100,000	80,000	50,000	
10	: 8	: 5	B1
$\frac{5}{23} = 20,000$			M1
1 = ?			
$20,000 \times \frac{23}{5}$			A1
= 92,000			
(a) (i) New Ratio			
5 : 4 : 3			B1
$\frac{120}{100} \times 92,000$			B1
New profit = 110,400			
Kamau's share = $\frac{5}{12} \times 110,400$			M1
= 46,000			A1
(ii) Tatwa's share = $\frac{4}{12} \times 110,400$			M1
= 36,800			M1
Difference = 46,000 – 36,800			
= 9,200			A1
			10

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PI	Qn	SOLUTIONS	MKS	REMARKS
	24			

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a)	B1 object
	B2 1 <sup>st</sup> image
b) i)	B2 2 <sup>nd</sup> image
ii) reflection in the line $y = x$ ( $x = y$ )	B2
c) i)	B2 3 <sup>rd</sup> image
ii) $A'''(-3, 0)$ $B'''(-4, -1)$ $C'''(-3, -3)$	B1
	10