

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

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

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

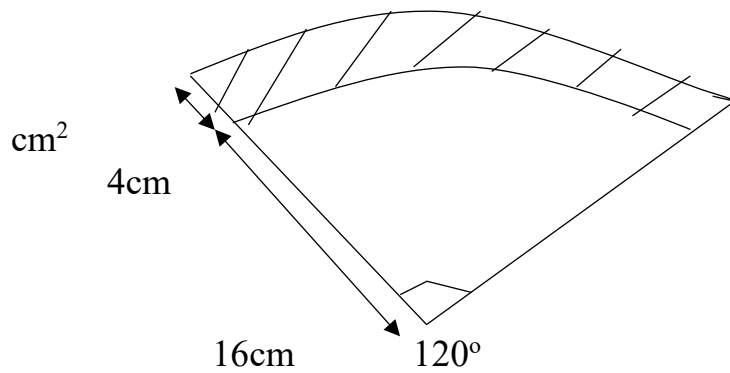
$$\frac{a(y-x)}{b(y-x)} = \frac{a}{b} = \frac{-a}{-b}$$

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

$50 \tan 24^\circ = H$



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

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

10. Total vol = 15 litres = 15000cm³
 Total mass = 3000g + (12000 × 0.8)g
 $= 3000\text{g} + 9600\text{g} = 12600\text{g}$ M1
 Density = $\frac{M}{V} = \frac{12600}{15000\text{cm}^3}$ M1
 $= 0.84\text{g/cm}^3$ A1

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

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

14.

<p>2. $y > 2$ $x \geq 0$ $y \leq -x + 8$</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

$824000 - 750000 =$

Sh.74000 A1

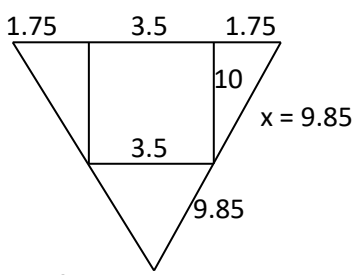
16. L.C.M=12 $24x - 16 - 12x + 6 = 12 - 10x$

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

$$22x = 22$$

$$X = 1$$

SECTION II

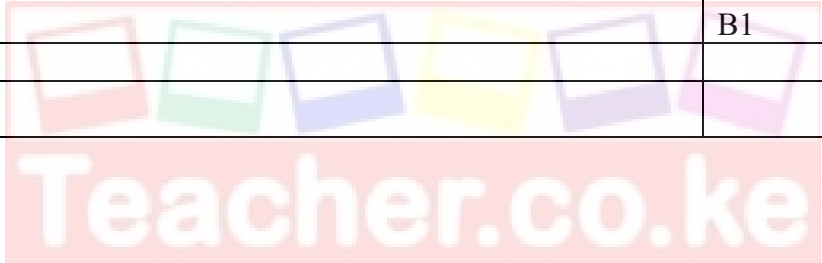
17	<p>a)</p>  <p style="text-align: right;"> $l = 9.85$ $L = 19.69$ </p> <p> $T.S.A = \pi r^2 + (\pi RL - \pi rL)$ $= \pi(r^2 + RL - rL)$ $= \frac{22}{7} (1.75^2 + 3.5^2 \times 19.69 - 1.75 \times 9.85)$ $= \frac{22}{7} \times 54.18$ $= 171.1 \text{ cm}^2$ </p> <p>b) Vol = $\frac{1}{3} \pi R^2 H - \frac{1}{3} \pi r^2 h$</p> <p style="text-align: right;"> $H = 20$ $h = 10$ </p> <p> $\frac{1}{3} \pi (R^2 H - r^2 h)$ $\frac{1}{3} \times \frac{22}{7} (3.5^2 \times 20 - 1.75^2 \times 10)$ $\frac{22}{21} (245 - 30.625)$ $\frac{22}{21} \times 214.375$ 224.6 cm^3 <i>0.2246 litres</i> </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</p> <p style="text-align: center;"><u>-9.00</u></p> <p style="text-align: center;">1.30</p> <p>Jane travelled = $\frac{3}{2} \times 15 = 22.5$</p> <p>Distance before Tom starts journey</p> <p>Relative speed = $15 + 25 = 40 \text{ km/hr}$</p> <p>T.T.T.M = $\frac{17.5}{40}$</p>	<p>M1</p> <p>M1</p>	
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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 $= 0.4375 \times 60$ $= 26 \text{ minutes}$	M1	
	10.30 $+ 26$ 10.56 am	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 $= 65 = 1 \text{ hr } 5 \text{ minutes}$	M1	
	10.56 $+ 1.05$ 12.01 pm	A1	
		10	

19	a)		
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	<p>b)</p> <p>i) Distance R from P $= 13.4\text{cm} \pm 0.1$ But 1 cm rep 20km = $13.4 \times 20 = 268\text{km}$</p> <p>ii) Bearing of Q from S $034^\circ \pm 001^\circ$</p> <p>iii) Distance of Q from S $12.4\text{cm} \pm 0.1$ But 1cm rep 20km = $12.4 \times 20 = 248\text{km}$</p> <p>iv) How far P is north of S $= 4.5\text{cm}$ But 1cm rep 20km = $4.5 \times 20 = 90\text{km}$</p>	<p>B1</p> <p>B1</p> <p>B1</p> <p>B1</p>
		<p>B1</p>



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)

$$L + \frac{\left(\frac{n}{2} - c\right) i}{f} = 39.5 + \frac{4 \cdot 0385}{26}$$

$$= 39.5 + \frac{0.1546}{26} = 39.5 + 0.005946 = 39.505946$$

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

(3mks)

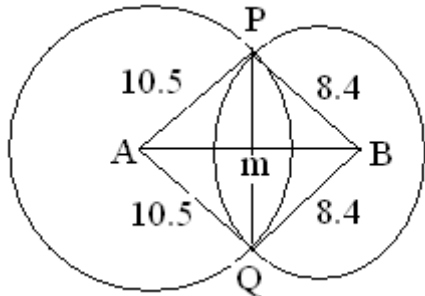
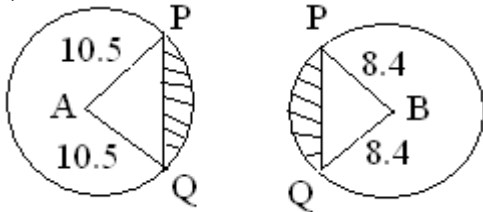
© On the same graph, draw a frequency polygon.

(1mk)

(d) Find the modal mark.

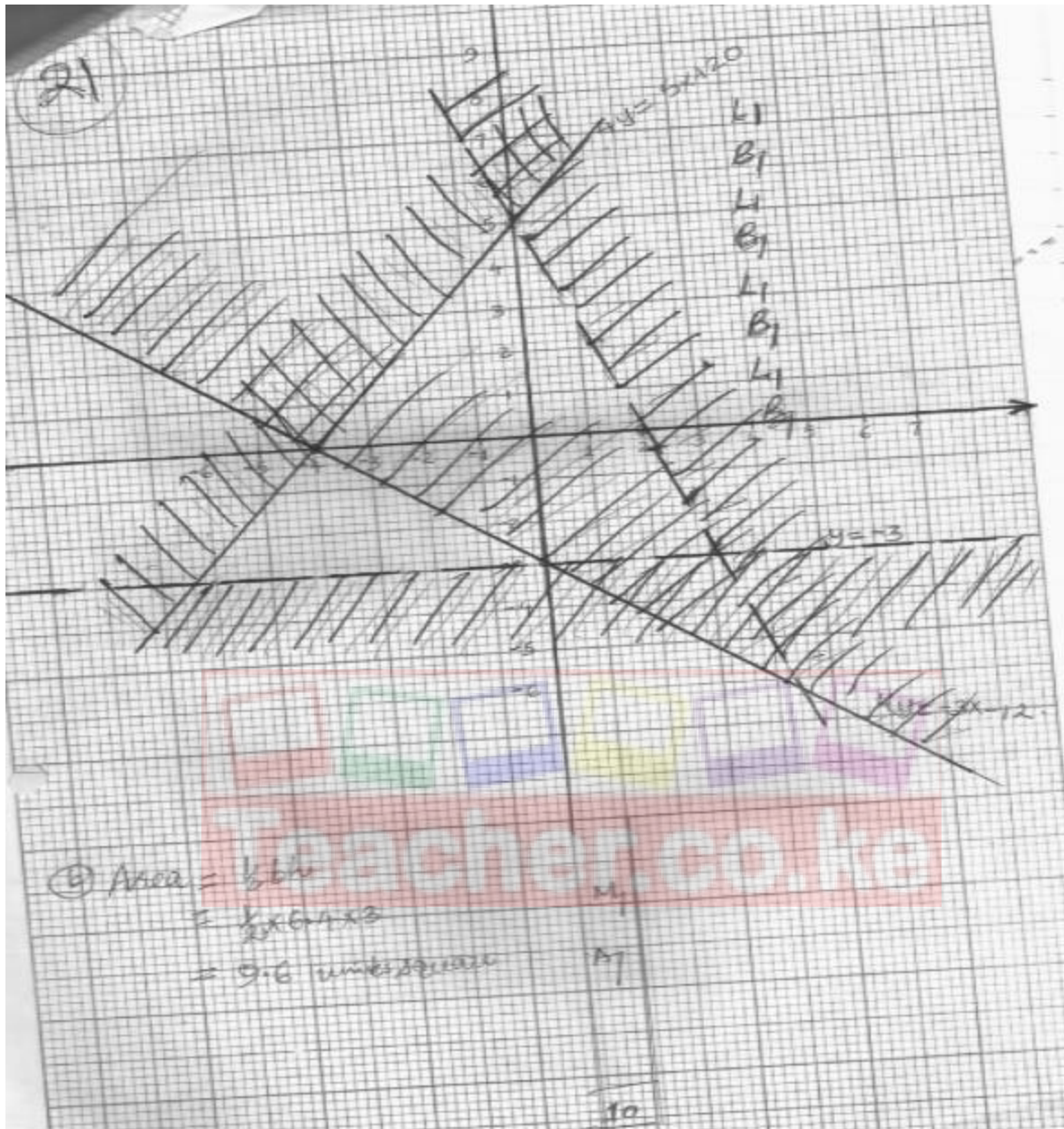
(1mk)

modal class = 40-44

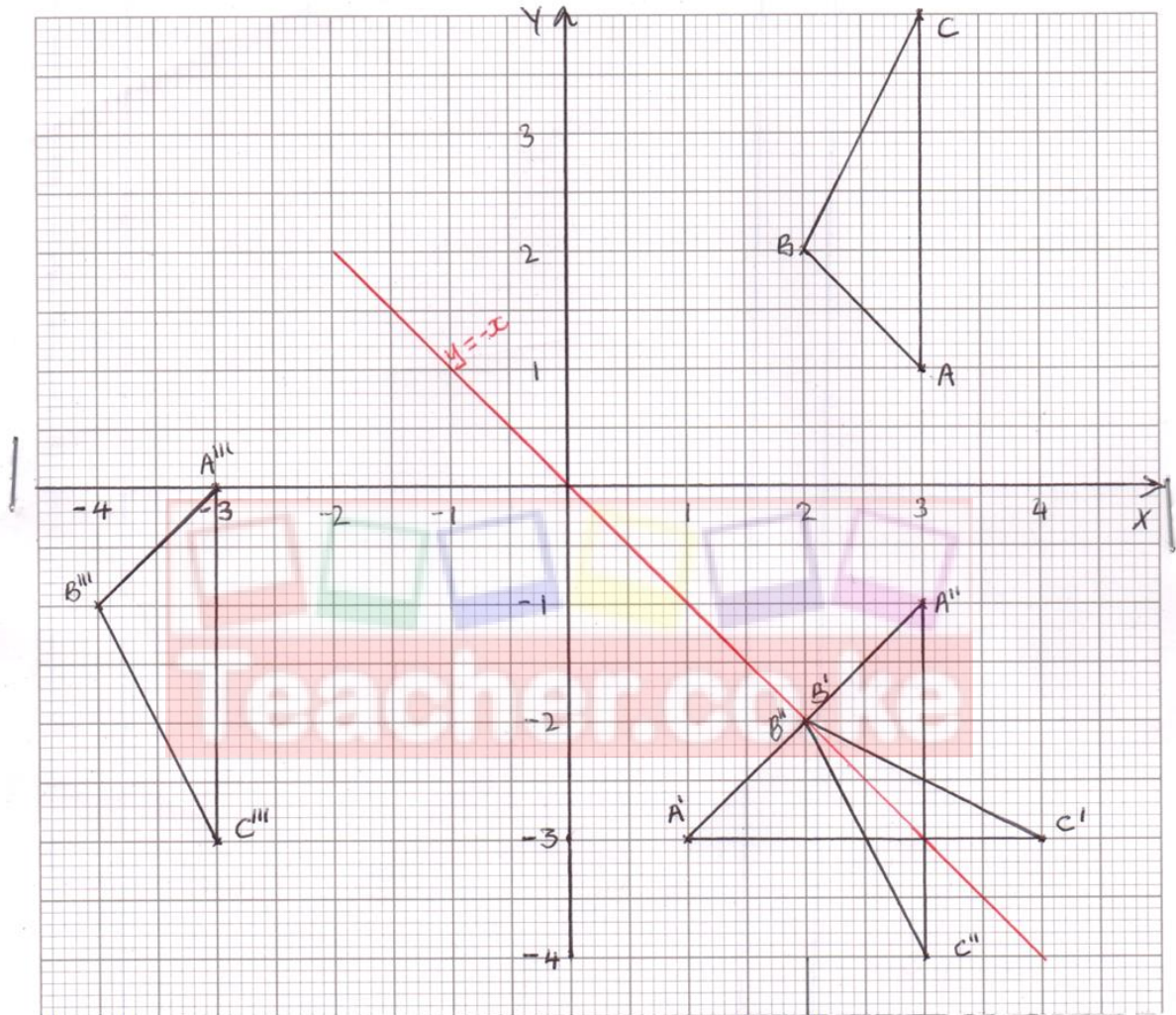
21	<p>a)</p>  <p> $\angle PAQ = \angle PAM + \angle QAM$ $\angle PAM = \sin^{-1} \frac{4.5}{10.5} = 0.4286$ $\sin^{-1}(0.4286) = 25.38^\circ$ $\angle QAM = \angle PAM = 25.38$ $\rightarrow \angle LAP = 25.38 \times 2 = 50.76$ </p> <p>b) $\angle PBQ = \angle PBM + \angle QBM$ $\angle PBM = \sin^{-1} \frac{4.5}{8.4} = 0.5357$ $\sin^{-1}(0.5357) = 32.39^\circ$ $\angle PBM = \angle QBM = 32.39^\circ$ $\angle PBQ = 32.39^\circ \times 2 = 64.78$ </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



PI	Qn	SOLUTIONS	MKS	REMARKS
	24			



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