

**2020 FORM 4 TERM 1 OPENER EXAMS  
MATHEMATICS PAPER 1 MARKING  
SCHEME.**

No. 1  $-8 - 5 \times -8 + 6$   
 $-8 + 40 + 6$   
 $= 38$

m1

$-3 - 8 \div 2 \times 4$   
 $-3 - 4 \times 4 = 19$

$= \frac{38}{-2} \sqrt$   
 $= -2 \sqrt$

NO. 2

$\frac{17}{7} - \frac{11}{6} = \frac{25}{42} \times \frac{6}{5} = \frac{5}{7}$   
 $\frac{2}{3} \times \frac{9}{4} = \frac{3}{2} - \frac{8}{7} = \frac{5}{14} \sqrt$   
 $\frac{5}{7} \times \frac{14}{5} = 2 \sqrt$

NO.3

Let mother's years be x and son's be y now:

$X + 14 = 2(y + 14) \dots\dots\dots i$

$X + 14 = 2y + 28$

$X - 2y = 14 \dots\dots\dots ii$

$(x-4) + (y-4) = 30$

$X + y = 38 \dots\dots\dots iii \sqrt$

l ii - ii  $x + y = 38$

$+ -x + 2 = -14$

$3y = 24 \sqrt \quad x = 30 \sqrt$

At son's birth: mothers age =  $30 - 8 = 22$  years  $\sqrt$

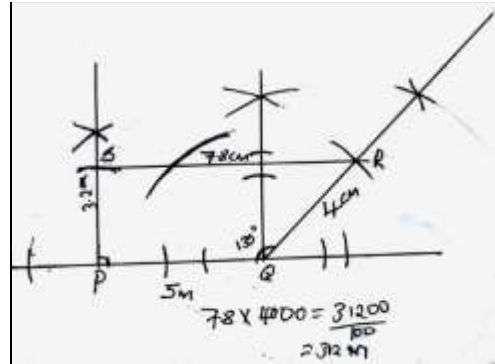
No. 4

$105000 \times 9.74$   
 $= \text{sh } 1,022,700$

$\frac{1022700 - 403879}{12.11} \sqrt$

$= 51100$  rands  $\sqrt$

No. 5



No 6

$g : c : s = 8 : 20 : 15$

$\frac{43}{15} \times 15 \sqrt$

$= 43$  Animals  $\sqrt$

No. 7

$100\% = x$

$90\% = 1440$

$\frac{1440 \times 100}{90}$

$= 1600$

$120\% = 1600$

$100\% = x$

$\frac{1600 \times 100}{120}$

$= 1333.3$

$1600 - 1333.3 = 266.70$

No. 8

$\frac{1}{0.03654} - 4.151^2$

$4.151^2 = 17.231$

$\frac{1}{0.03654} = \frac{1}{3.654 \times 10^{-2}} = \frac{1}{3.654} \times \frac{1}{10^{-2}} \sqrt$

$= 0.2737 \times 10^2 = 27.37 \sqrt$

$27.37 - 17.231 = 10.139 \sqrt$

No. 9

$\frac{12a^2 - 3b^2}{2a^2 - ab - b^2} \sqrt \sqrt$   
 $\frac{3(2a + b)(2a - b)}{2a(a - b) + b(a - b)} \sqrt \sqrt$

$$\frac{3(2a - b)}{a - b} \sqrt{\quad}$$

No. 10

$$\sin(x + 60^\circ) = \cos 2x$$

$$X + 60 + 2x = 90 \sqrt{\quad}$$

$$3X = 30$$

$$X = 10 \sqrt{\quad}$$

$$\tan \tan(x + 60) = \tan 70^\circ$$

$$= 2.748 \text{ (from tables)}$$

$$= 2.748 \text{ (from calculator)}$$

$$4 \text{ s. f. } 2.7475 \sqrt{\quad}$$

No. 11

$$\frac{12}{8} = \frac{3}{2}$$

$$\text{a.s.f.} = \frac{9}{12} \sqrt{\quad}$$

$$\text{Area PST} = \frac{4}{9} \times 336 = 149 \frac{1}{3} \sqrt{\quad}$$

$$\text{Area QRST} = 336 - 149 \frac{1}{3} = 186 \frac{2}{3} \sqrt{\quad}$$

No. 12

$$\text{Volume} = \frac{\text{mass}}{\text{density}}$$

$$= \frac{1050 \text{ cm}^3}{8.4} = 125 \text{ cm}^3$$

$$\therefore L \times L \times 0.2 \text{ cm} = 125 \text{ cm}^3 \sqrt{\quad}$$

$$L^2 = \frac{125 \text{ cm}}{0.2} = 625 \sqrt{\quad}$$

$$L = \sqrt{625} = 25 \text{ cm} \sqrt{\quad}$$

No. 13

$$2 \times 3.142 \times 36 = 226.224$$

$$3.142 \times 610.82 = 204.0 \sqrt{\quad}$$

$$\text{Total } 430.224 \sqrt{\quad}$$

No. 14

$$9 - 3x > 2x + 2$$

$$\frac{7}{5} > x \sqrt{\quad}$$

$$x + 1 > -2x - 1$$

$$3x > -2$$

$$X > -\frac{2}{3} \sqrt{\quad}$$

$$-\frac{2}{3} < x < 1 \frac{2}{5}$$

interval values 0, 1  $\sqrt{\quad}$

No. 15

$$3t + 2a = 9000 \dots (i)$$

$$4t + a = 9500 \dots (ii)$$

Multiply (ii) x 2

$$8t + 2a = 19000$$

$$3t + 2a = 9000$$

$$5t = 10000$$

$$t = 2000 \sqrt{\quad}$$

substituting in (i) above

$$3 \times 2000 + 2a = 9000$$

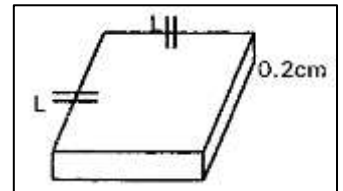
$$a = \frac{3000}{2}$$

$$a = 1500 \sqrt{\quad}$$

$$t = 2000$$

$$2 \times 2000 + 5 \times 1500$$

$$= 11500 \sqrt{\quad}$$



No. 16

$$a) r^2 = 7.6^2 + 4.8^2 - 2 \times 7.6 \times 4.8 \cos 80$$

$$= 57.76 + 23.04 - 12.67$$

$$= 68.13 \sqrt{\quad}$$

$$R = 68.13$$

$$= 8.3 \sqrt{\quad}$$

$$b) \frac{\sin b}{4.8} = \frac{\sin 80}{8.254}$$

$$\sin B = 0.5727$$

$$B = \sin^{-1} 0.5727\sqrt{2}$$
$$= 34.9^\circ\sqrt{2}$$

$$Y = 3X\sqrt{2}$$

SECTION II

No 17.

$$\begin{aligned} \text{a) } 2y - 3x &= 6 \\ 3y + x &= 20 \\ 2y - 3x &= 6\sqrt{2} \\ 9y + 3x &= 60 \\ 11y &= 60 \end{aligned}$$

$$Y = 6\sqrt{2}$$
$$X = 20 - 18$$
$$= 2$$

Co-ordinates of A are (2,6)  $\sqrt{2}$

b)  $L_2: 3y = -x + 20$

$$y = -\frac{1}{3}x + 20\sqrt{2}$$

Gradient of perpendicular = 3

$$\frac{y-6}{x-2} = 3\sqrt{2}$$
$$Y = 3X - 6 + 6$$

No. 18

c) Gradient of  $L_4$  = gradient of  $L_1$

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

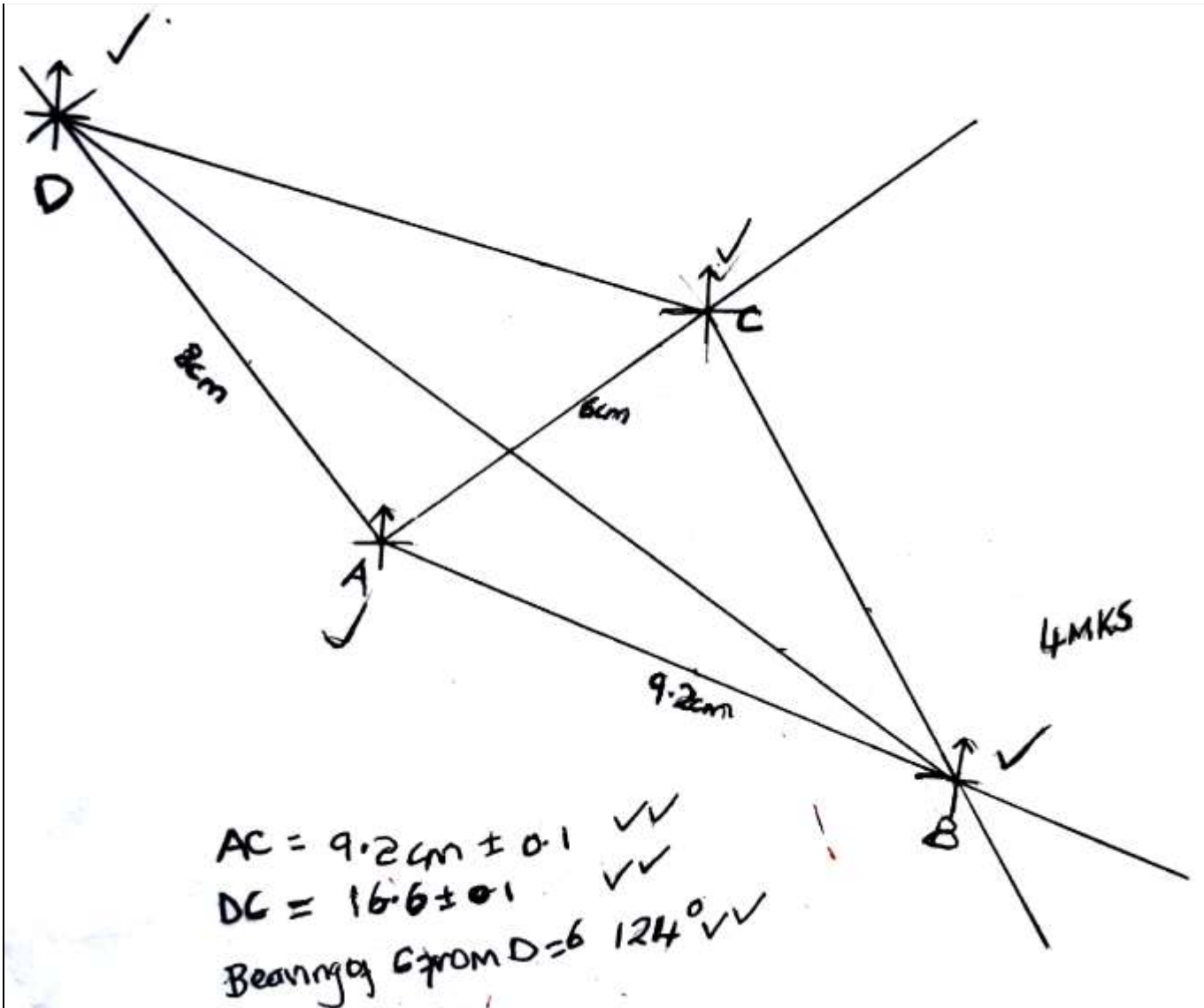
$$\frac{y-3}{x-1} = \frac{3}{4}\sqrt{2}$$

$$2y - 6 = 3X + 3$$

$$2y - 3X = 9\sqrt{2}$$

When  $X = 0$   $y = 4.5\sqrt{2}$

When  $y = 0$   $x = -3\sqrt{2}$



No. 19

a)  $x + 2 + 12 + 7 + 15 + X = 40$

$X = 4\sqrt{\quad}$

b) Mean of  $\frac{\sum fx}{\sum f} = \frac{1287.5}{40} = 32.1875\sqrt{\quad}$

c)

	5-14.5	14.5-29.5	29.5-34.5	34.5-44.5	44.5-49.5
	0.2	0.8	0.4	0.5	0.8
	19	64	24	5.5	88

d) total area  $A = 10 \times 0.2 = 2\sqrt{\quad}$   
 $B = 15 \times 0.8 = 12$   
 $C = 1.4 \times y = 6 \quad \sqrt{\quad} = \frac{40}{2} = 20\sqrt{\quad}$   
 $D = 1.5 \times 10 = 15$   
 $E = 0.8 \times 5 = 4$   
 Point to draw the lie is  $29.5 + \frac{6}{7} = 30.36$

No.20

a)  $a^2 = b^2 + c^2 - 2bc \cos A$   
 $7^2 = 10^2 + 8^2 - (2 \times 10 \times 8) \cos A$

$49 = 164 - 60 \cos A$   
 $-116 = -60 \cos A$   
 $\cos A = \frac{116}{60} \sqrt{\quad}$   
 $\cos A = 0.725\sqrt{\quad}$   
 $\cos^{-1} 0.725 = 43.53115$

$\angle BAC = 43.53\sqrt{\quad}$

b)  $\frac{a}{\sin A} = 2R$

$\frac{7}{\sin 43.53} = 2R\sqrt{\quad}$

$R = 5.082\text{cm}\sqrt{\quad}$

(c)  $\sin 43.53 = \frac{3.5}{r}$

$$r = \frac{3.5}{\sin \sin 43.53} = 5.082 \text{ cm}\sqrt{\phantom{x}}$$

$$\text{Area of } \triangle OCB = \frac{1}{2} ab \sin \theta$$

$$= \frac{1}{2} \times 5.082 \sin 87.06\sqrt{\phantom{x}}$$

$$= 12.896 \text{ cm}^2\sqrt{\phantom{x}}$$

Area of sector ACB

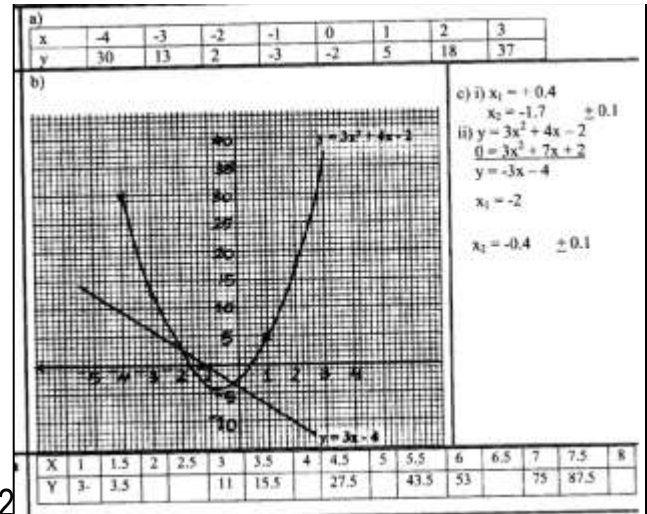
$$= \frac{\theta}{360} \pi r^2$$

$$= \frac{87.06}{360} \times \frac{22}{7} \times 5.082 = 19.630\sqrt{\phantom{x}}$$

Shaded region

$$(19.630 - 12.896) = 6.734 \text{ cm}^2\sqrt{\phantom{x}}$$

No.22



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No. 21

(a)  $15 \text{ m/s}\sqrt{\phantom{x}}$

(b) Maximum speed

$$\frac{1}{2}(15 + h) \times 10 + \frac{1}{2}(10 + 30)h = 825$$

$$75 + 5h + 20h = 825\sqrt{\phantom{x}}$$

$$25h = 750\sqrt{\phantom{x}}$$

(c)  $h = 30 \text{ m/s(i)} = \frac{30-15}{10}$

$$= 1.5 \text{ m/s}^2\sqrt{\phantom{x}}$$

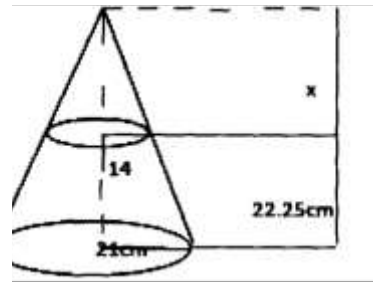
(ii)  $= \frac{0-30}{20} = -1.5 \text{ m/s}^2\sqrt{\phantom{x}}$

(d)  $\left[ \frac{1}{5}(15 + 30) \times 10 + 10 \times 30 \right] \div 20$

$$= (225 + 300) \div 20$$

$$= 26.25 \text{ m/s}\sqrt{\phantom{x}}$$

No. 23



a) i) Volume

$$\text{Ratio } \frac{x}{14} = \frac{22.5+x}{21}$$

$$21x = 14(22.5 + x)$$

$$21 = 14(22.5 + x)\sqrt{\phantom{x}}$$

$$21x - 14x = 315$$

$$x = 45 \text{ cm}\sqrt{\phantom{x}}$$

Volume of whole cone

$$= \frac{1}{3} \times \frac{22}{7} \times 21 \times 21 \times 67.5 = 31185 \text{ cm}^3\sqrt{\phantom{x}}$$

Volume of small cone

$$= \frac{1}{3} \times \frac{22}{7} \times 14 \times 14 \times 45 = 9240 \text{ cm}^3\sqrt{\phantom{x}}$$

Volume of frustum

$$31185 - 9240 = 21945 \text{ cm}^3\sqrt$$

ii) Mass of frustum

$$\text{Mass} = 21945 \times \frac{3g}{\text{cm}^3} = 65835g \sqrt$$

$$\text{Mass in kg} = \frac{65.835g}{1000g} = 65.835kg\sqrt$$

$$\text{b) } 20\% \text{ of } 65.835kg = 13.167 \text{ kg}$$

$$65.835 - 13.167 = 52.668 \text{ kg}\sqrt$$

Volume of material remaining =

$$\frac{56682}{3} = 17556 \text{ cm}^3\sqrt$$

$$\text{Length of cube} = \sqrt[3]{17556} = 25.99 \text{ cm}\sqrt$$

No.24

$$\text{(a) (i) } 6400 + 1750 \times 20$$

$$= \text{Ksh } 4400\sqrt$$

$$\text{(ii) } 41400 - 36000 = \text{Ksh } 5400\sqrt\sqrt$$

$$\text{(b) } 36000 (1 + r/100) = 41400$$

$$\left(1 + \frac{r}{100}\right) = 1.15\sqrt$$

$$\left(1 + \frac{r}{100}\right) = 1.15^{\frac{3}{5}}\sqrt$$

$$\frac{r}{100} = 0.087473554\sqrt$$

$$r = 8.7473554\sqrt\sqrt$$

$$\text{(c) } 36000 \times 1.087^2$$

$$= 42536.484\sqrt$$

$$42536.484 - 36000\sqrt$$

$$= 6536.484 \approx \text{Ksh } 6536\sqrt$$