

Form 3 mathematics marking scheme

$$1. \frac{-8 + 40 + 6\sqrt{19}}{-3 - 16}$$

$$\frac{38}{-19} = -2\sqrt{19}$$

$$2. \frac{\sqrt[3]{675 \times 135}}{\sqrt{2025}} = \frac{\sqrt[3]{3^3 \times 5^2 \times 3^3 \times 5}}{\sqrt{3^4 \times 5^2}}$$

$$= \frac{3^2 \times 5}{3^2 \times 5}$$

$$= 1$$

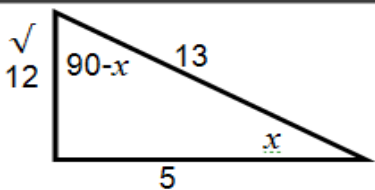
3	$\frac{\sqrt{14}(\sqrt{7}+\sqrt{2})-\sqrt{14}(\sqrt{7}-\sqrt{2})}{(\sqrt{7}-\sqrt{2})(\sqrt{7}+\sqrt{2})}$	M1
	$\frac{\sqrt{7}\sqrt{2}+2\sqrt{7}-\sqrt{7}\sqrt{2}+2\sqrt{7}}{7-2}$	M1
	$\frac{4\sqrt{7}}{5}$	A1
	; a = 4/5 b = 0	A1

$$4. 5000 \times 86.25 = 431250$$

$$431250 - 289580 = 141400\sqrt{}$$

$$\frac{141400}{67.26} \times 100\sqrt{}$$

$$= 210228.9622 \text{ Japanese yen}\sqrt{}$$

5. H.P = Depos	M	6.	
Interes			$12^2 + 5^2 = 144 + 25 = 169$
$\frac{6250 \times$			$\sqrt{169} = 13$
36,500			$\sin(90-x) = \frac{5}{13}\sqrt{}$
Theref			

$$7: AB = OB - OA$$

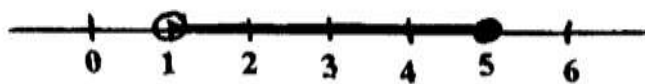
$$[3] (2)$$

8 (a) $\angle ADE = \frac{180^\circ - 108^\circ}{2} = 36^\circ$ (1 mark)

(b) $\angle AEF = \{180^\circ - (108^\circ - 60^\circ)\} \div 2$
 $= 66^\circ$ (1 mark)

(c) $\angle DAF = 108^\circ - (60^\circ + 36^\circ)$
 $= 12^\circ$ (1 mark)

9 $3 - 2x < x$
 $3 < 3x$
 $1 < x$
 $x \leq \frac{2x + 5}{3}$
 $3x \leq 2x + 5$
 $3x - 2x \leq 5$ or $x \leq 5$
 $1 < x \leq 5$



(4 marks)

10. $\frac{k - 8}{3 - k} = -3$
 $k = \frac{1}{2}$
 $\frac{y - 8}{x - \frac{1}{2}} = -3$
 $3x + y = 9\frac{1}{2}$

13. $P = kx$
 $Q = \frac{c}{x}$
 $2k + \frac{c}{x} = 7$
 $3k + \frac{c}{3} = 7$
 $\begin{cases} 4k + c = 16 \\ 9k + c = 21 \end{cases}$
 $-5k = -5$
 $k = -1$
 $4(1) + c = 16$

$$+ 10 \log_3 \sqrt[5]{3^5}$$

$$+ 10 \log_3 3$$

$$\times 1$$

12. $E^2 = \frac{xn - x^2}{n - 1}$

15. (a)

$$p(-2, 3) \longrightarrow p'(10, 10)$$

$$T = \begin{pmatrix} 10 & - & -2 \\ 10 & - & 3 \end{pmatrix}$$

$$= \begin{pmatrix} 12 \\ 7 \end{pmatrix}$$

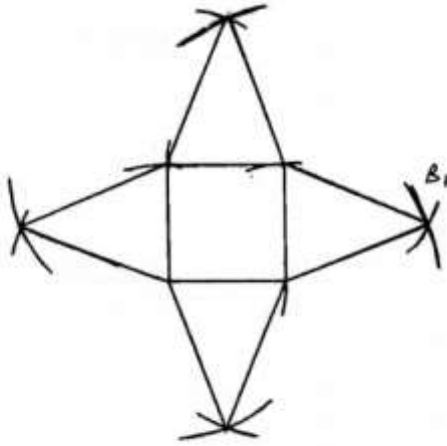
$$Q' = (1+12, 3+7)$$

$$= (13, 10)$$

15. (b) $m \begin{pmatrix} -2 \\ 3 \end{pmatrix} - n \begin{pmatrix} 1 \\ 3 \end{pmatrix} = \begin{pmatrix} -12 \\ 9 \end{pmatrix}$

$$\begin{array}{r} -2m - n = -12 \\ 3m - 3n = 9 \\ \hline m = n + 3 \\ 2(n + 3) + n = 12 \\ 3n = 6 \\ n = 2 \\ m = 5 \end{array}$$

15.(a)



(b) $3.7 \pm 0.1\text{cm}$

(2 marks)

(1 mark)

17.

<p>a) $\angle ACD = 74^\circ$ ✓ Angles subtended by the same chord AB to the circumference of the circle are equal.</p> <p>b) $\angle ABO = 42^\circ$ c) $\angle ADO = 42^\circ$</p> <p>d) $\angle ACB = 74^\circ$ ✓ Angles subtended by the same chord AB to the circumference of the circle are equal.</p> <p>e) $\angle ACB = 96^\circ$ line $AO = OB$ thus $\triangle AOB$ is an isosceles triangle. $\angle AOB$ therefore is $180 - (42 + 42) = 96^\circ$.</p>	<p>Triangle BOA is an isosceles triangle. Since $\angle ABO$ and $\angle AOB$ are 74° then $\angle ABO = \angle ADO = 74 - 32 = 42^\circ$.</p>	<p>B1</p> <p>✓ B1</p> <p>✓ B1</p> <p>✓ B1</p> <p>B1</p> <p>✓ B1</p> <p>✓ B1</p> <p>✓ B1</p>
---	--	---

18 a)(i) Taxable income p.m
 $19600 + 6000 + 2840 + 5000$
 =Ksh 33,440

	Tax sh
ii) 1 st 9680 $\times \frac{10}{100} =$	968
Next 9120 $\times \frac{15}{100} =$	1368
Next 9120 $\times \frac{20}{100} =$	1824
$(33440 - 27920) \times \frac{25}{100} =$	<u>1380</u>
Gross Tax	5580
Total relief	
$1056 + \frac{15}{100} \times 3200$	<u>1536</u>
Net tax	<u>4004</u>

b) $150,000(1 + \frac{R}{100}) = 213315$

$$1 + \frac{R}{100} = \sqrt[4]{1.422}$$

$$\frac{R}{100} = 1.04499 - 1$$

$$R = 4.499$$

$$\text{Rate p.a} = 4.499 \times 4$$

$$= 17.996$$

$$= 18\%$$

a. cone

19.



$$\frac{1}{3} \pi r^2 l + \pi r^2 h$$

$$\frac{1}{3} \times \frac{22}{7} \times 1.5 \times 0.9 \times 0.9 = 1.273 m^3 \checkmark$$

$$\frac{22}{7} \times 0.9 \times 0.9 \times 3 = 7.637 \checkmark$$

$$1.273 m^3 + 7.637 = 8.91$$

$$= 8.9 m^3 \checkmark \checkmark$$

b.

$$\pi r l + 2 \pi r l + 2 \pi r^2$$

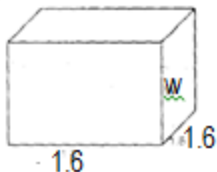
$$\sqrt{0.9^2 + 1.5^2} = 1.75 \checkmark$$

$$\frac{22}{7} \times 0.9 \times 1.75 + 2 \times \frac{22}{7} \times 0.9 \times 3 +$$

$$\frac{22}{7} \times 0.9 \times 0.9 \checkmark$$

$$4.95 + 16.97 + 2.545 = 24.465 \checkmark \checkmark$$

c.



$$W = 16^2 \times h = 8.9$$

$$1.62 = 3.48 \text{ cm} \checkmark$$

$$8.9 \div 3.48 = 3.5 \text{ cm} \checkmark$$

20. a) $6 + 14 + 24 + 14 + x + 10 + 6 + 4 = 100$

$$X = 100 - 78 \checkmark$$

$$= 22 \checkmark$$

b) Modal class = $35 - 44 \checkmark$

c) Median = $44.5 + \left(\frac{\frac{100}{2} - 44}{4} \right) 10 \checkmark$

$$= 48.79 \checkmark \checkmark$$

d)

X	f	Xf	c.f
19.5	6	117	6
29.5	14	413	20
39.5	24	948	44
49.5	14	693	58
59.5	22	1309	80
69.5	10	695	90
79.5	6	477	96
89.5	4	358	100

$$\Sigma f = 100 \checkmark \quad \Sigma fx = 5010 \checkmark$$

$$\text{mean } x = \frac{\Sigma fx}{\Sigma f}$$

$$= \frac{5010}{100} \checkmark$$

$$= 50.10 \checkmark$$

21.a

$$a = \frac{v-u}{t}$$

$$2 \frac{3}{4} = \frac{22-0}{t} \checkmark$$

$$T = 22 \div 2 \frac{3}{4}$$

$$= 8 \text{ seconds} \checkmark$$

b.

Distance = area covered under the curve

$$= \frac{1}{2} \times 8 \times 22$$

$$= 88 \text{ m} \checkmark \checkmark$$

c. total distance covered before deceleration

$$88 + (32 \times 22)$$

$$= 792 \text{ m} \checkmark$$

Distance remaining $847 - 792$

$$= 55 \text{ m} \checkmark$$

Distance = time x speed

$$= (t \times 22) \times \frac{1}{2}$$

$$55 = 11t$$

Ecolebooks.com



[DOWNLOAD MORE RESOURCES LIKE THIS ON ECOLEBOOKS.COM](http://EcoleBooks.com)

22(a) height = $\sqrt{3^2 - 1.8}$
 $= 2.4$
 x-sectional area = $\frac{2.4}{2}(2 + 5.6)$
 $= 9.12 \text{ cm}^2$

volume = 9.12×8
 $= 72.96 \text{ cm}^3$ (3 marks)

(b) mass in g = 72.96×5.75
 $= 419.52$ (2 marks)

(c) (i) v.s.f = $\frac{246.24}{72.96} = 3.375$
 l.s.f = $\sqrt[3]{3.375} = 1.5$
 $\therefore a.s.f = 1^2 : 1.5^2 \rightarrow 1 : 2.25$
 Area of x-section = 9.12×2.25
 $= 20.25 \text{ cm}^2$ (3 marks)

(ii) $\frac{5}{2} \times \frac{419.52 \text{ g}}{246.24 \text{ cm}^3}$
 $= 1.250 \text{ g/cm}^3$ (2 marks)

24.B Writing each number to one significant figure: $788 \approx 800$ and $0.006 = 0.006$
 Thus, $800 \times 0.006 = 4.8$
 $\% \text{ error} = \frac{4.8 - (788 \times 0.006)}{788 \times 0.006} \times 100 \%$
 $= \frac{0.072}{4.728} \times 100\%$
 $= 1.523\% \text{ or } (1.52284264\%)$ (3 marks)

23. (a) (i) Distance of bus from Nairobi
 $500 - 2.5 \times 60$
 $= 350 \text{ Km.}$ (2 marks)

(ii) Let distance required be x km
 For bus $x = 150 + 60t$
 For car $x = 100t$
 $\therefore 100t = 150 + 60t$
 $t = 3 \frac{3}{4} \text{ h}$

Hence, distance required = $100 \times 3 \frac{3}{4} = 375 \text{ km}$ (4 marks)

(b) Distance yet to be covered
 $= 500 - 375 = 125 \text{ km}$
 Time taken by bus
 $= \frac{125}{60}$
 $= 2 \text{ h } 5 \text{ min (or } 125 \text{ min)}$
 New speed of car
 $= \frac{125}{(125 - 25)}$
 $= \frac{60}{75} \text{ Km/h}$

