

FORM FOUR CLUSTER KCSE MODEL1

MATHEMATICS PAPER 1 ANSWER

SECTION I (50 Marks)

Answer all questions in this section in the spaces provided.

1.

$$\frac{29}{20} \times \frac{7}{10} = 2\frac{1}{14}$$

2.

$$\begin{aligned} P(3,0) \\ \frac{y}{x-3} &= \frac{3}{4} \\ y &= \frac{3}{4}x - \frac{9}{4} \end{aligned}$$

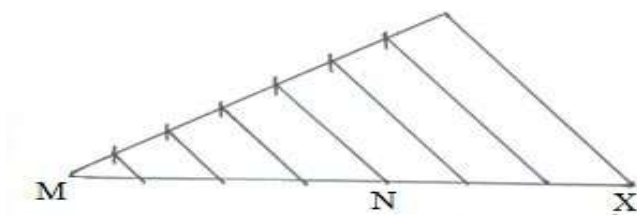
4.

$$4,500 \times 80 - 200,000 = 160,000$$

$$\frac{160,000}{120.95} \times \frac{92.5}{100}$$

£1,224

5.



6.

$$x + 2x + \frac{3}{2}x = 108$$

$$x = 24$$

$$\frac{3}{2} \times 24 = 36$$

$$7. \quad \frac{(7x-y)(7x-y)}{(7x-y)(x+3y)} \\ \frac{7x+y}{x+3y}$$

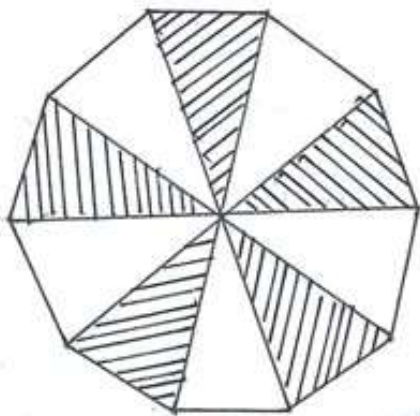
$$8. \quad \frac{500}{75} = 6 \text{ hours } 40 \text{ min} + 30 \text{ min} = 7 \text{ hr } 10 \text{ min} \\ 1835 \text{ hrs} - 7 \text{ hrs } 10 \text{ min} = 1125 \text{ hrs} = 11.25 \text{ a.m}$$

$$9. \quad 1320 - 1105 = 2 \text{ hrs } 15 \text{ min} \\ = \frac{8100}{360} = 22.5 \\ 22 \text{ times}$$

$$10. \quad \frac{\frac{-\sqrt{3}}{2} + \frac{1}{\sqrt{3}}}{\frac{1}{2}} \\ \left| \frac{2-\sqrt{9}}{2\sqrt{3}} \right| \times \frac{2}{1} \\ = -\frac{1}{\sqrt{3}}$$

$$11. \quad 26.83281573 = \sqrt{12(12-7)(12-x)(x-5)} \\ x^2 - 17x + 72 = 0 \\ (x-9)(x-8) \\ x = 9 \text{ or } x = 8 \text{ (The other two sides are 9cm \& 8cm)}$$

12.



13.

$$49.8, 50.7, 52.3, 52.3, 54.2, 55.6, 57.2, 58.2$$

$$= \frac{52.3 + 54.2}{2}$$

$$= 53.25$$

14.

$$-3(3-x) \leq -2(x+1) \leq 2(2x+1)$$

$$x \leq \frac{7}{5} \quad x \geq \frac{-2}{3}$$

$$= 0, 1$$

15.

$$(2^{-3})^{(1-x)} = 12^{12x+4} \div 2^{(x-1)}$$

$$= -3 + 3x = 11x + 5$$

$$8x = -8$$

$$x = -1$$

16.

$$10x + 22 + x + 22 = 77$$

$$x = 3$$

Ian $\Rightarrow$ 10 yrs

Kim $\Rightarrow$ 37 yrs

SECTION II (50 Marks)

Answer only five questions in this section

17.

$$(i) AC = c - a$$

$$(ii) BD = -c - \frac{4}{5}a$$

$$(i) OT = a + h(c - a) \\ = (1 - h)a + hc$$

$$OT = a + c + t \left(-c - \frac{4}{5}a \right)$$

$$\left(1 - \frac{4}{5}t \right) a + (1 - t)c$$

$$(i) h = 1 - t$$

$$1 - h = 1 - \frac{4}{5}t \Rightarrow h = \frac{4}{5}t$$

$$1 - t = \frac{4}{5}t$$

$$t = \frac{5}{9} \text{ and } h = \frac{4}{9}$$

$$(ii) AC : TC = 9 : 5$$

18.

(a)

$$A.S.F = 9 : 4$$

$$v.s.f = 27 : 8$$

$$\frac{8}{27} \times 0.945$$
$$= 0.28 \text{ ltrs}$$

(b)

$$45 \times 13 = 585 \text{ cm}^3$$

$$45h + 20h = 585$$

$$h = 9$$

(c) Height on large = $\frac{4}{9} \times 9 = 7.2 \text{ cm}$

$$\frac{1}{5} \times 45 \times 9$$

Height in small

$$= \frac{81}{20} + 9 = 13.05$$

Difference

$$13.05 - 7.2 = 5.85$$

19.

(i) $\frac{180,000}{\times}$

(ii) $\frac{180,000}{\times + 3}$

b)

$$\frac{180,000}{\times} - \frac{180,000}{\times + 3} = 300$$

$$\times^2 + 3 \times - 180 = 0$$

$$(\times + 15)(\times - 12) = 0$$

$$\times = 12$$

(c)

$$\frac{180,000}{12} \quad |$$

shs. 15,000

$$\frac{180,000}{15}$$

$$15$$

$$12,000$$

$$\text{Decrease} \Rightarrow 15,000 - 1,200 = 3,000$$

$$\frac{30,000}{15,000} \times 100\%$$

$$= 20\%$$

20.

$$(i) \frac{22}{7} \times 100 \times 30 = 9429$$

$$\frac{22}{7} \times 2.8^2 \times 30 = 739.2$$

$$(9429 - 739.2) + 12,000$$

$$= 20689.8m^2$$

$$(ii) \left. \begin{array}{l} 40 \times 30 \times 2 = 2400 \\ 30 \times 10 \times 2 = 600 \\ 40 \times 10 \times 2 = 800 \end{array} \right\}$$

$$\frac{22}{7} \times 30 \times 20 = 1885.7$$

$$\frac{22}{7} \times 5.6 \times 30 = 528$$

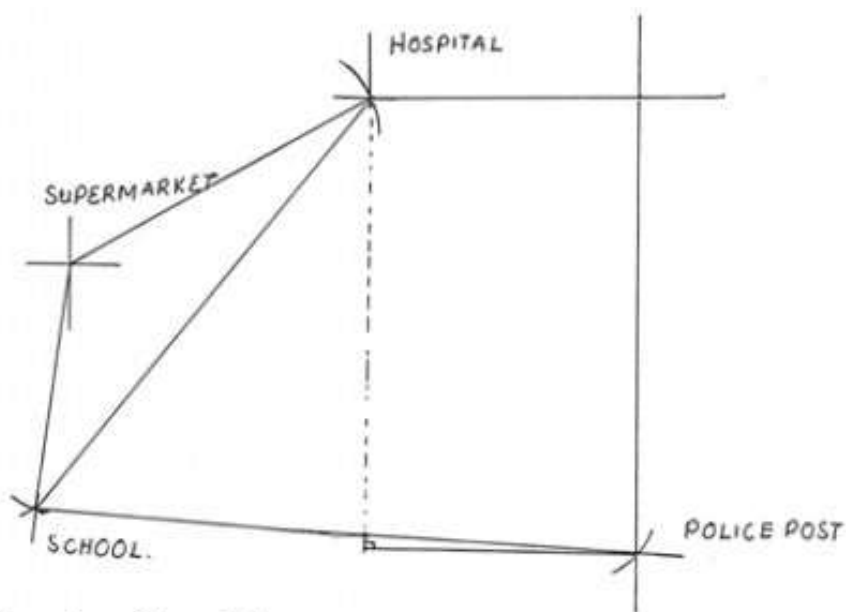
$$\text{Total S.A} = 6213.7$$

$$500 \times 8689.8 = 43,44,900kg$$

$$650 \times 1200 = 7,800,000kg$$

$$\text{Total mass} = 12,144,900kg$$

21.



✓ location of hospital

✓ location of police post

✓ location of school

(i) $(10.4 \pm 0.1) \times 20 = 208 \text{ km}$

(ii) $273^\circ \pm 1^\circ$

(iii) $(13.0 \pm 0.1) \times 20 = 260 \text{ km}$

(i) *N-S line from hospital produced*

└ from police to N-S line of Hospital

$(8.4 \pm 0.1) \times 20 = 168 \text{ km}$

(ii) $222^\circ \pm 1^\circ$

22.

$$\frac{5}{4} \times 80 = 100$$

$$500 - 100 = 400 \checkmark$$

$$\frac{100}{40} = 2\frac{1}{2} \text{ hours}$$

$$2\frac{1}{2} \times 120 =$$

$$= 300 \text{ km}$$

$$\frac{500}{120} = 4 \text{ hours } 10 \text{ min}$$

$$\frac{350}{120} = 2 \text{ hours } 55 \text{ min}$$

$$4 \text{ hrs } 10 \text{ min} - 2 \text{ hrs } 55 \text{ min}$$

$$1 \text{ hr } 15 \text{ min}$$

$$\frac{150}{3/4}$$

$$= 200 \text{ km/h}$$

23.

$$\frac{dy}{dx} = 8x + 4$$

$$M_1 = -4$$

$$M_2 = \frac{1}{4}$$

$$y = 4 - 4 - 3 = -3(-1, -3)$$

$$\frac{y+3}{x+1} = \frac{1}{4}$$

$$y = \frac{1}{4}x - \frac{11}{4}$$

$$\text{Turning point} = \left(-\frac{1}{2}, -4\right)$$

-1	$\frac{1}{2}$	0
<		>

Min

X intercept

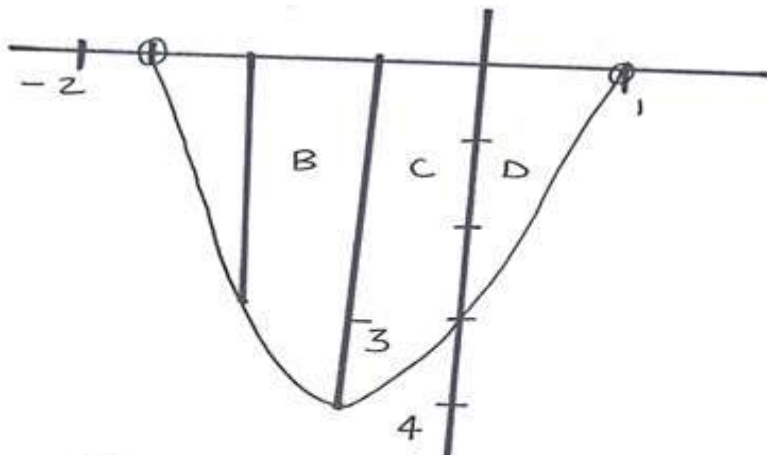
$$0 = 4x^2 + 4x - 3$$

$$0 = (2x+3)(2x-1)$$

$$x = -\frac{3}{2}, \frac{1}{2}$$

$$\left(-\frac{3}{2}, 0\right) \left(\frac{1}{2}, 0\right)$$

y intercept (0, -3)



$$A = \frac{1}{2} \times 0.5 \{ (0+0) + 2(3+4+3) \}$$

$$0.25 \times 20 = 5 \text{ sq. Units}$$

24.

$$(i) \angle APB = 2 \times \angle APQ$$

$$= 2 \sin^{-1} \left(\frac{4.5}{8} \right)$$

$$= 68.46^\circ$$

$$(ii) \angle AQB = 2 \times \angle AQP$$

$$= 2 \sin^{-1} \left(\frac{4.5}{6} \right)$$

$$= 97.18^\circ$$

$$(i) \left(\frac{97.18}{360} \times \pi \times 6^2 \right) - \left(\frac{1}{2} \times 6 \times 6 \sin 97.18 \right)$$

$$38.24 - 29.77$$

$$= 8.47$$

Area of shaded region

$$(17.59 + 29.77) - (12.94 + 8.47)$$

$$= 47.36 - 21.41$$

$$= 25.95$$