MATHEMATICS PAPER 1

ANSWERS

KCSE 2010

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30.3.3 Mathematics Alt. B Paper 1 (122/1)

1. $270 \div (90 \times 2) + 7 \times 4 - 40 \div 5$

$= 270 \div 180 + 28 - 8$

$= 21\frac{1}{2}$ 2 marks

2. $7056 = 2^4 \times 3^2 \times 7^2$

$\sqrt{7056} = 2^2 \times 3 \times 7$

$= 84$ 2 marks

3. $\frac{2(^-2) + 3(3+5)}{4 \times 3 \times 5}$

$= \frac{^-4 + 24}{60}$ 2 marks

$= \frac{1}{3}$

4. Width of floor $= \sqrt{37.7^2 - 35.2^2}$

$\therefore$ area of floor $= \sqrt{37.7^2 - 35.2} \times 35.2$

$= 475.2\ m^2$ 3 marks

5.

NO.	LOG	
43.2		1.6355
0.015		+
		$\bar{2}.1861$
		$\bar{1}.8116$
		-
$\sqrt[3]{0.00679}$	$\bar{3}.8319 \div 3$	$\bar{1}.2773$
3.422		0.5343

6. $\angle CBG = 180^0 - 120^0 = 60^0$

$\angle ECB = 90^0$

$\angle BGC = 30^0$ 3 marks

7. $$\frac{3\frac{1}{3} + \frac{6}{7} \times \frac{49}{9}}{\frac{44-35}{10}}$$

$$= \frac{8}{\frac{9}{10}}$$

$$= \frac{8 \times 10}{9} = 8\frac{8}{9}$$ 3 marks

8. Volume of water in m^3

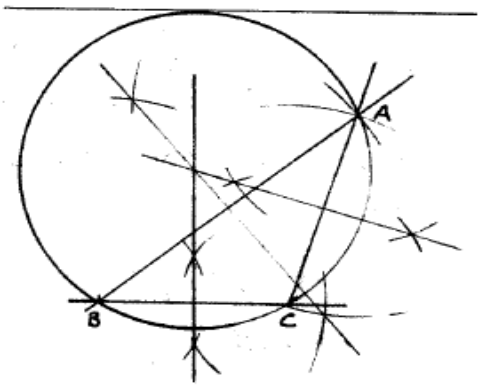
$$= \frac{21000}{100} = 21\ m^3$$

Height of water

$$= \frac{21}{4 \times 3.5} = 1.5\ m$$

3 marks

9.



Construction of ΔABC
Construction of $\perp$ as bisectors
Construction of circle

3 marks

10. $3x - 2 < 10 + x \leq 2 + 5x$

$3x - 2 < 10 + x$
$2x < 12$
$x < 6$

$10 + x \leq 2 + 5x$
$-4x < -8$
$-x < -2$
$x \geq 2$

$\therefore 2 \leq x < 6$

3 marks

11. Length of $\perp a$, $h = 12 \sin 36^0$
$= 7.05$

$\therefore$ area of trapezium

$$= \frac{20+8}{2} \times 7.05$$

$$= 98.75 \text{ cm}^3$$

4 marks

12. Ratio of increase: 1200:800
= 3:2

Original price for a pair of trousers

$$\frac{t}{2700} = \frac{2}{3}$$

$$t = \frac{2}{3} \times 2700 = 1800$$

3 marks

13. Shaded area

$= \frac{150}{360} \times \pi \times 10.5^2 - \frac{1}{2} \times 10.5^2 \sin 150^0$

$= 144.3169125 - 27.5625$

$= 116.7544125 \approx 116.8 cm^2$

4 marks

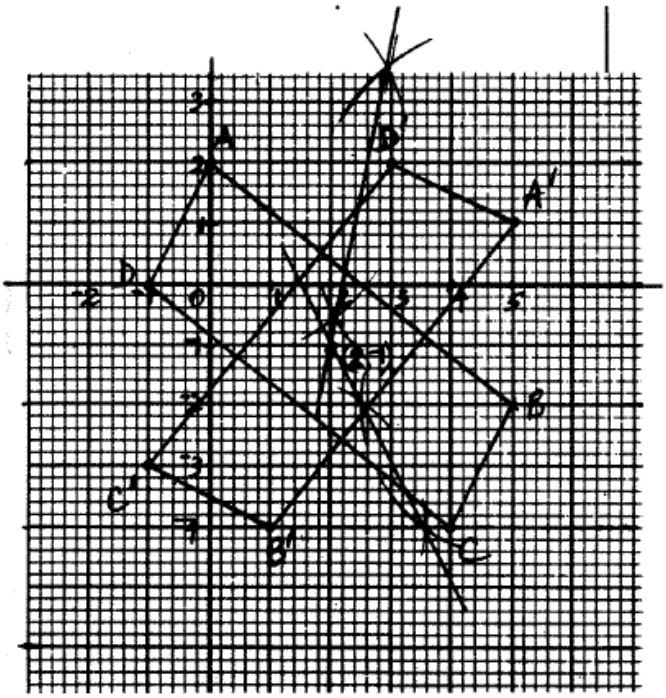
14. $25 = 5^2$; $30 = 2 \times 3 \times 5$; $35 = 5 \times 7$

LCM = $2 \times 3 \times 5^2 \times 7$

Time = $\frac{1050}{60} = 17.5h$

4 marks

15.



a) Construction of at least 2 mediators
Centre of rotation (2,-1)

b) Angle of rotation -90^0

3 marks

16. Commission earned

$\frac{2}{100} \times 30000 + \frac{3.5}{100} \times (84000 - 30000)$

$= 600 + 1890 = 2490$

Total earnings

12000 + 2490 = 14490

4 marks

17. a) 2400 x 120

= 288000

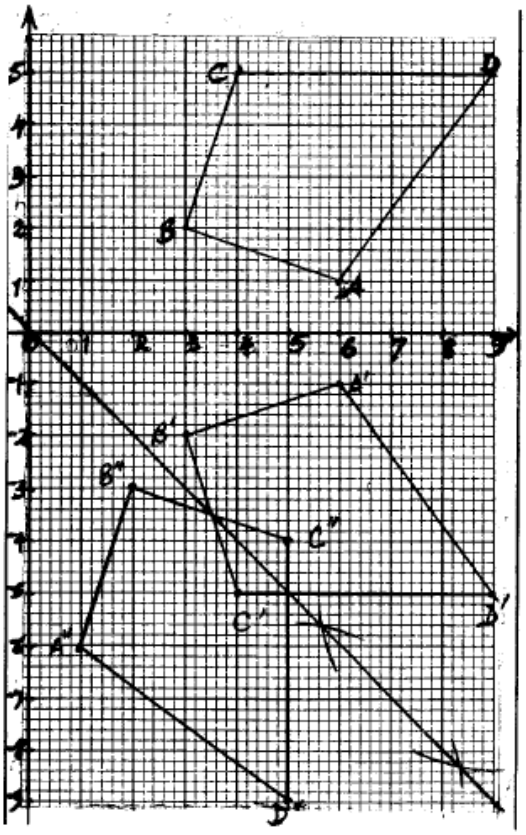
b) Amount left
288000 – 13500
In Tsh. = 153000 x 16.5
= 2524500
Amount in Tsh spent
$\frac{40}{100} \times 2524500 = 1009800$

c) Remaining amount in £
$= \frac{60}{100} \times \frac{153000 \times 16.5}{1980}$

= £ 765

10 marks

18.



a) Drawing image A'B'C'D'

b) (i) image A"B"C"D"
(ii) mediator(s)

c) (i) equation of line

Gradient $\frac{^{-}5 - {}^{-}3.5}{5 - 3.5} = {}^{-}1$

$\therefore$ equation $y = {}^{-}x$

(ii) $I(1,0) \rightarrow I'(0,-1)$; $J(0,1) \rightarrow J'(-1,0$

$\therefore$ matrix of reflection in

$y = -x$ is $\begin{pmatrix} 0 & -1 \\ -1 & 0 \end{pmatrix}$

10 marks

19. a)

$$(7x+5)(x+10)$$
$$= 7x^2+70x+5x+50$$
$$= 7x^2+75x+50$$

b)

$$7x^2+75x+50=600$$
$$7x^2-35x+110x-550=0$$
$$(7x+110)(x-5=0)$$
$$x=5$$
$$\therefore \textit{ perimeter}$$
$$=2(7\times 5+5)+2(5+10)$$
$$=80+30=110m$$

c) $\frac{110}{5} = 22$

10 marks

20. a) Cross sectional area

$$=\pi\times(0.3^2-0.26^2)$$
$$=0.070371675 \simeq 0.07$$

b) (i) External surface area

$$\pi\times 2\times 0.3\times 6.5+2\times 0.07$$
$$= 12.25221135+0.14$$
$$= 12.39$$

(ii) Internal surface area

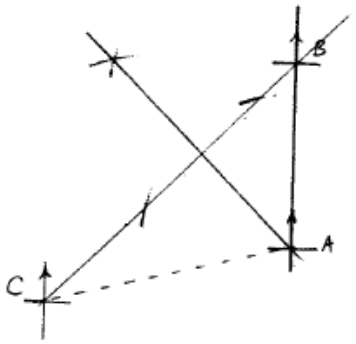
$$= \pi\times 2\times 0.26\times 6.5$$
$$= 10.61858317 \simeq 10.62$$

(iii) Total surface area

$$12.39+10.62$$
$$= 23.01m^2$$

10 marks

21.



a) Location of B
Location of C

b) Distance of A from C
5.5
5.5 x 100 = 550 km

Bearing of A from C = 255^0

c) Shortest distance of A from BC
Drawing ⊥ ar
Measuring 2.8 cm
Actual distance = 2.8 x 100 = **280 km**

10 marks

22. a) $64\ m^3 = 64 \times 1000000$
$= 64000000\ cm^3$

b) v.s.f. $= \frac{64000000}{512} = 125000$

d.s.f. $\sqrt[3]{12500} = 50$

A.s.f. $= 50^2 = 2500$

c) Amount of paint required
= 2500 x 0.004 = 10

Cost = 10 x 120 = 1200

10 marks

23. a) distance travelled:

$$\frac{1}{2} \times 10 \times 20 = 100\,m$$

b) average velocity:

distance: 10 x 25 + ½ x 25 x 20
= 250 + 250 = 500

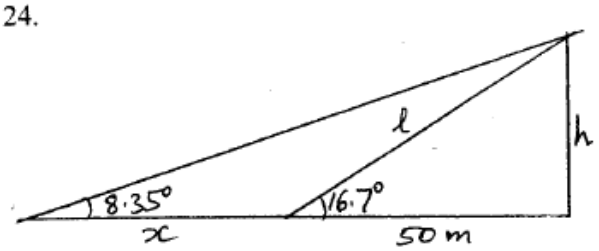
$\therefore$ velocity $\quad \dfrac{500}{45-20} = 20$ m/s

c) acceleration: $\dfrac{0-30}{60-45}$ 4

4 4 4 4 $\quad = \dfrac{-30}{15} = -2m/s^2$

10 marks

24.



a) (i) $\dfrac{h}{50} = \tan 16.7^0$

$h = 50\tan 16.7^0 = 15.00071889$

$= 15.00m$

(ii) $\dfrac{50}{l} = \cos 16.7$

$l = \dfrac{5}{\cos 16.7} = 52.20173912$

$= 52.20\,m$

b) $\dfrac{15}{50+x} = \tan 8.35$

$50 + x = \dfrac{15}{\tan 8.35}$

$50 + x = 102.1968412$

$x = 102.1968412 - 50$

$= 52.20$ m

10 marks