

# GB ASSESSMENT TEST

VIRTUAL MOCK EXAMINATION (2)  
 MATHEMATICS- APRIL, 2020  
 MOCK EXAMINATION- MARKING SCHEME

**OBJECTIVE TEST**

1. B	6. D	11. A	16. D	21. C	26. C	31. A	36. D
2. A	7. B	12. C	17. D	22. C	27. C	32. D	37. A
3. A	8. C	13. A	18. B	23. B	28. D	33. D	38. A
4. C	9. B	14. C	19. D	24. B	29. C	34. C	39. A
5. B	10. C	15. A	20. C	25. D	30. A	35. C	40. B

**THEORY**

Q no	SOLUTION
<b>1</b>	<p>a) i. <math>\frac{3+7+4+3+3+x+8+3x+5+7}{10} = 6</math></p> $\frac{40+4x}{10} = \frac{6}{1} \quad \text{M1}$ <p><i>Cross multiply</i></p> $40 + 4x = 6 \times 10$ $40 + 4x = 60 \quad \text{M1}$ $4x = 60 - 40$ $4x = 20$ $\frac{4x}{4} = \frac{20}{4}$ $x = 5 \quad \text{A1}$ <p>ii. the modal mark is <b>3</b>    <b>A1</b></p> <p>iii. the median mark                      arranging them in ascending order                      3,3,3,4,5,5,7,7,8,15</p> $\frac{5+5}{2} = \frac{10}{2}$ $= \underline{5} \quad \text{A1}$ <p>b) i. cost of 18 packets of crayon                      18 x GhC 1.50                      = GhC 27.00</p> <p>N<sub>o</sub> of pencils = <math>\frac{\text{GhC } 27.00}{\text{GhC } 0.30}</math></p> $= \frac{27}{0.3} \quad \text{M1}$ $= \underline{90} \text{ pencils} \quad \text{A1}$ <p>c) i. finding the actual fractions of expenditure</p> <p>breakfast = <math>\frac{2}{5}</math></p> <p>snacks = <math>\frac{1}{6}</math> of remaining <math>(1 - \frac{2}{5} = \frac{3}{5})</math></p> $= \frac{1}{6} \times \frac{3}{5} \quad \text{M1}$ $= \frac{3}{30}$ $= \frac{1}{10} \quad \text{M1}$ <p>lunch = <math>\frac{3}{4}</math> of remaining <math>(1 - (\frac{2}{5} + \frac{1}{10}))</math></p> $= 1 - \frac{1}{2}$ $= \frac{1}{2}$ $= \frac{3}{4} \times \frac{1}{2}$

$$= \frac{3}{8} \quad \mathbf{M1}$$

$$\begin{aligned} \text{Total fraction of expenditure} &= \frac{2}{5} + \frac{1}{10} + \frac{3}{8} \\ &= \frac{16+4+15}{40} \\ &= \frac{35}{40} \quad \mathbf{M1} \\ &= \frac{7}{8} \end{aligned}$$

$$\text{Amount left after expenditure} = \text{Gh}\phi 100 = 1 - \frac{7}{8} = \frac{1}{8} \quad \mathbf{M1}$$

$$\therefore \text{if } \frac{1}{8} = \text{C}100$$

$$1 = x$$

$$\text{Total amount } (x) = 100 \times 8 = \text{C}800 \quad \mathbf{A1}$$

ii. Daily expenditure = total amount – amount left

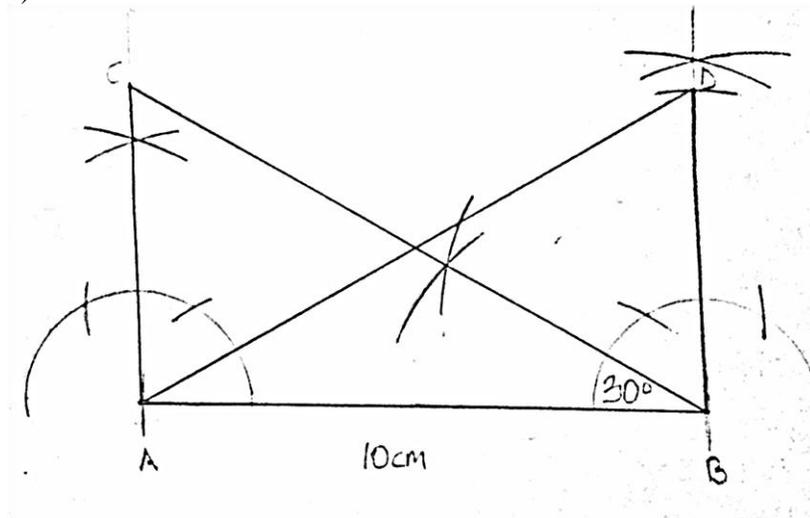
$$= \text{C}800 - \text{C}100 \quad \mathbf{M1}$$

$$= \text{C}700$$

$\therefore$  GhC 800 will not be sufficient for the week.  $\mathbf{A1}$

2

a)



i.  $\alpha$ . Line  $|AB|$   $\mathbf{B \frac{1}{2}}$

$\beta$ . Perpendicular bisector at A to C.  $\mathbf{B 1}$

$\gamma$ . Angle  $ABC = 30^\circ$   $\mathbf{B 1}$

ii.  $\alpha$ . Perpendicular bisector at B to D such that  $|AC| = |BD|$ .  $\mathbf{B1}$

$\beta$ . Join A to D.  $\mathbf{B \frac{1}{2}}$

iii. Measure.  $\alpha$ .  $|AD| = 11.3 \text{ cm} \mp 0.2$   $\mathbf{A1}$

$\beta$ . Angle  $ADB = 60^\circ$   $\mathbf{A1}$

b) i. volume of Cylinder =  $\pi r^2 h$

$$\pi = \frac{22}{7} \quad r = \frac{14}{2} = 7$$

$$\therefore 1694 = \frac{22}{7} \times 7 \times 7 \times h \quad \mathbf{M1}$$

$$1694 = 154h$$

$$\frac{1694}{154} = \frac{154h}{154}$$

$$h = 11 \text{ cm} \quad \mathbf{A1}$$

ii. Total surface area =  $\pi r(r + 2h)$

$$\frac{22}{7} \times 7 (7 + 2 \times 11)$$

$$\frac{22}{7} \times 7 (7 + 22) \quad \mathbf{M1}$$

$$22 \times 29$$

$$= \mathbf{638cm^2} \quad \mathbf{A1}$$

c) 18 cows = 21 days

24 cows = ?

$$\frac{18}{24} = 21 \quad \mathbf{M1}$$

$$\frac{24}{9 \times 7}$$

$$\frac{4}{63}$$

$$= 15\frac{3}{4}$$

$\therefore$  16 days = 2 weeks 1 day 18hrs  $\quad \mathbf{A1}$

d) 1.5, 75%,  $\frac{14}{25}$ , 5

$$\frac{15}{10}, \frac{75}{100}, \frac{56}{100}, \frac{5}{1} \quad \mathbf{M1}$$

$$\frac{(15 \times 10), 75, 56, (5 \times 100)}{100}$$

$$\frac{150, 75, 56, 500}{100} \quad \mathbf{M1}$$

Descending order

$$5, 1.5, 75\%, \frac{14}{25} \quad \mathbf{A1}$$

3

(a) 5,200 m = 5.2 km

1 hour = 3600 sec

Time taken to travel from Ashongman to Tema

$$\text{Time} = \frac{\text{distance}}{\text{average speed}}$$

$$= \frac{5.2 \times 3600}{40} \quad \mathbf{M1}$$

$$= 5.2 \times 90$$

$$= \mathbf{468 \text{ sec.}} \quad \mathbf{A1}$$

(b)  $\frac{0.000108 \times 0.00434}{0.12 \times 0.14}$

$$\frac{108 \times 10^{-6} \times 434 \times 10^{-5}}{12 \times 10^{-3} \times 14 \times 10^{-2}} \quad \mathbf{M1}$$

$$\frac{9 \times 31 \times 10^{-6+(-5)}}{1 \times 10^{-3+(-2)}}$$

$$\frac{279 \times 10^{-11}}{10^{-5}} \quad \mathbf{M1}$$

$$= 279 \times 10^{-11-(-5)}$$

$$279 \times 10^{-11+5}$$

$$279 \times 10^{-6} \quad \mathbf{M1}$$

$$2.79 \times 10^2 \times 10^{-6}$$

$$\mathbf{2.79 \times 10^{-4}} \quad \mathbf{A1}$$

(c) i.  $-4x^2 - 12x + 7$

$$-4x^2 - (14 - 2)x + 7$$

$$-4x^2 - 14x + 2x + 7 \quad \mathbf{M1}$$

$$-2x(2x + 7) + 1(2x + 7)$$

$$(2x + 7)(-2x + 1) \quad \mathbf{A1}$$

ii.  $R = r = \begin{pmatrix} -6 \\ 4 \end{pmatrix}$

$$S = s = \begin{pmatrix} -10 \\ 7 \end{pmatrix}$$

$$\overrightarrow{RS} = s - r$$

$$= \begin{pmatrix} -10 \\ 7 \end{pmatrix} - \begin{pmatrix} -6 \\ 4 \end{pmatrix} \quad \mathbf{M1}$$

$$= \begin{pmatrix} -10+6 \\ 7-4 \end{pmatrix} = \begin{pmatrix} -4 \\ 3 \end{pmatrix}$$

$$|RS| = \sqrt{(-4)^2 + (3)^2} \quad \mathbf{M1}$$

$$= \sqrt{16 + 9}$$

$$= \sqrt{25}$$

$$= 5 \text{ units.} \quad \mathbf{A1}$$

(d) Average age of family = 30yrs

$$\text{Total age of family} = 8 \times 30 = 240\text{yrs}$$

Average age of six children = 19yrs

$$\text{Total age of six children} = 6 \times 19 = 114\text{yrs} \quad \mathbf{M1}$$

Total age of father and mother =  $240 - 114 = 126\text{yrs}$

Let mother's age =  $x$                       father's age =  $x + 4$

$$\text{Therefore } x + x + 4 = 126 \quad \mathbf{M1}$$

$$2x + 4 = 126$$

$$2x = 126 - 4$$

$$\frac{2x}{2} = \frac{122}{2} \quad \mathbf{M1}$$

$$x = 61\text{yrs}$$

$$\text{Father's age} = 61 + 4 = 65\text{yrs} \quad \mathbf{A1}$$

4

(a) i.  $y_1 = 2x + 3$

$$x = -2$$

$$2(-2) + 3 = -4 + 3 = -1$$

$$x = 2$$

$$2(2) + 3 = 4 + 3 = 7$$

$$x = 3$$

$$2(3) + 3 = 6 + 3 = 9$$

$$x = 0$$

$$2(0) + 3 = 0 + 3 = 3$$

$$y_2 = 2 - 3x$$

$$x = -2$$

$$2 - 3(-2) = 2 + 6 = 8$$

$$x = -1$$

$$2 - 3(-1) = 2 + 3 = 5$$

$$x = 0$$

$$2 - 3(0) = (2 - 0) = 2$$

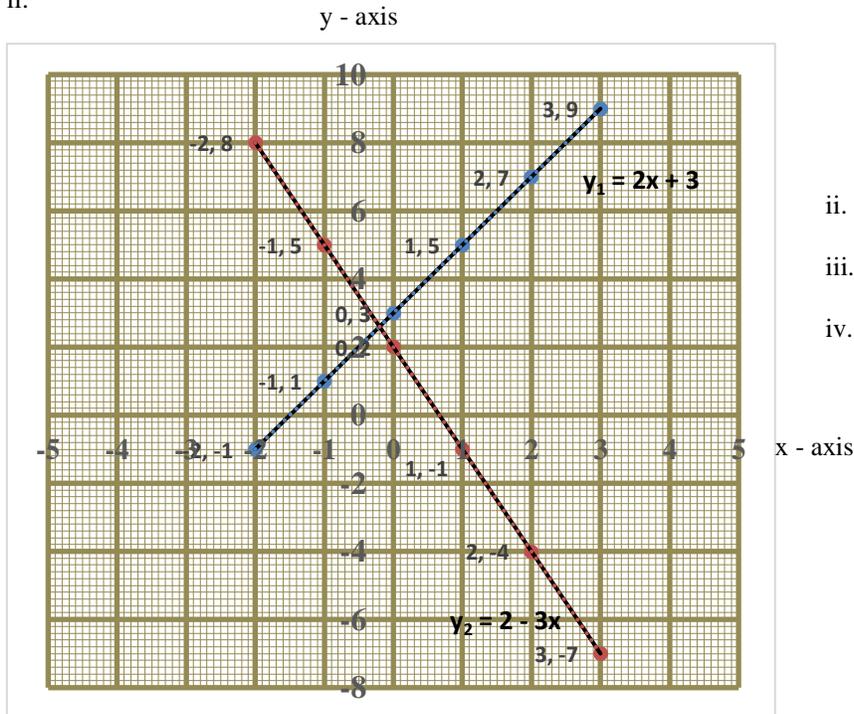
$$x = 3$$

$$2 - 3(3) = (2 - 9) = -7$$

$x$	-2	-1	0	1	2	3
$y_1$	-1	1	3	5	7	9
$y_e$	8	5	2	-1	-4	-7

**B4** (8 x ½ = 4)

ii.



ii. **B3**

iii. **B3**

iv. (-0.1, 2.8) **B1**

(b)  $b = \frac{2}{3}(m + n)$

$$3b = 2(m + n)a \quad \mathbf{M1}$$

$$3b = (2m + 2n)a$$

$$3b = 2am + 2an$$

$$3b - 2am = 2an$$

$$\frac{2an}{2a} = \frac{3b - 2am}{2a}$$

$$n = \frac{3b - 2am}{2a} \quad \mathbf{A1}$$

when  $m = 2$ ,  $b = 3$  and  $a = 4$

$$n = \frac{3(3) - 2(4)(2)}{2(4)} \quad \mathbf{M1}$$

$$n = \frac{9 - 16}{8}$$

$$n = \frac{-7}{8} \quad \mathbf{A1}$$

5

(a) Area of a kite =  $\frac{1}{2}$  x products of the diagonals

$$88 \text{ cm}^2 = \frac{1}{2} (11 \text{ cm} \times x) \quad \mathbf{M1}$$

$$88 \text{ cm}^2 = \frac{1}{2} \times 11x \quad \mathbf{M1}$$

$$\frac{176 \text{ cm}^2}{11 \text{ cm}} = \frac{11x \text{ cm}}{11 \text{ cm}} \quad \mathbf{M1}$$

$$16 \text{ cm} = x$$

Longer diagonal is = 16 cm. **A1**

$$(b) \frac{100-6}{100} \times \frac{100-6}{100} \times \frac{100-6}{100} \times \frac{100-6}{100} \times 4500 \quad \mathbf{M1}$$

$$\frac{94}{100} \times \frac{94}{100} \times \frac{94}{100} \times \frac{94}{100} \times 4500 \quad \mathbf{M1}$$

$$= \underline{\mathbf{GhC3513.37}} \quad \mathbf{A1}$$

$$(c) \frac{1}{6}(2a-5) - 3 = \frac{2}{5}(a+2) - \frac{1}{3}$$

$$= 30 \times \frac{1}{6}(2a-5) - 30(3) = 30\left(\frac{2}{5}\right)(a+2) - 30\left(\frac{1}{3}\right) \quad \mathbf{M1}$$

$$= 5(2a-5) - 90 = 12(a+2) - 10$$

$$= 10a - 25 - 90 = 12a + 24 - 10 \quad \mathbf{M1}$$

$$= 10a - 12a = 24 - 10 + 25 + 90$$

$$= \frac{-2a}{-2} = \frac{129}{-2} \quad \mathbf{M1}$$

$$= a = -\frac{129}{2} \text{ or } -\mathbf{64.5}$$

the truth set of a is such that a = - **64.5** **A1**

(d) The bearing of Adabraka from Amasaman

$$= \theta > 180^\circ \quad \mathbf{M1}$$

$$= 198^\circ - 180^\circ \quad \mathbf{M1}$$

$$= \mathbf{18^\circ} \quad \mathbf{A2}$$

**6**

(a) i. Point (8,-4) origin (0,0) gradient of the line

$$= \frac{y_2 - y_1}{x_2 - x_1} = \frac{-4 - 0}{8 - 0} = \frac{-4}{8} = \frac{-1}{2}$$

Using the point (8,-4) the equation of the line is

$$y - (-4) = \frac{-1}{2}(x - 8) \quad \mathbf{M1}$$

$$= 2y + 2(4) = 2\left(\frac{-1}{2}\right)(x - 8)$$

$$= 2y + 8 = -x + 8$$

$$= 2y + x = 0.$$

$$= \mathbf{y = \frac{-x}{2}} \quad \mathbf{M1}$$

Note: the origin (0,0) could have been used to arrive at the same answer.

$$\text{ii. } P = \begin{pmatrix} a \\ b \end{pmatrix} \quad Q = \begin{pmatrix} 3 \\ 9 \end{pmatrix}$$

$$2\left[\begin{pmatrix} a \\ b \end{pmatrix} + \frac{1}{3}\begin{pmatrix} 3 \\ 9 \end{pmatrix}\right] = \begin{pmatrix} 0 \\ 12 \end{pmatrix}$$

$$2\left[a + \frac{1}{3}(3)\right] = 0$$

$$= 2a + 2 = 0 \quad \mathbf{M1}$$

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

$$= a = -1.$$

$$2\left[b + \frac{1}{3}(9)\right] = 12$$

$$= 2b + 6 = 12$$

$$= 2b = 12 - 6 \quad \mathbf{M1}$$

$$= \frac{2b}{2} = \frac{6}{2}$$

$$= b = 3.$$

$$\therefore \mathbf{p = \begin{pmatrix} -1 \\ 3 \end{pmatrix}} \quad \mathbf{A1}$$

(b) Volume of cone =  $\frac{1}{3}\pi r^2 h$

$$\pi = \frac{22}{7} \quad r = 7\text{cm} \quad h = 16\text{cm}$$

$$\therefore \text{Volume of cone} = \frac{1}{3} \times \frac{22}{7} \times 7 \times 7 \times 16 \quad \mathbf{M1}$$

$$= \frac{2,464}{3}$$

$$= \mathbf{821.33\text{cm}^3} \quad \mathbf{A1}$$

- (c) Percentage of T.V only = 100%  
Percentage of T.V + VAT =  $100 + 5 = 105\%$ .

i. Price of T.V set =  $y$   
if  $105 = 800.00$

$$100 = y$$

$$y = \frac{100}{105} \times 800$$

$$y = \frac{80,000}{105} \quad \text{M1}$$

$$y = 761.90$$

Price of TV = **Ghc761.90 A1**

ii. VAT paid =  $800 - 761.90$   
= **Ghc 38.10 A1**

**OR** VAT

$$761.9 = 100\%$$

$$x = 5\%$$

$$\frac{5\%}{100\%} \times 761.9$$

$$x = 38.10$$

(d)  $\angle BAE = \angle AED$

$$b^{\circ} = 53^{\circ} \quad \text{A1}$$

$$\angle ABE = \angle BEF$$

$$65^{\circ} = a^{\circ} \quad \text{A1}$$

$$\angle ABE + \angle CBE = 180$$

$$65^{\circ} + C^{\circ} = 180^{\circ}$$

$$C^{\circ} = 180^{\circ} - 65^{\circ}$$

$$C^{\circ} = 115^{\circ} \quad \text{A1}$$

$$\angle AED = 53^{\circ}$$

$$\angle AEB = d^{\circ} \quad \text{M1}$$

$$\angle ABE = 65^{\circ}$$

$$\angle AED + \angle AEB + \angle ABE = 180^{\circ}$$

$$53^{\circ} + 65^{\circ} + d^{\circ} = 180^{\circ}$$

$$118^{\circ} + d^{\circ} = 180^{\circ}$$

$$d^{\circ} = 180^{\circ} - 118^{\circ}$$

$$d^{\circ} = 62^{\circ} \quad \text{A1}$$

$$a = 65^{\circ}, \quad b = 53^{\circ}, \quad c = 115^{\circ}, \quad d = 62^{\circ}$$