

Edexcel IGCSE Higher Tier Mathematics Paper 4 – January 2012

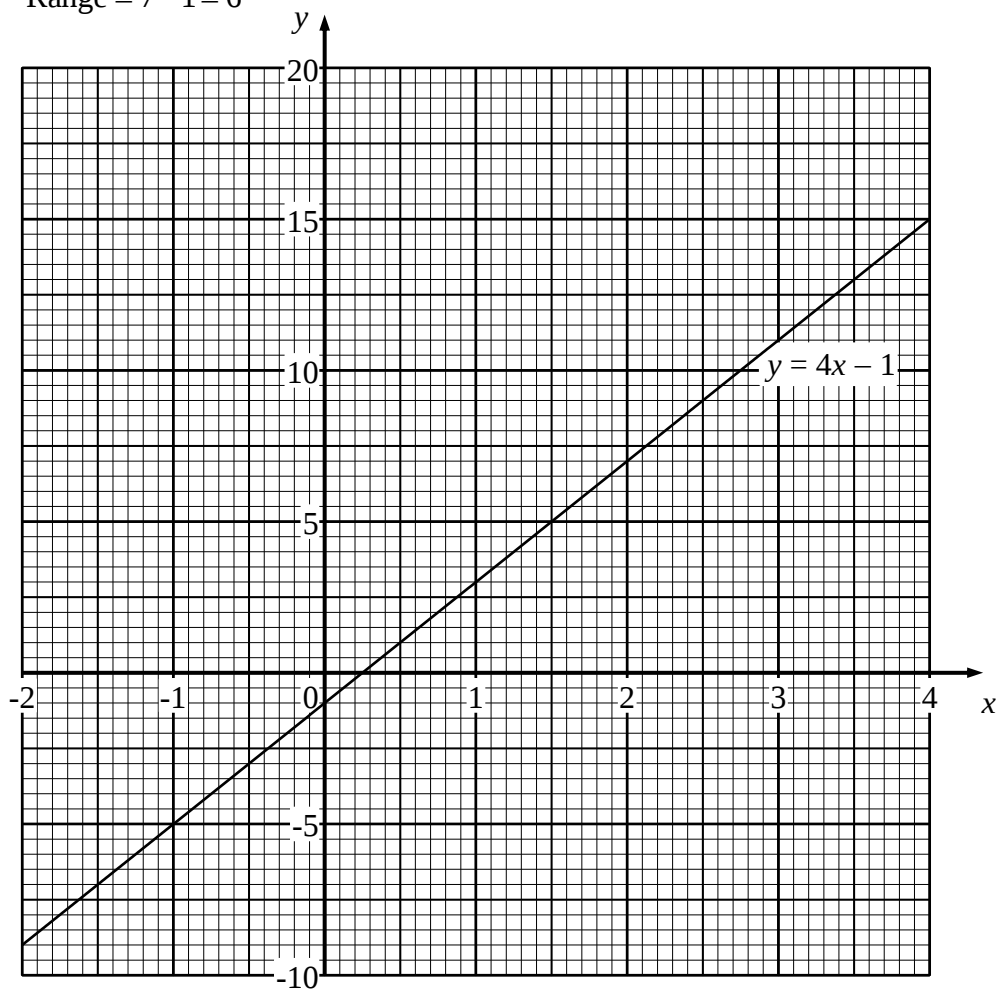
1. $\frac{(6.7 - 2.5)}{(2.8 \times 0.4)} = 3.75$

2. $\frac{135}{180} \times 60 = 45$ minutes

3. $7x - 5 = 3x + 2$
 $4x = 7$
 $x = 1.75$

4. Three positive whole numbers have a median of 7 and a mean of 5
Middle number is 7
Numbers add to $3 \times 5 = 15$
First and last add to 8
Since all are positive others must be 1 and 7
Numbers are 1, 7, 7
Range = $7 - 1 = 6$

5.



$$6. \quad (a) \frac{32}{(1+7)} \times 7 = 28$$

$$(b) \frac{45 \times 32}{72} = 20 \text{ cm}$$

$$\begin{aligned} 7. \quad 200 &= 2 \times 100 \\ &= 2 \times 2 \times 50 \\ &= 2 \times 2 \times 2 \times 50 \\ &= 2 \times 2 \times 2 \times 5 \times 5 \\ &= 2^3 \times 5^2 \end{aligned}$$

$$\begin{aligned} 8. \quad \frac{y^3 \times y^n}{y} &= y^6 \\ \frac{y^{3+n}}{y} &= y^6 \\ y^{2+n} &= y^6 \\ n+2 &= 6 \\ n &= 4 \end{aligned}$$

$$9. \quad (a) 4 \times \frac{6 \times 4}{2} = 48 \text{ cm}^2$$

$$\begin{aligned} (b) \quad AB &= \sqrt{4^2 + 6^2} \\ &= \sqrt{52} \\ &= 7.21 \text{ cm (3 sf)} \end{aligned}$$

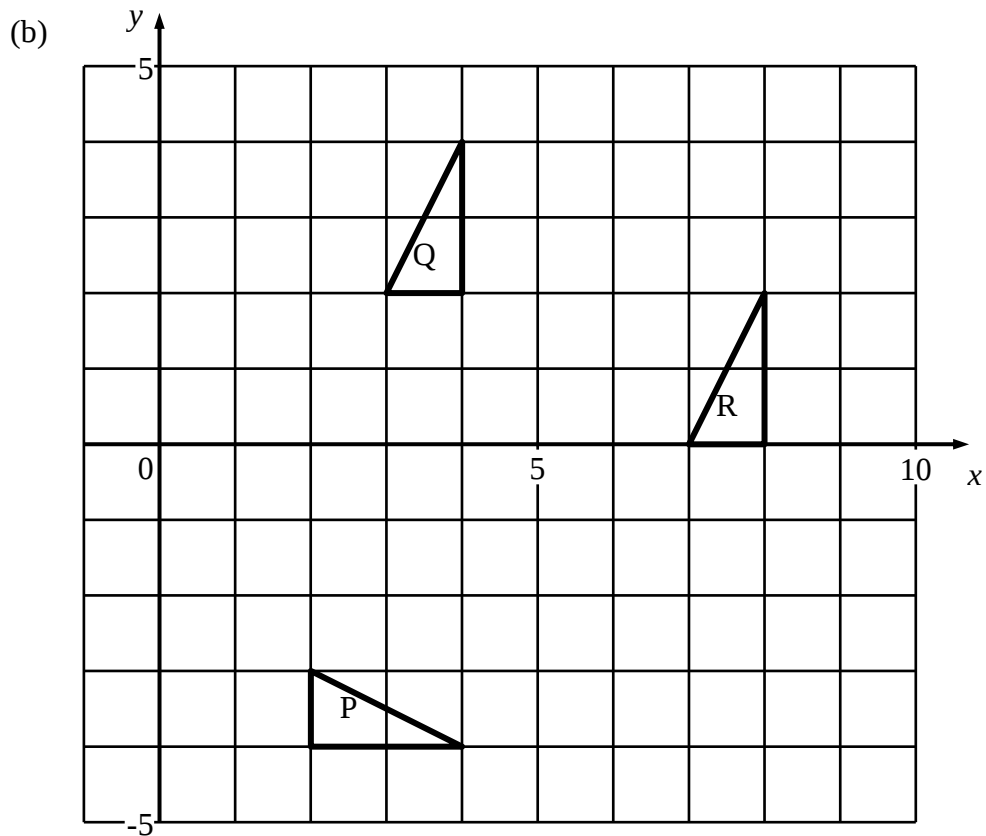
$$\begin{aligned} 10. \quad (i) \quad -6 &< 4x \leq 8 \\ -\frac{6}{4} &< x \leq \frac{8}{4} \\ -1.5 &< x \leq 2 \end{aligned}$$

$$(ii) -1, 0, 1, 2$$

$$11. \quad (a) HCF = 15$$

$$(b) LCM = \frac{75 \times 90}{15} = 450$$

12. (a) Rotation of 90° (anti-clockwise) about the origin



- (c) Rotation of 90° (anti-clockwise) about (3,1)

13. (a) $4y = -3x + 10$

$$y = -\frac{3}{4}x + \frac{5}{2}$$

Gradient = $-\frac{3}{4}$

(b)

$$3x + 4y = 10 \quad (1)$$

$$5x - 6y = 23 \quad (2)$$

$$9x + 12y = 30 \quad (1) \times 3 = (3)$$

$$10x - 12y = 46 \quad (2) \times 2 = (4)$$

$$19x = 76 \quad (3) + (4)$$

$$x = 4$$

$$12 + 4y = 10 \quad \text{substitute for } x \text{ in } (1)$$

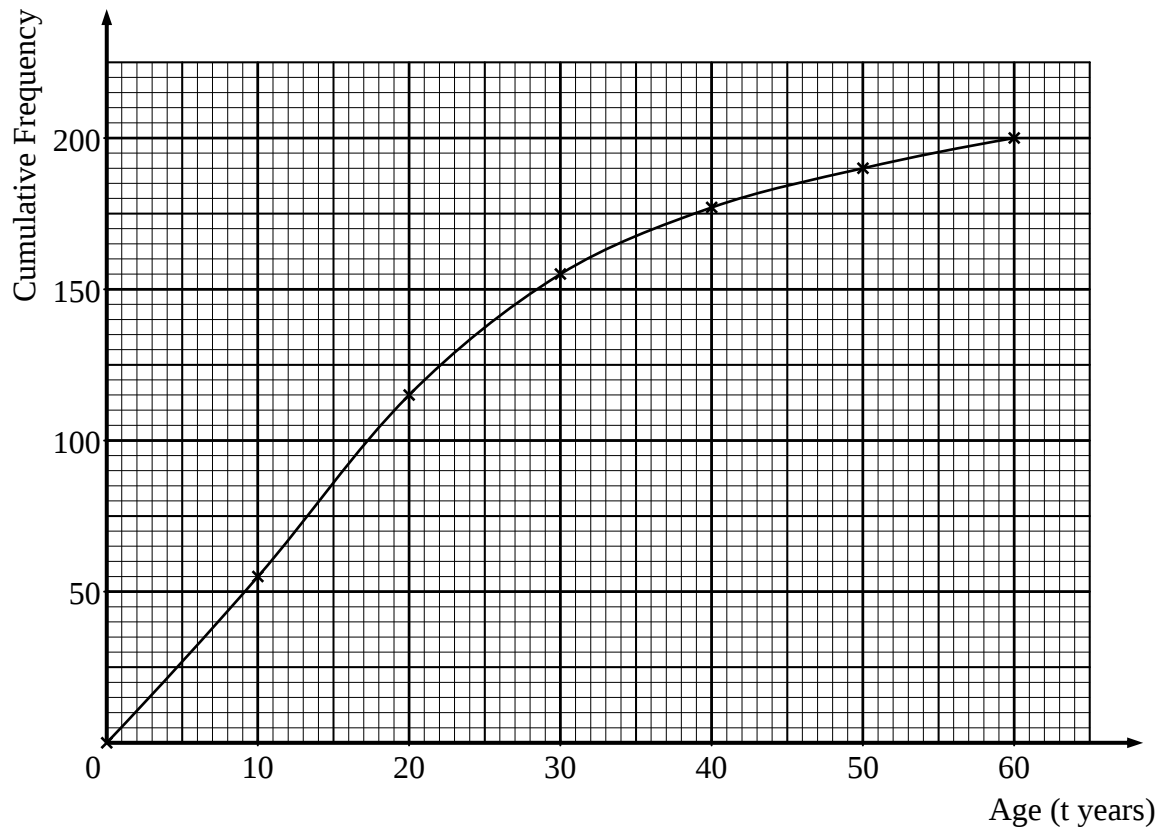
$$4y = -2$$

$$y = -0.5$$

Coordinates are (4, -0.5)

14. (a) Cumulative frequencies are 55,115,155,177,190,200

(b)



(c) $200 - 140 = 60$

15. $-4 < x < 4$

16. (a) $\frac{5}{8}$

(b) (i) $P(9 \& 9) = \frac{2}{8} \times \frac{1}{7} = \frac{1}{28}$

(ii) $P(9 \& 8) + P(8 \& 9) = \frac{2}{8} \times \frac{3}{7} + \frac{3}{8} \times \frac{2}{7} = \frac{12}{56} = \frac{3}{14}$

17. (a) $f(10) = \sqrt{10-6} = \sqrt{4} = 2$

(b) $x < 6$

(c) $g(2) = 7$

(d) $fg(0) = f(g(0)) = f(15) = \sqrt{15-6} = \sqrt{9} = 3$

(e) $k = 12$

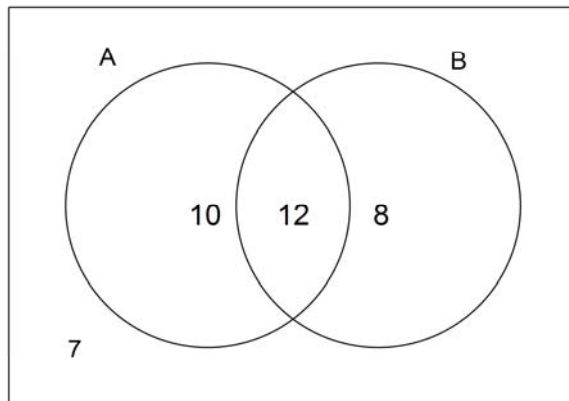
$x = -0.8$ or 3.8

(f) Draw tangent at $x = 3.5$

$$\text{Gradient} = \frac{13-0}{4-1.5} = 8.7$$

18. $\cos x = \frac{4^2 + 6^2 - 8^2}{2 \times 4 \times 6}$
 $= -\frac{12}{48} = -\frac{1}{4}$
 $\theta = 104.5^\circ$ (1 dp)

19. (a)



(b) (i) $n(A \cap B') = 10$

(ii) $n(A' \cup B') = 25$

20.

$$\pi \times r \times 9 = 100$$

$$r = \frac{100}{9\pi} = 3.536776513$$

$$h = \sqrt{9^2 - \left(\frac{100}{9\pi}\right)^2}$$

$$= 8.275941753$$

$$V = \frac{1}{3} \times \pi \times \left(\frac{100}{9\pi}\right)^2 \times \sqrt{9^2 - \left(\frac{100}{9\pi}\right)^2}$$

$$= 108 \text{ cm}^3 \text{ (3 sf)}$$

21. (a) $(16y^8)^{\frac{3}{4}} = 16^{\frac{3}{4}} \times (y^8)^{\frac{3}{4}}$

$$= (\sqrt[4]{16})^3 \times y^{8 \times \frac{3}{4}}$$

$$= 2^3 \times y^6$$

$$= 8y^6$$

(b) $2^p \times 8^q = 2^n$

$$2^n = 2^p \times (2^3)^q$$

$$2^n = 2^p \times 2^{3q}$$

$$2^n = 2^{p+3q}$$

$$n = p + 3q$$

22. (a) (i) $\overrightarrow{OP} = 3\mathbf{a}$

$$\overrightarrow{OQ} = \overrightarrow{OP} + \overrightarrow{PQ} = 3\mathbf{a} + 3\mathbf{b}$$

(ii) $\overrightarrow{OE} = \frac{2}{3}\overrightarrow{OQ} = \frac{2}{3}(3\mathbf{a} + 3\mathbf{b}) = 2\mathbf{a} + 2\mathbf{b}$

(iii) $\overrightarrow{DE} = \overrightarrow{DO} + \overrightarrow{OE} = -\mathbf{a} + 2\mathbf{a} + 2\mathbf{b} = \mathbf{a} + 2\mathbf{b}$

(b) $\overrightarrow{DF} = \overrightarrow{DP} + \overrightarrow{PF} = 2\mathbf{a} + \frac{4}{3} \times 3\mathbf{b} = 2\mathbf{a} + 4\mathbf{b}$

$$= 2(\mathbf{a} + 2\mathbf{b}) = 2\overrightarrow{DE}$$

So DEF is a straight line