

Edexcel IGCSE Higher Tier Mathematics Paper 4 – May 2005

1. $3p + 5 = 7p + 3$

$$5 - 3 = 7p - 3p$$

$$4p = 2$$

$$p = 0.5$$

2. $182 \text{ units at } £0.0821 = £14.9422$

$$429 \text{ units at } £0.0704 = £30.2016$$

$$\text{Total amount} = £45.1438$$

$$\text{Tax} = £2.25719$$

$$\text{Amount to pay} = £47.40$$

3. (a) (b) $\angle SQP = 70^\circ$ (corresponding angles)

$$\angle QSP = 60^\circ \text{ (angles on a straight line)}$$

$$x = 180 - 70 - 60 = 50^\circ \text{ (angles in a triangle)}$$

4. (a) (i) $p \times p \times p \times p = p^4$

$$(ii) 2a + 3b - 5a + b - 7 = -3a + 4b - 7$$

$$(iii) \frac{q^3 \times q^5}{q^2} = \frac{q^8}{q^2} = q^6$$

$$(b) x(2x + 3) = 2x^2 + 3x$$

$$(c) (y - 1)(y + 2) = y^2 + 2y - y - 2 = y^2 + y - 2$$

5. (a) $10 - 19$

$$(b) \frac{8 + 20 + 14}{59} = \frac{42}{59}$$

$$(c) \text{Total} = 8 \times 4.5 + 20 \times 14.5 + 14 \times 24.5 + 5 \times 34.5 + 12 \times 44.5 = 1375.5$$

6. He may not be correct as some people may be left-handed and wear glasses i.e. the two outcomes might not be mutually exclusive.

7. (a) $ML = \sqrt{8^2 + 15^2} = \sqrt{64 + 225} = \sqrt{289} = 17 \text{ cm}$

(b) $\tan x = \frac{15}{8}$

8. (a) Those pieces of furniture in Angela's house that are kitchen chairs.

(b) (i) $P \cup Q = \{1, 2, 3, 4, 5, 6, 7, 8, 9\}$

(ii) Yes as all the number in P are even numbers and a number cannot be odd and even at the same time.

9. $2 \times \pi \times r \times 2.1 = 19.8$

$$r = \frac{19.8}{(2 \times \pi \times 2.1)} = 1.5 \text{ (1 dp)}$$

10. (a) $1.85 \times 10^6 + 9.72 \times 10^7 = 99,050,000 \text{ tonnes}$

(b) $0.097 \times 9.72 \times 10^7 = 9,428,400 \text{ tonnes}$

(c) $\frac{4.98 \times 10^8}{1.75 \times 10^6 + 1.85 \times 10^6 + 9.72 \times 10^7 + 4.98 \times 10^8} \times 100 = \frac{4.98 \times 10^8}{5.988 \times 10^8} \times 100 = 83.2\%$

11. (a)

$$2x + 3y = 4 \quad -(1)$$

$$6x + 5y = 8 \quad -(2)$$

$$6x + 9y = 12 \quad -(3) = 3 \times (1)$$

$$4y = 4 \quad (3) - (2)$$

$$y = 1$$

$$2x + 3 = 4 \quad \text{substituting into (1)}$$

$$x = 0.5$$

(b) (0.5, 1)

12. (a) $\angle BAC = 49^\circ$

(b) (i) $\frac{DF}{2.5} = \frac{3}{2}$

$$DF = \frac{3}{2} \times 2.5 = 3.75 \text{ cm}$$

$$(ii) \frac{AB}{1.5} = \frac{2}{3}$$

$$DF = \frac{2}{3} \times 1.5 = 1 \text{ cm}$$

$$13. \quad (a) \quad f(-4) = 2 \times -4 - 3 = -11$$

$$(b) \quad f(a) = 5$$

$$2x - 3 = 5$$

$$2x = 8$$

$$x = 4$$

$$(c) \quad f(6) = 2 \times 6 - 3 = 9$$

$$g(f(6)) = g(9) = 1 + \sqrt{9} = 1 + 3 = 4$$

$$(d) \quad x < 0$$

$$(e) \quad \text{Let } y = 1 + \sqrt{x}$$

$$x = 1 + \sqrt{y} \quad (\text{swapping letters})$$

$$\sqrt{y} = x - 1$$

$$y = (x - 1)^2$$

$$g^{-1}(x) = (x - 1)^2$$

$$14. \quad (a) \quad y = x(28 - 2x) = 28x - 2x^2$$

$$(b) \quad (i) \quad \frac{dy}{dx} = 28 - 4x$$

$$(ii) \quad \frac{dy}{dx} = 0$$

$$28 - 4x = 0$$

$$4x = 28$$

$$x = 7$$

$$(iii)$$

$y = 28x - 2x^2$ is a \cap -shaped curve, therefore any stationary point is a maximum

$$(c) \quad \text{Maximum area} = 28 \times 7 - 2 \times 7^2 = 98 \text{ m}^2$$

15. (a) $\frac{110}{360} \times \pi \times 12^2 = 138 \text{ cm}^2$ (3 sf)

(b)

Perimeter of fan = Straight edges + Arc

$$= 2r + \frac{120}{360} \times 2 \times \pi \times r$$

$$= 2r + \frac{2}{3} \pi r$$

$$= \frac{6}{3} r + \frac{2}{3} \pi r$$

$$= \frac{2}{3} r (3 + \pi) \text{ cm}$$

16. (a) (i) $\overrightarrow{MN} = \overrightarrow{MP} + \overrightarrow{PN} = -\mathbf{a} + \mathbf{b}$

(ii) $\overrightarrow{PQ} = 2\mathbf{a}$

(iii) $\overrightarrow{QR} = \overrightarrow{QP} + \overrightarrow{PR} = -2\mathbf{a} + 2\mathbf{b} = 2(-\mathbf{a} + \mathbf{b})$

(b) QR is parallel to MN

QR is twice the length of MN

17. (a)

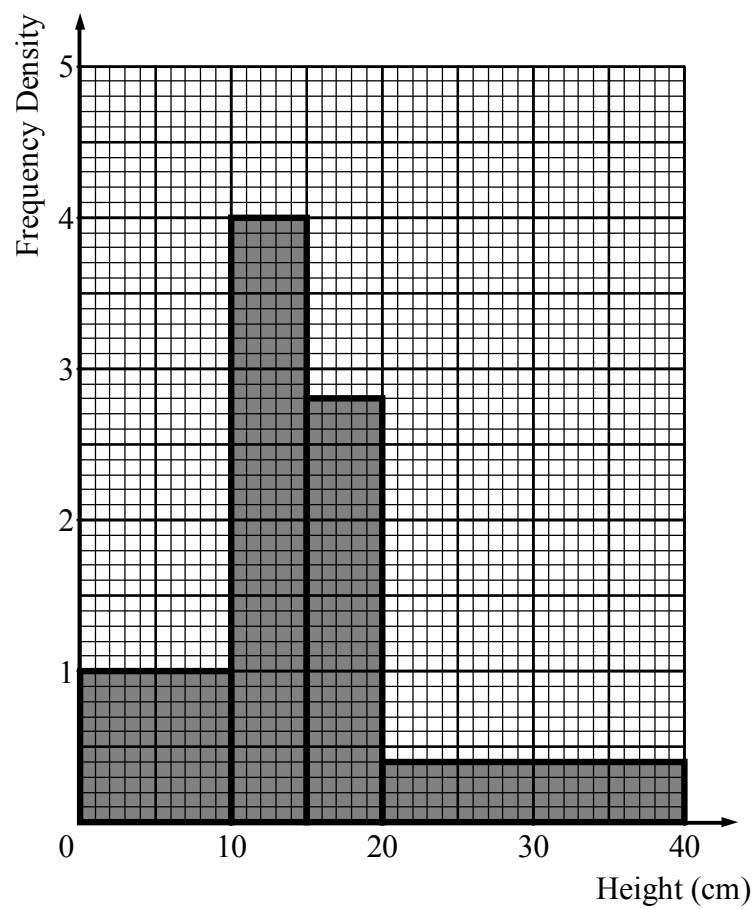
Frequency density of class $0 \leq h < 10$ is $\frac{10}{10} = 1$

Each large square on the frequency density axis is worth 1

Frequency density of class $10 \leq h < 15$ is $\frac{20}{5} = 4$

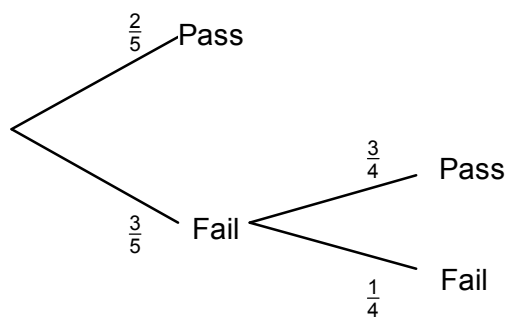
Frequency density of class $15 \leq h < 20$ is $\frac{14}{5} = 2.8$

Frequency density of class $20 \leq h < 40$ is $\frac{8}{20} = 0.4$



(b) We need the area under the histogram between 17.5 and 25 cm
This is $2.5 \times 2.8 + 5 \times 0.4 = 7 + 2 = 9$

18. (a)



(b) $\frac{2}{5} + \frac{3}{5} \times \frac{3}{4} = \frac{17}{20} = 0.85$

19. $x = 0.511111111111...$

$$10x = 5.111111111111...$$

$$9x = 4.6$$

$$x = \frac{4.6}{9} = \frac{4.6 \times 5}{9 \times 5} = \frac{23}{45}$$