

OCR 1962
Summer 2004
INTERMEDIATE SOLUTIONS
Paper 3 (Non-calculator)

1.

$\pounds 9 - \pounds 1.50 = \pounds 7.50$ which is $\pounds 2.50 \times 3$

→ 3 games

2.

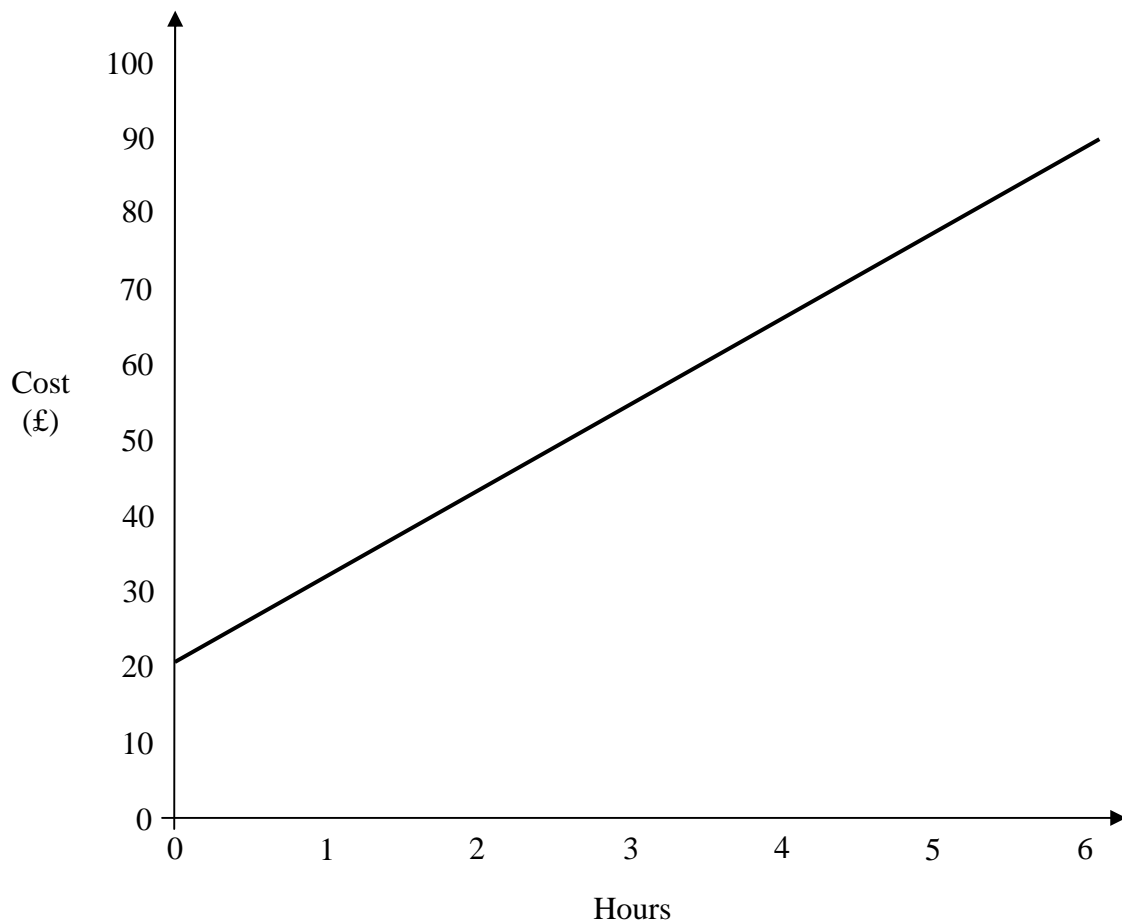
(a) 9000

(b)(i) $62 \times 10 = \pounds 620$

(ii) It will be smaller as both numbers have been rounded down

3.

(a) See graph



(b) About $\pounds 92$

(c) $\pounds 20$ (y intercept)

(d) $C = 20 + 12h$

4.

(a) $9x + 3y$

(b) Take out what's common $\rightarrow 3(x + 6)$

(c)(i) $4p = 10 \rightarrow p = \frac{10}{4} \rightarrow p = 2.5$

(ii) $\frac{k}{3} = 4 \rightarrow k = 4 \times 3 \rightarrow k = 12$

5.

(a) 229

(b) 213

(c) 19 scores and 7 are less than 200 $\rightarrow \frac{7}{19}$

6.

(a) The diagram should be drawn with base 10cm . Angle ABT should remain 35° , and angle BTA should still be a right angle

(b) About 70m

(c)(i) On your diagram there should be a mark 4cm across from B. Call this point P.

(ii) Angle APT is about 49°

7.

(a) Angles in a triangle add up to $180^\circ \rightarrow 180 - (80 + 43) = 57^\circ$

(b) $80^\circ \rightarrow$ Alternate angles

8.

Firstly she pays 15% of $\pounds 8000 \rightarrow \pounds 1200$

Remaining cost = $\pounds 6800$ (payable in 20 equal amounts)

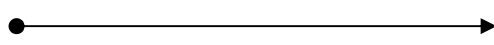
1 payment will be $6800 \div 20 = \pounds 340$

9.

(a) $x^2 + 2x$

(b) $12x + 3 + 4x - 2 \rightarrow 16x + 1$

(c)(i) $2x \geq 9 \rightarrow x \geq 4.5$

(ii) 
4.5

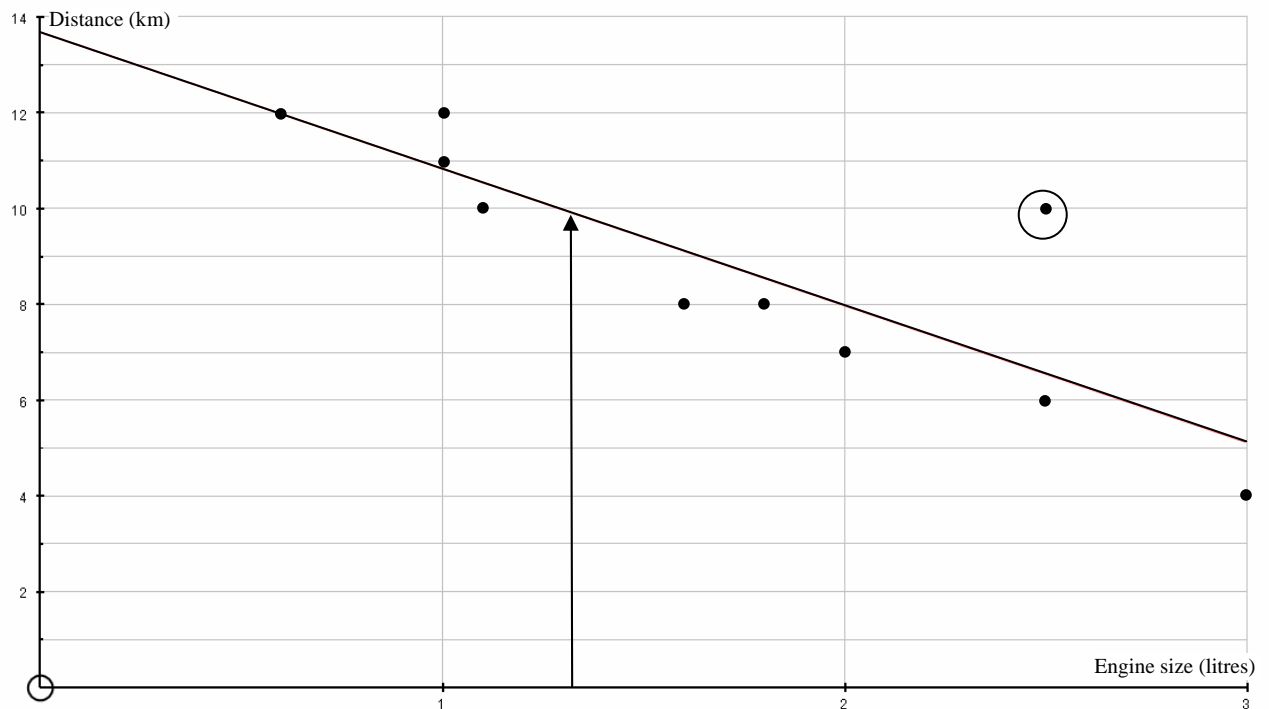
10.

(a) 4 right, 2 down $\rightarrow \begin{pmatrix} 4 \\ -2 \end{pmatrix}$

(b) New vertices of the triangle will be, $(1, -2)$, $(3, -2)$ and $(3, -3)$

11.

(a) See graph



(b) See graph

(c) Strong negative correlation

(d)(i) See graph

(ii) See graph → About 10km

12.

(a) 3:7

(b) $80000 \div 10$ (10 ratios altogether) = 8000

→ £24000 : £56000

(c) UB = 35.5km → LB = 34.5km

13.

(a) $360 \div 30 = 12$ sides

(b) Using Pythagoras → $AB = \sqrt{12^2 + 5^2} \rightarrow AB = 13cm$

14.

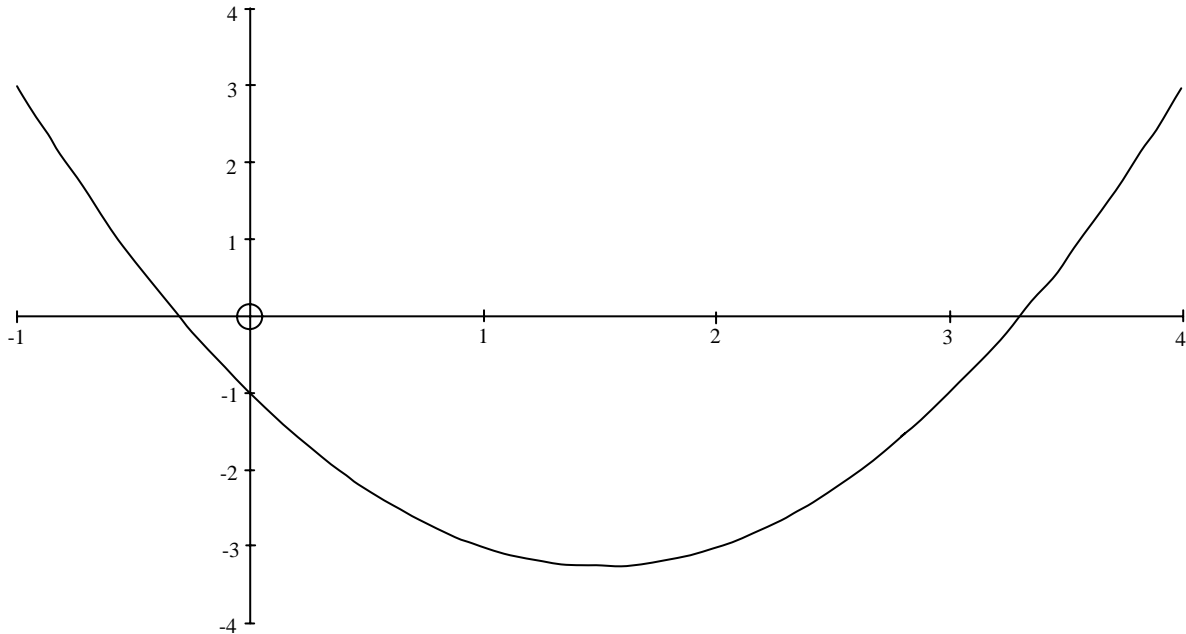
(a)

x	-1	0	1	2	3	4
y	3	-1	-3	-3	-1	3

(b) See graph

(c) What this means is where does the curve $y = x^2 - 3x - 1$ intersect with the line $y = 0$ (which is the x axis)

→ About -0.3 and 3.3



15.

(a)(i) Which 2 numbers multiply to make 24 and add/subtract to make 10? → 6 and 4

→ $(x+6)(x+4)$

(ii) $(x+6)(x+4) = 0$ → Either $x+6 = 0$, hence $x = -6$ or $x+4 = 0$, hence $x = -4$

(b) We need to get rid of the square root, this can be achieved by squaring both

sides → $P^2 = 6T$ → $T = \frac{P^2}{6}$

16.

(a) Science = 0.6 for all parts

(b) $P(\text{same}) = 0.4 \times 0.4 + 0.6 \times 0.6 = 0.52$

17.

What do we know from looking at the diagram? OQ and OP are radii and therefore OQP is an isosceles triangle. PT meets OP at 90° ,

(The angle between the tangent and the radius is 90°). Angle QOP must be $180 - 70 = 110^\circ$

as angles on a straight line add up to 180° . This means that OPQ must equal $\frac{180-110}{2} = 35^\circ$.

Hence angle x° will be $90 - 35 = 55^\circ$

18.

(a) Look at the ratio of the heights and diameters

10cm : 15cm Diameters

16cm : x Heights

How do you get from 10 to 15? By multiplying by $\frac{3}{2}$. Apply this to 16 to work out

$$x \rightarrow 16 \times \frac{3}{2} \rightarrow \frac{48}{2} = 24\text{cm}$$

(b) Look at the ratios like you did in part (a)

8cm : 12cm Width

d : 18cm Height

How do you get from 12 to 8? By multiplying by $\frac{2}{3}$. Apply this to 18 to work out

$$d \rightarrow 18 \times \frac{2}{3} \rightarrow \frac{36}{3} \rightarrow 12\text{cm}$$

19.

(a) Multiplication on the top so add the indices $\rightarrow \frac{5^{7+2}}{5^3} \rightarrow \frac{5^9}{5^3}$. Now it's divide,

so subtract the indices $\rightarrow 5^6$

(b)(i) What is 10^5 ? $\rightarrow 100000$. What you are really doing is moving the *d.p.* 5 places to the right and adding some extra noughts

$\rightarrow 104000$

(ii) 7.9×10^{-5} \rightarrow Remember in this one the *d.p.* has had to move back 5 places

(iii) Using the fact that $a^m \times a^n = a^{m+n} \rightarrow 10^6 \times 10^{-3} = 10^3$ and $8 \times 5 = 40$

$\rightarrow 40 \times 10^3 \rightarrow 40 \times 1000 = 40000$

(c)(i) $8\sqrt{2}$

(ii) $\sqrt{8 \times 2} \rightarrow \sqrt{16} \rightarrow \pm 4$

(iii) $\sqrt{8}$ can also be written as $\sqrt{4 \times 2} \rightarrow 4$ could be taken out and therefore

squarerooted $\rightarrow 2\sqrt{2}$, hence $\frac{2\sqrt{2}}{\sqrt{2}}$ the $\sqrt{2}$ cancels with the other leaving 2.

END OF PAPER 3 SOLUTIONS