

AQA 3301
Summer 2004
INTERMEDIATE SOLUTIONS
Paper 1 (Non – calculator) Solutions

1.

Day	Number of pupils	Amount collected
Monday	16	£48
Tuesday	12	£36
Wednesday	20	60

1 pupil = $\frac{48}{16} \rightarrow 3$

2.

Think about the ratios

200 : 4

x : 1 hour

How do you get from 4 to 1? Divide by 4, so divide 200 by 4

$\rightarrow 50\text{mph}$

3.

1% of £40 = 0.40 $\rightarrow 0.40 \times 60 = \text{£}24$

$\frac{1}{5}$ of £55 = £11 $\rightarrow \text{£}11 \times 2 = \text{£}22$

hence 60% of £40 is the larger amount

4.

(a) $3x + 7y$

(b) $5(4) + 2(-7) \rightarrow 20 - 14 = 6$

(c) $5^2 - 3^2 \rightarrow 25 - 9 = 16$

5.

(a)/(b)

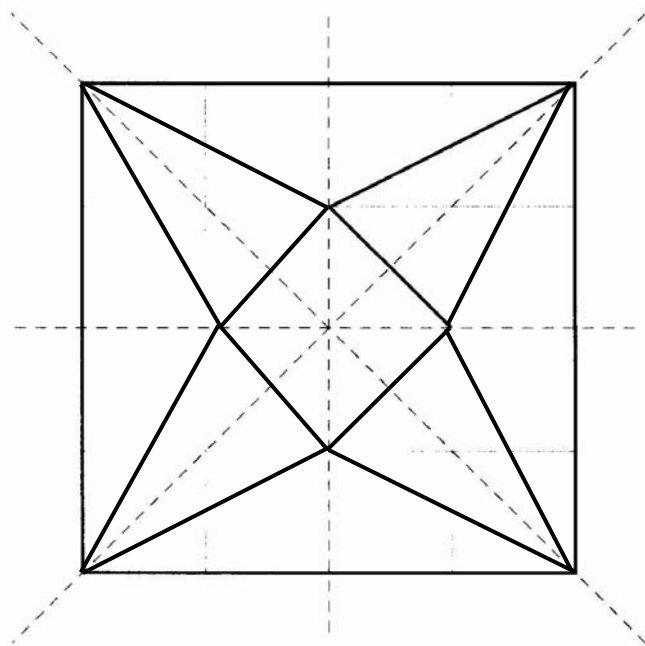
+	1	3	5	7
2	3	5	7	9
4	5	7	9	11
6	7	9	11	13
8	9	11	13	15

16 choices and 6 are less than 9 $\rightarrow \frac{6}{16}$

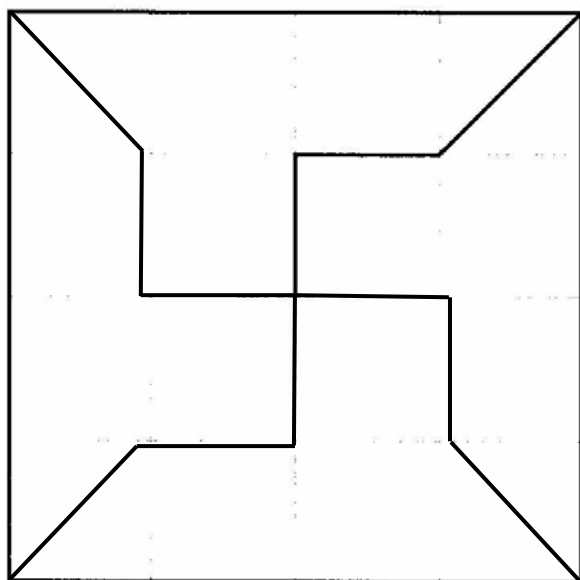
$\rightarrow \frac{3}{8}$

6.

(a)



(b)



7.

$$(a) 4x = 12 \rightarrow x = \frac{12}{4} \rightarrow x = 3$$

$$(b) y + 5 = \frac{28}{2} \rightarrow y + 5 = 14 \rightarrow y = 9$$

$$(c) 10z = 7 \rightarrow z = \frac{7}{10}$$

8.

$$\frac{1}{2} + \frac{1}{3} = \frac{1 \times 2 + 1 \times 3}{2 \times 3} \rightarrow \frac{5}{6}$$

9.

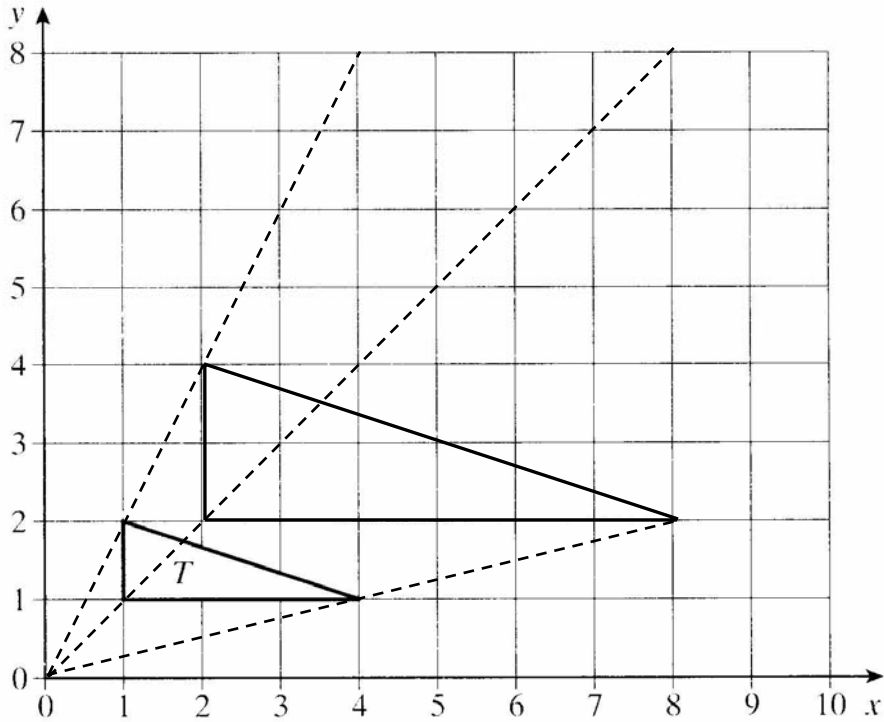
(a) All together there are 5 ratios $\rightarrow \frac{\pounds 250}{5} = \pounds 50$

\rightarrow Bob will receive $\pounds 50 \times 1 = \pounds 50$

\rightarrow Mary will receive $\pounds 50 \times 4 = \pounds 200$

(b) $\frac{200}{250} \rightarrow \frac{20}{25} \rightarrow \frac{4}{5} \rightarrow 80\%$

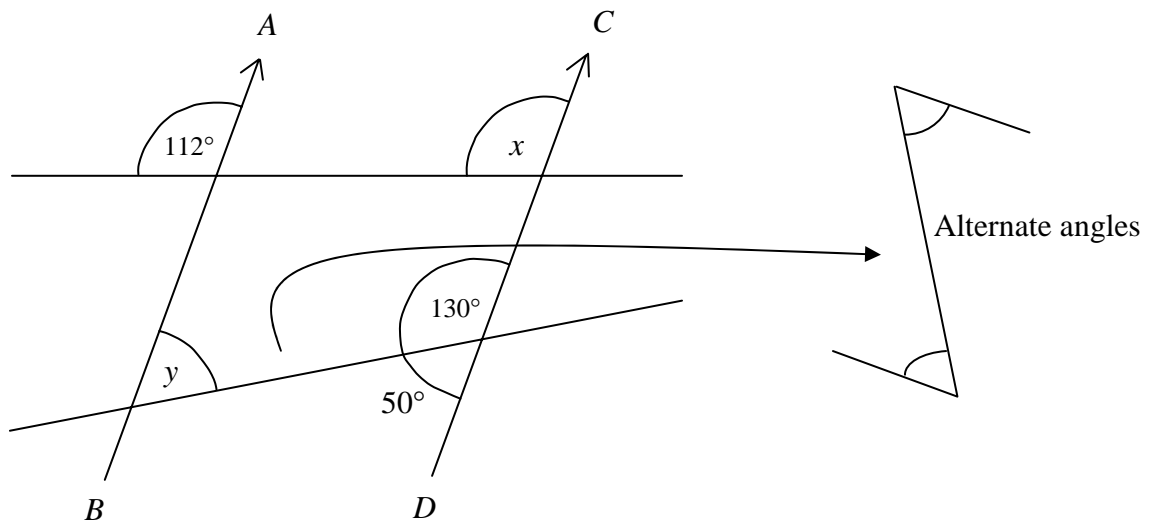
10.



11.

(a) x will be 112° as it is corresponding to the angle left of A

(b)



$y = 50^\circ$

12.

UB = 8848.5m, LB = 8847.5m

How do you change m to km ? Divide by 1000

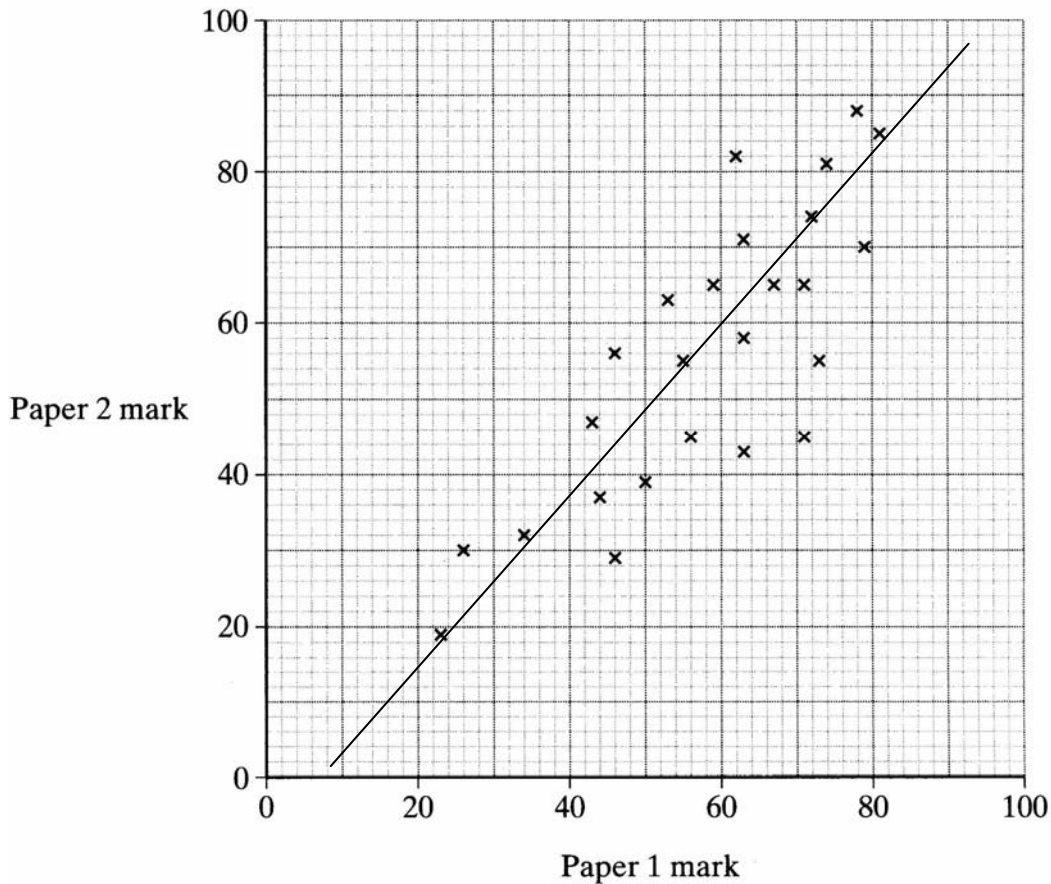
→ 8.8475km

13.

(a) 88 marks

(b) The graph is positively correlated

(c) See graph



(d) About 55 marks

14.

This question is guiding you to find the LCM of 2, 5 and 8 → In other words what is the first number that appears in all three times tables?

→ 40

15.

(a) $w^{6+2} \rightarrow w^8$

(b) $x^{3-5} \rightarrow x^{-2}$

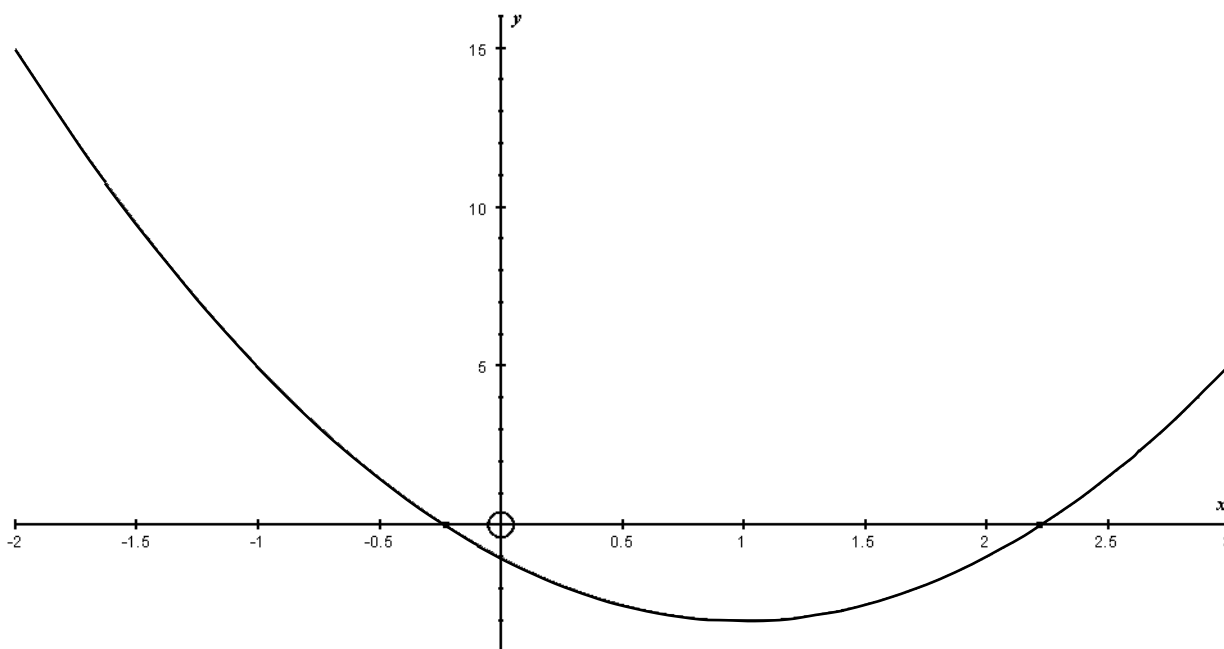
(c) Bracket to a power → Multiply the powers → $y^{3 \times 2} \rightarrow y^6$

16.

(a)

x	-2	-1	0	1	2	3
y	15	$2(-1)^2 - 4(-1) - 1 = 5$	-1	-3	-1	5

(b) See graph



(c)(i) Solutions can be found where the curve meets the line $y = 0$ which is the x axis

(ii) The other solution is about -0.2

17.

(a)

Distance travelled, d (km)	Frequency	Midpoint	$m.p \times f$
$0 < d \leq 2$	12	$\frac{1}{2}(2-0) = 1$	$1 \times 12 = 12$
$2 < d \leq 4$	18	3	54
$4 < d \leq 6$	10	5	50
$6 < d \leq 8$	8	7	56
$8 < d \leq 10$	2	9	18
	$\Sigma 50$		$\Sigma 190$

$$\text{Mean distance} \rightarrow \frac{\Sigma(m.p \times f)}{\Sigma \text{Frequency}} \rightarrow \frac{190}{50} \rightarrow \frac{19}{5} \rightarrow 3\frac{4}{5}$$

(b)(i) The median will be at the $\frac{n^{\text{th}} + 1}{2}$ position $\rightarrow \frac{51}{2} = 25.5^{\text{th}}$ position

\rightarrow Draw a line from 25.5 on the $c.f$ axis and read of the value where it hits the curve

\rightarrow About 3.4

(ii) The I.Q range can be worked out as follows $\rightarrow \frac{3(n+1)}{4}$ position $-\frac{1(n+1)}{4}$ position

About the 38.25^{th} position $-\text{the } 12.75^{\text{th}}$ position \rightarrow Draw lines across and read off the two values $\rightarrow 5.6 - 2.2 = 3.4\text{km}$

18.

(a) Using pythagoras, $h^2 = a^2 + b^2 \rightarrow 15^2 = 10^2 + b^2 \rightarrow b^2 = 15^2 - 10^2$

$$\rightarrow b = \sqrt{225 - 100} \rightarrow b = \sqrt{125} \rightarrow b = \sqrt{25 \times 5} \rightarrow b = 5\sqrt{5}$$

(b) Compare the ratios to work out PR \rightarrow

$$10 : 25 \text{ AB:PQ}$$

$$15 : ? \text{ AC:PR}$$

How do you get from 10 to 25? By multiplying by 2.5, so multiply 15 by 2.5

to find PR $\rightarrow 15 \times 2.5 = 37.5$

(c) DE is the opposite, you have the adjacent length, hence use TAN $\rightarrow \text{Tan}50 = \frac{\text{opp}}{\text{adj}}$

$$\rightarrow 1.192 = \frac{\text{DE}}{10} \rightarrow \text{DE} = 1.192 \times 10$$

$$\rightarrow 11.92 \text{ cm}$$

19.

$\frac{300 \times 4}{0.2} \rightarrow \frac{1200}{0.2}$, think of 0.2 as a fraction $\rightarrow \frac{1200}{\frac{1}{5}}$, when you divide by a fraction

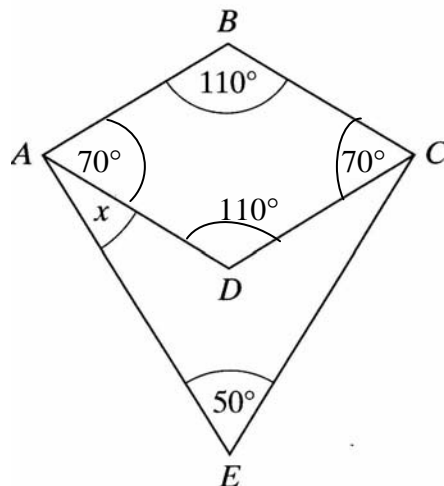
it's the same as multiplying by it upside down $\rightarrow 1200 \times \frac{5}{1} = 6000$

20.

Which two numbers add to make -10 and multiply to make $+25$? $\rightarrow 5$ and 5

$$\rightarrow (x-5)(x-5)$$

21.



BAC must therefore be $\frac{360 - (110 + 50)}{2} = 100$, hence DAE must be $100 - 70$
22. $= 30^\circ$

What this is saying is, $600 \text{ g} = 120\% \rightarrow 1\% = \frac{600}{120} \rightarrow 1\% = 5 \text{ g} \rightarrow 100\% = 500 \text{ g}$

23.

Make the x 's the same

$$[1] \quad 4x + 3y = 14$$

$$[2] \quad 4x + 2y = 10 \quad (\text{I have multiplied this equation by 2})$$

Subtract [2] from [1] $\rightarrow y = 4$

Substitute this into either equation to find $x \rightarrow 4x + 3(4) = 14 \rightarrow 4x = 2$

$$\rightarrow x = \frac{1}{2}$$

24.

$$(a) \quad 1.75 \times 10^6$$

$$(b) \quad 8.2 \times 10^{-3}$$

(c) The power, -2 simply indicates the decimal place has to move backwards 2 places
 $\rightarrow 0.049$

(d) Think of 0.1 as $\frac{1}{10}$, hence when you divide by a fraction, it's the same as multiplying by it upside down $\rightarrow 2.6 \times 10^5 \times 10^{(1)} = 2.6 \times 10^6$

25.

It has to be kite 2 as opposite angles in a cyclic quadrilateral add up to 180°

END OF PAPER 1 SOLUTIONS