EDEXCEL 1387
Summer 2004
INTERMEDIATE SOLUTIONS
Paper 3 (Non-calculator)

1.

To work out the area of a rectangle, you use the formula, length $\times$ width $\rightarrow 5m \times 2m$ $\rightarrow 10m^2$

2.

(a) (i) There are 3 *e*'s and 2 *f*'s $\rightarrow 3e + 2f$

(ii) There are 3 lots of $p^2 \rightarrow 3p^2$

(b) Substitute the value of *x* into the formula $\rightarrow 5(-3)+1 \rightarrow -15+1 \rightarrow -14$

3.

Basically you just have to work out 26×32.9, there are various ways to do this $\rightarrow$ You could do $(10 \times 32.9)+(10 \times 32.9)+(6 \times 32.9) \rightarrow 10 \times 32.9$, this just moves the decimal place 1 place to the right $\rightarrow 329$, so now you have $(329)+(329)+(6 \times 32.9)$

$$\begin{array}{r} 32.9 \\ \times \quad 6 \\ \hline 197.4 \\ \hline {\scriptstyle 1\ \ 5} \end{array} \longrightarrow \begin{array}{r} 329 \\ + \ 329 \\ \hline 197.4 \\ \hline 855.4 \\ \hline {\scriptstyle 1\ \ 2} \end{array}$$

4.

(a)

	France	Germany	Spain	Total
Female	$17-15=2$	$34-(9+2)=23$	9	34
Male	15	$25-23=2$	$18-9=9$	$60-34=26$
Total	$60-(25+18)=17$	25	18	60

(b) 25 out of 60 students visited Germany $\rightarrow \frac{25}{60}$

5.

(a) 1% of 800 is 8 so 45% of 800 will be $45 \times 8 \rightarrow 360$

(b) $\frac{176}{800}$, you are trying to simplify this so it will look like $\frac{?}{100} \rightarrow$ How did I manage to change 800 to 100? $\rightarrow$ By dividing by 8, so divide 176 by $8 \rightarrow 22$ $\rightarrow \frac{22}{100} \rightarrow$ Which means 22%

6.

(a) $\frac{5}{6}$ is the same as $\frac{10}{12} \rightarrow \frac{11}{12} - \frac{10}{12} = \frac{1}{12}$

(b) $\frac{70 \times 400}{200} \rightarrow \frac{28000}{200} \rightarrow \frac{280}{2} \rightarrow 140$

7.

(a) (i) Angles in a triangle add up to $180° \rightarrow 180 - (60 + 60) \rightarrow 60°$

(ii) All the angles are equal which therefore makes all the lengths equal

(b) (i)/(ii) If $SQ = SR$ then angle $SQR = SRQ$ (isosceles triangle) $\rightarrow SQR = 50°$

Angles on a straight line always add up to $180° \rightarrow 180 - 50 = 130°$

(c) $y° = 64°$ due to 'Z' angles (Alternate angles)

8.

Goals scored (x)	Number of students (f)	(fx)
1	9	$9 \times 1 = 9$
2	3	6
3	5	15
4	3	12
	Total = 20	Total = 42

The formula to work out the mean is $\frac{\sum fx}{\sum f} \rightarrow \frac{42}{20} \rightarrow 2\frac{2}{20} \rightarrow 2\frac{1}{10}$

$\rightarrow 2.1$

9.

(a) Where does the distance – time graph start on the x axis? $\rightarrow$ 0905

(b) Anil arrived at the park at 0935, therefore the distance is $7km - 0km \rightarrow 7km$

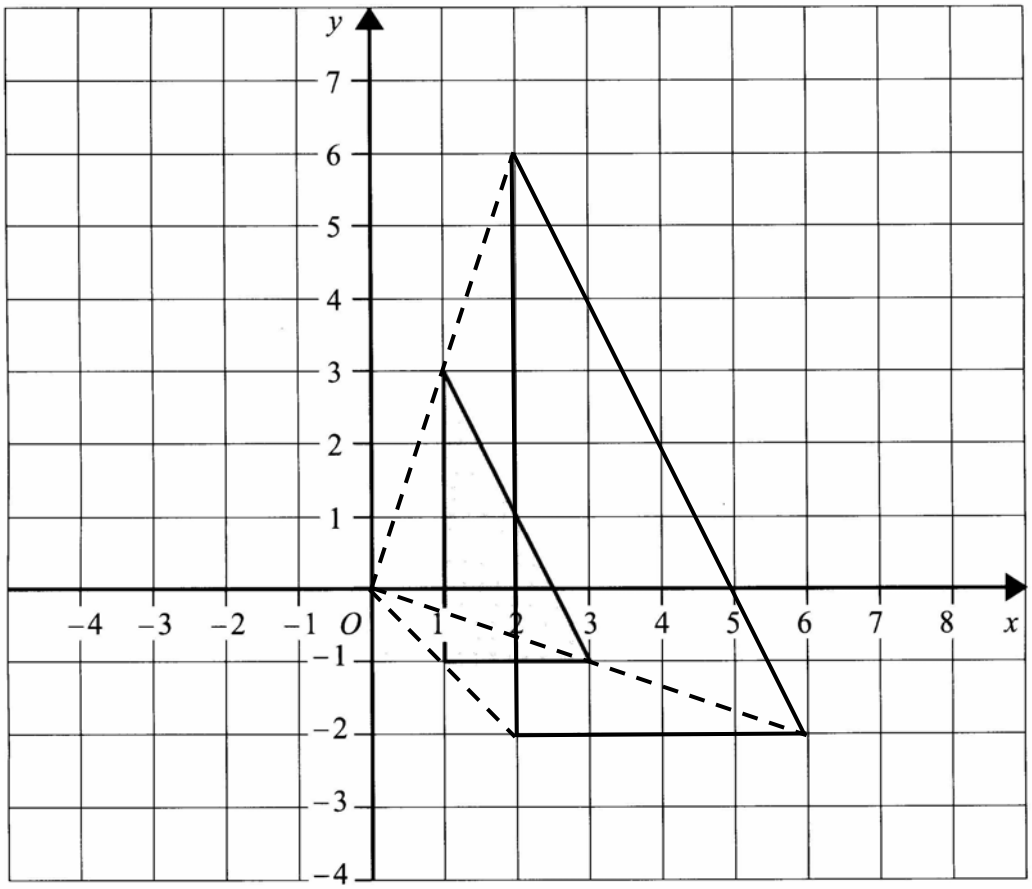
(c) Anil waited from 0935 to 0945 $\rightarrow$ 10 minutes

(d) Anil left the park at 0945 and arrived back at 1005 $\rightarrow$ 20 minutes : $7km$

To find his speed in *km*/h, then all we need to do is multiply 'both' sides by 3

$\rightarrow$ 60 minutes : $21km \rightarrow 21km$/h

10.



11.

2 is a prime number, use n as 2 and show that when substituted, $n^2+3,$ is not even

$\rightarrow (2)^2+3=7$ which is not even

12.

Within a regular pentagon there are 3 triangles, as you know the internal angles of a triangle total up to 180°, hence in a pentagon all internal angles will total up to $180\times 3=540°$

(a) Angles on a straight line total up to 180°, the exterior angle shown in the diagram will be $180-\left(\frac{540}{5}\right)=72°$

(b) How many *mm* in a *cm*? $10\rightarrow$ Divide your answer by 10^2

$\rightarrow 85.6cm^2$

(c) (i) $101mm-\frac{1mm}{2}\rightarrow 100.5mm$

(ii) $101mm+\frac{1mm}{2}\rightarrow 101.5mm$

13.

Angles in a quadrilateral add up to $360°$, so using this fact we can say,

$360° = 47 + 100 + 2x + x \rightarrow 360° = 147 + 3x \rightarrow 3x = 360 - 147 \rightarrow 3x = 213°$

$x° = 71 \rightarrow$ The largest angle will be $2x$ which is $2 \times 71 = 142°$

14.

(a) (i) The decimal point has moved back in both numbers, therefore it should move back twice in 221

= 2.21

(ii) I would firstly rearrange the sum given into the style of the question $\rightarrow \frac{221}{17} = 13$

Compare what you have with $\frac{221}{17} = 13$, its $\frac{22.1}{1700} = ?$

Back one decimal place on the top and forward two on the bottom, but because it's divide it also means back two $\rightarrow$ Altogether back 3

= 0.013

(b) You have the prime factors, $39 = 13 \times 3$ and $17 = 17$, no factors are present in either so, $13 \times 3 \times 17 = 663$

15.

Tick the boxes underneath the three expressions which could represent areas.

$\frac{\pi abc}{2d}$	πa^3	$2a^2$	$\pi a^2 + b$	$\pi(a+b)$	$2(c^2 + d^2)$	$2ad^2$
✓	✗	✓	✗	✗	✓	✗

Ignore π and 2, then cancel '*d*' with any letter from the top. Leaves you with length $\times$ width which in effect is an area.

$(\text{Area} + \text{Area}) = \textit{bigger}$ area

16.

About 200×0.2, which can also be written as $200 \times \frac{1}{5} \rightarrow$ Multiply across

$\rightarrow \frac{200}{5} = 40$

17.

(a) Just divide 108 by the lowest prime number you can think of each time

$108 \div 2 = 54$

$54 \div 2 = 27$

$27 \div 3 = 9$

$9 \div 3 = 3$

$3 \div 3 = 1$

Hence, 108 is the same as $2^2 \times 3^3$

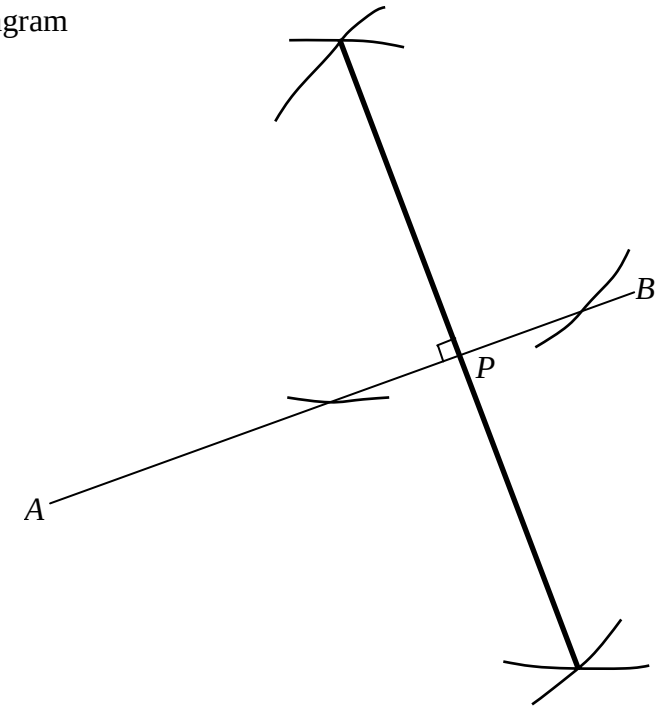
(b) Using the same method in part (a), 24 can be written as $2^3 \times 3$

Compare $2^2 \times 3^3$ with $2^3 \times 3$

2^2 is in both and 3, hence HCF = $2^2 \times 3$

$= 12$

18. See diagram



19.

Volume of a prism = Area of cross section $\times$ length

$15cm^2 \times 10cm = 150cm^3$

20.

The line DC is parallel to AB, hence they have the same gradient.

As you can see on the diagram, the line DC has a y intercept of 6 (at C),

therefore the equation of the line will be,

$\rightarrow y = 2x + 6$

21.

Firstly it would be a good idea to work out the area of the triangle.

Area of a triangle = $\frac{1}{2}(base \times height)$

$\rightarrow \frac{1}{2}\left(\frac{5}{8} \times 6\frac{2}{5}\right)$ I think here it would be a good idea to rewrite $6\frac{2}{5}$ as a top heavy fraction so it becomes clearer to work out

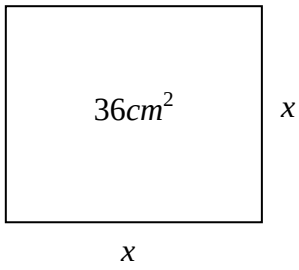
$\rightarrow \frac{1}{2}\left(\frac{5}{8} \times \frac{32}{5}\right)$

$\rightarrow \frac{1}{2}\left(\frac{160}{40}\right) \rightarrow \frac{1}{2}(4) \rightarrow 2cm^2$

From information in the question, area of the square is 18 times bigger, therefore $\rightarrow$

$2cm^2 \times 18 = 36cm^2$

Think about the square now. If one side of the square is x, then all the other sides must also be x.



The area of a square is length $\times$ width. As shown in the diagram, this is equal to x^2, hence $x^2 = 36$, therefore $x = \pm 6$. Only the positive value counts here as x is a length.

The perimeter is 4 times $x \rightarrow 24cm$

22.

(a) x is common so take it out $\rightarrow x(x-3)$

(b) $= k^{5-2}$

$\rightarrow k^3$

(c)(i) $4x + 20 + 3x - 21$

$\rightarrow 7x - 1$

(ii) Using FOIL (First Outer Inner Last)

$\rightarrow x^2 + 3xy + 2xy + 6y^2$

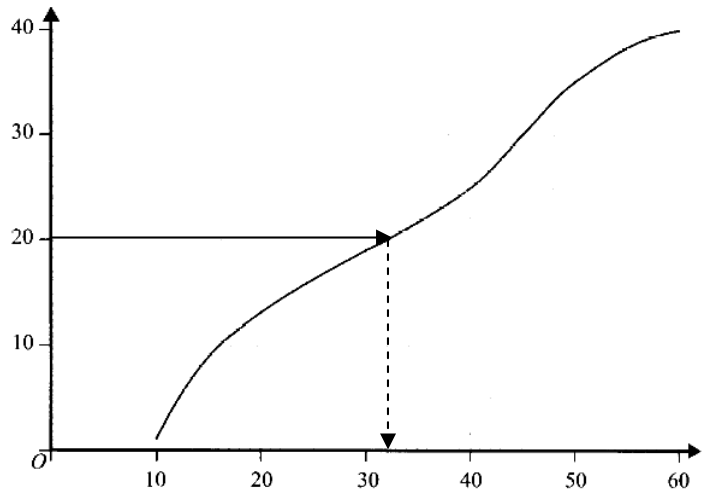
$\rightarrow x^2 + 5xy + 6y^2$

(d) $(p+q)(p+q+5)$

23.

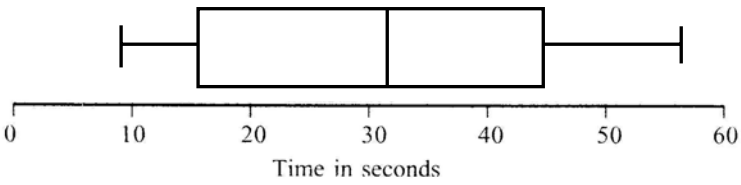
(a) Median time will occur at when the CF $\rightarrow \frac{40}{2} = 20$

Draw a line across as shown in the diagram and read off the time



$\rightarrow$ *about 32 seconds*

(b) See box plot



[Note that your median on the diagram has to be consistent with part (a)]

(c)

- The boys data is more spread out than the girls, it has a higher IQR than the girls
- The girls median is lower than the boys, 30 seconds rather than 32 seconds
- The girls data has a smaller range than that of the boys

24.

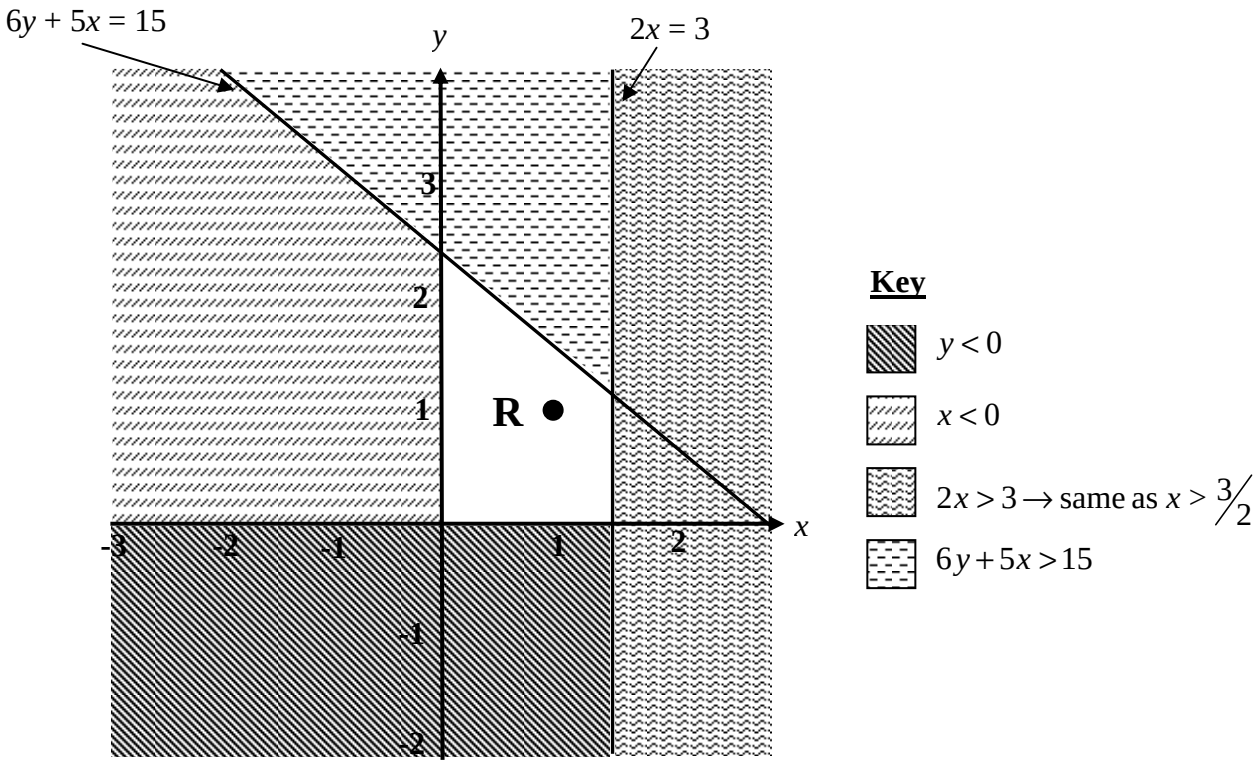
(a) $6y + 5x = 15 \rightarrow 6y = 15 - 5x \rightarrow y = \frac{1}{6}(15 - 5x)$ OR $y = \frac{15 - 5x}{6}$

(b) Subs $x = -21$ into equation $\rightarrow y = \frac{1}{6}(15 - 5(-21))$

$\rightarrow y = \frac{1}{6}(120) \rightarrow y = 20$

hence, k = 20

(c)(i) See diagram



(ii) P (1,1)

25.

(a) $\rightarrow 60°$

(b) $\rightarrow 35°$

(c) Yes he is right, the angle formed at the two ends of a diameter is $90°$, which $65 + 25$ does equal.

END OF PAPER 3 SOLUTIONS