| Centre No. | | | | | | Paper Reference | | | | | | | Surname | Initial(s) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Candidate No. | | | | | | 5 | 5 | 3 | 8 | / | 1 | 8 | Signature | |

Paper Reference(s)

**5538/18**

Examiner's use only

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Team Leader's use only

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# Edexcel GCSE

## Mathematics B – 1388

Paper 18 (Non-Calculator)

# Higher Tier

Monday 5 June 2006 – Afternoon

Time: 1 hour 15 minutes

**Materials required for examination**
Ruler graduated in centimetres and millimetres, protractor, compasses, pen, HB pencil, eraser.
Tracing paper may be used.

**Items included with question papers**
Nil

### Instructions to Candidates

In the boxes above, write your centre number, candidate number, your surname, initials and signature.
Check that you have the correct question paper.
Answer ALL the questions in the spaces provided in this question paper.
**You must NOT write on the formulae page. Anything you write on the formulae page will gain NO credit.**
If you need more space to complete your answer to any question, use additional answer sheets.

### Information for Candidates

The marks for individual questions and the parts of questions are shown in round brackets: e.g. **(2)**.
There are 17 questions in this question paper. The total mark for this paper is 62.
There are 20 pages in this question paper. Any blank pages are indicated.
**Calculators must not be used.**

### Advice to Candidates

Show all stages in any calculations.
Work steadily through the paper. Do not spend too long on one question.
If you cannot answer a question, leave it and attempt the next one.
Return at the end to those you have left out.



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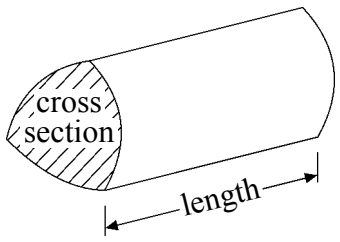
edexcel

**GCSE Mathematics 1387/8**

Formulae: Higher Tier

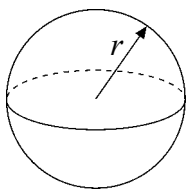
**You must not write on this formulae page.**
**Anything you write on this formulae page will gain NO credit.**

**Volume of a prism** = area of cross section × length



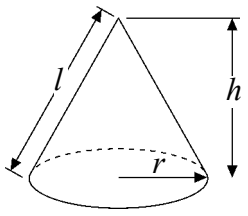

**Volume of sphere** $= \frac{4}{3}\pi r^3$

**Surface area of sphere** $= 4\pi r^2$

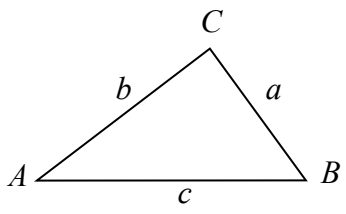



**Volume of cone** $= \frac{1}{3}\pi r^2 h$

**Curved surface area of cone** $= \pi r l$




**In any triangle ABC**




**The Quadratic Equation**

The solutions of $ax^2 + bx + c = 0$
where $a \neq 0$, are given by

$$x = \frac{-b \pm \sqrt{(b^2 - 4ac)}}{2a}$$

**Sine Rule** $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

**Cosine Rule** $a^2 = b^2 + c^2 - 2bc \cos A$

**Area of triangle** $= \frac{1}{2} ab \sin C$

Leave blank

**Answer ALL SEVENTEEN questions.**

**Write your answers in the spaces provided.**

**You must write down all stages in your working.**

**You must NOT use a calculator.**

**1.** $3x^2 = 108$

Find the value of $x$

$x =$ .....

**Q1**

**(Total 2 marks)**

**2.** The diagram shows a prism.

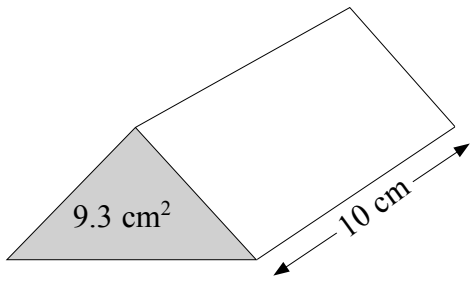



Diagram **NOT** accurately drawn

The cross section of the prism is a triangle of area 9.3 cm$^2$.
The length of the prism is 10 cm.

Work out the volume of the prism.
State the units of your answer.

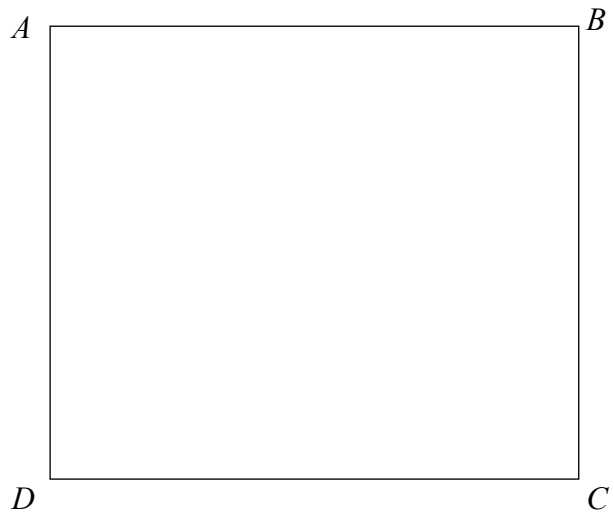
..... .....

**Q2**

**(Total 3 marks)**

Leave blank

**3.**




*ABCD* is a rectangle.

Shade the set of points inside the rectangle which are **both**

more than 4 centimetres from the point *A*
**and** more than 1 centimetre from the line *DC*.

**Q3**

**(Total 4 marks)**

**4.** Factorise $x^2 + 6x + 8$

..... **Q4**

**(Total 2 marks)**

**5.** Change 57 000 000 cubic centimetres to cubic metres.

..... cubic metres **Q5**

**(Total 2 marks)**

Leave blank

**6.** A student wanted to find out how many pizzas adults ate.

He used this question on a questionnaire.

'How many pizzas have you eaten?'

☐ A few ☐ A lot

This is not a good question.

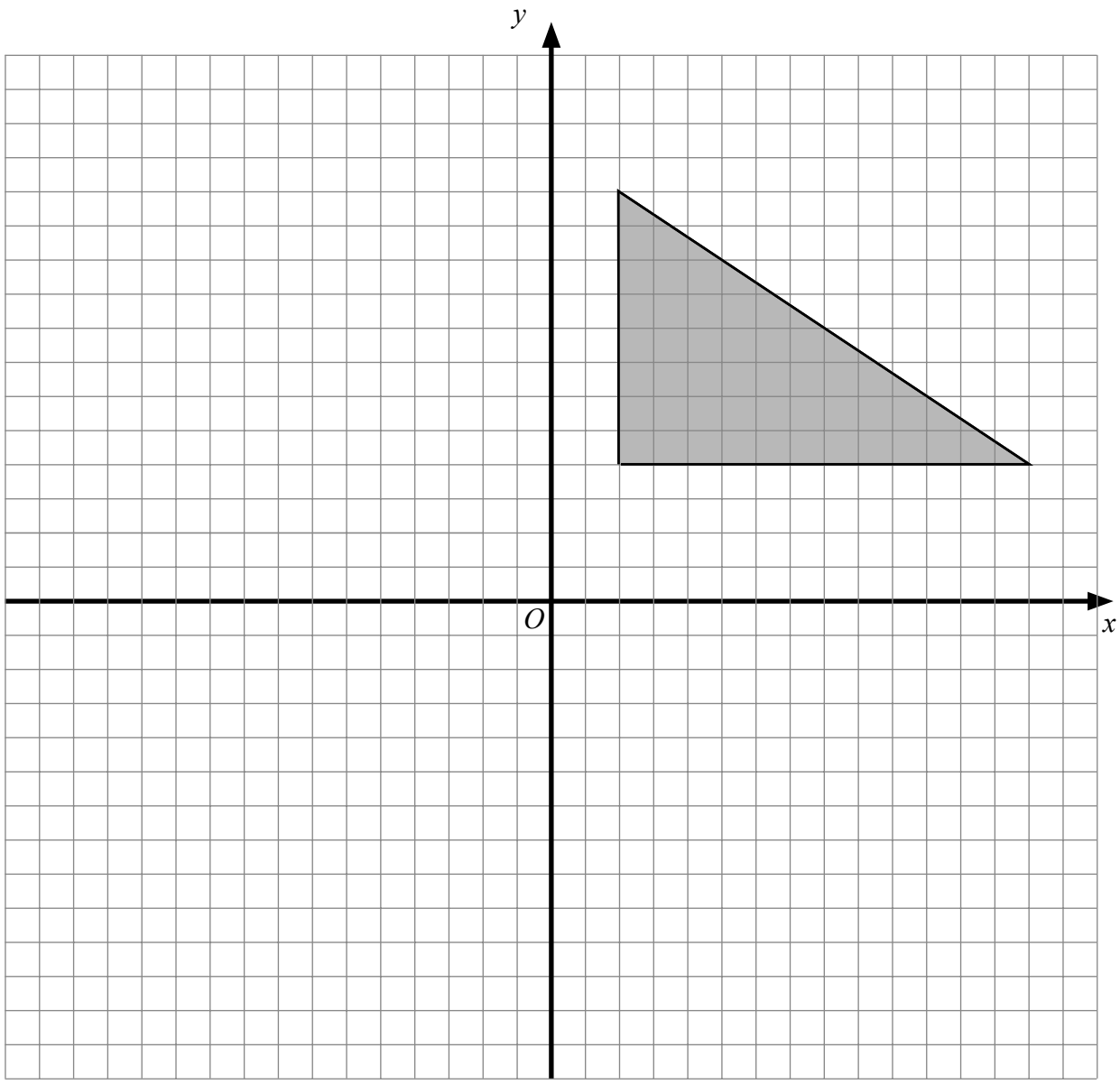
Design a better question that the student can use to find out how many pizzas adults ate.
You should include some response boxes.

**Q6**

**(Total 2 marks)**

Leave blank

**7.**



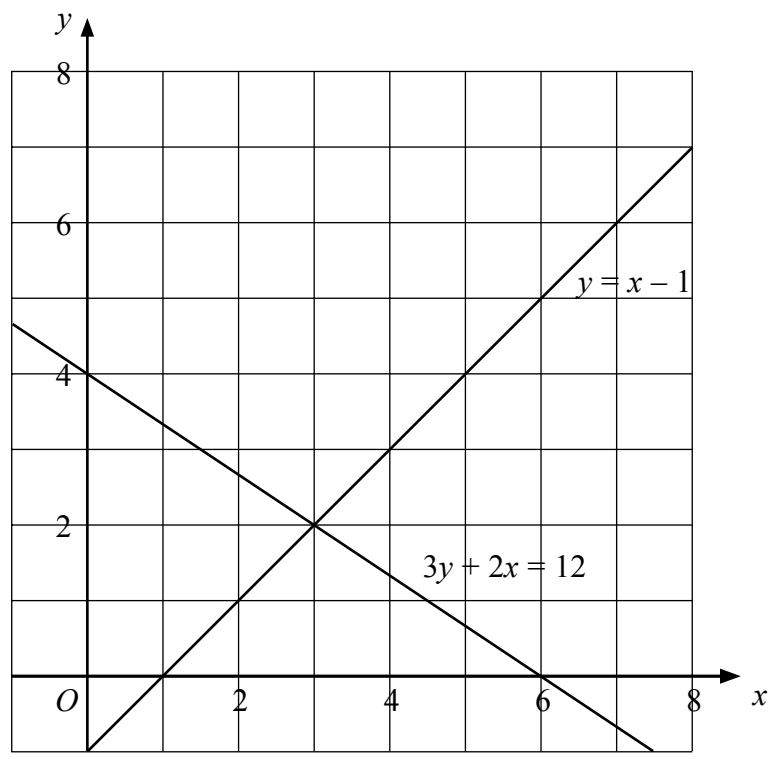

Enlarge the triangle by a scale factor of $-\frac{1}{2}$, centre $O$.

**Q7**

**(Total 2 marks)**

Leave blank

**8.** The graphs of the straight lines with equations $3y + 2x = 12$ and $y = x - 1$ have been drawn on the grid.




$3y + 2x > 12$ $y < x - 1$ $x < 6$

$x$ and $y$ are integers.

On the grid, mark with a cross (×), each of the **four** points which satisfies **all** 3 inequalities.

**Q8**

**(Total 3 marks)**

Leave blank

**9.** A company tested 100 batteries.

The table shows information about the number of hours that the batteries lasted.

| Time ($t$ hours) | Frequency |
|---|---|
| $50 \leqslant t < 55$ | 12 |
| $55 \leqslant t < 60$ | 21 |
| $60 \leqslant t < 65$ | 36 |
| $65 \leqslant t < 70$ | 23 |
| $70 \leqslant t < 75$ | 8 |

(a) Complete the cumulative frequency table for this information.

**(1)**

| Time ($t$ hours) | Cumulative frequency |
|---|---|
| $50 \leqslant t < 55$ | 12 |
| $50 \leqslant t < 60$ | |
| $50 \leqslant t < 65$ | |
| $50 \leqslant t < 70$ | |
| $50 \leqslant t < 75$ | |

(b) On the grid, draw a cumulative frequency graph for your completed table.

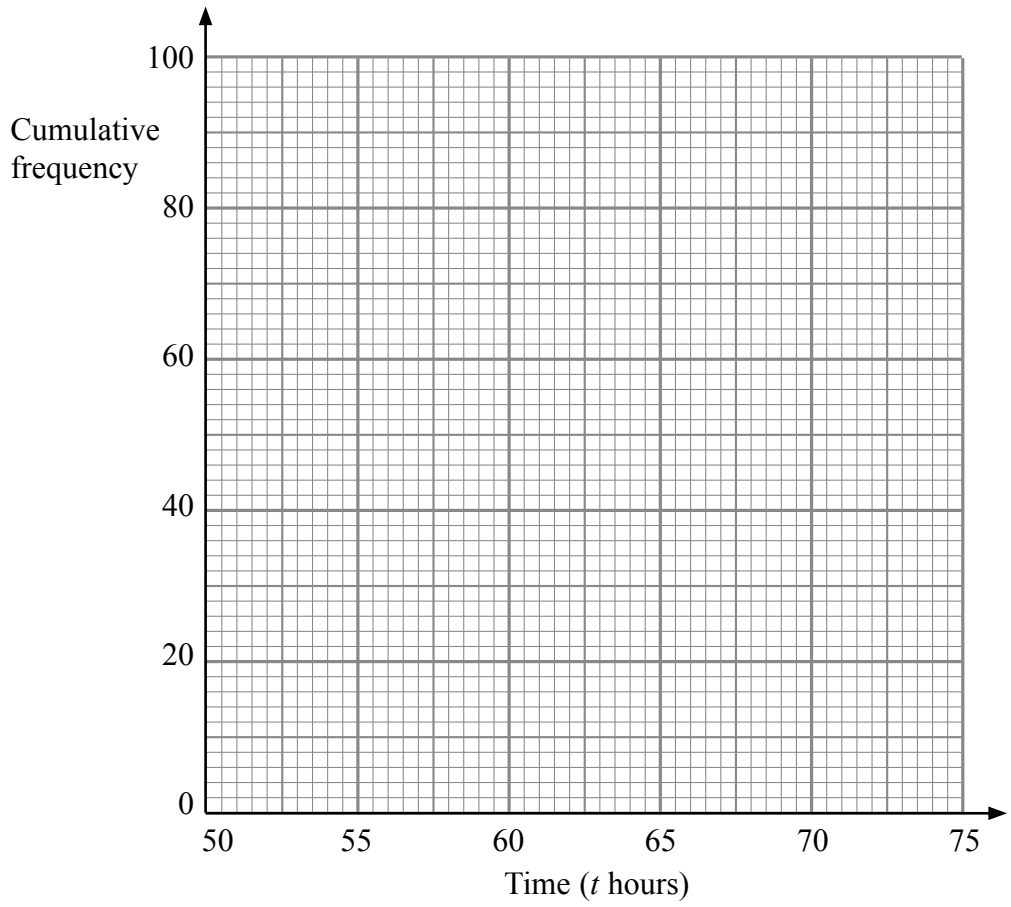
**(2)**

(c) Use your completed graph to find an estimate for the median time.

..... hours

**(1)**

Leave blank




**Q9**

**(Total 4 marks)**





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**10.**

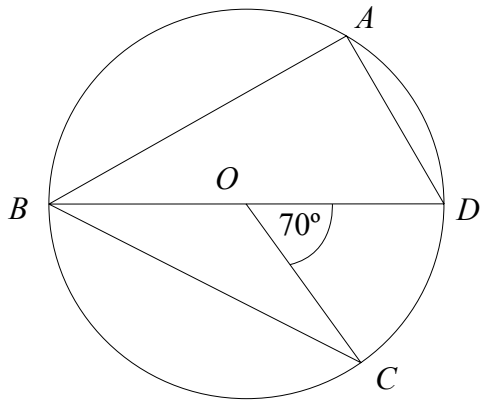



Diagram **NOT** accurately drawn

*A*, *B*, *C* and *D* are points on the circumference of a circle, centre *O*.
*BOD* is a straight line.
Angle *COD* = 70º

(a) Find the size of angle *BAD*.
Give a reason for your answer.

..... º
**(2)**

(b) Find the size of angle *CBD*.
Give a reason for your answer.

..... º
**(2)** **Q10**

**(Total 4 marks)**

Leave blank

**11.** The time, $T$ seconds, it takes a water heater to boil some water is directly proportional to the mass of water, $m$ kg, in the water heater.

When $m = 250$, $T = 600$

(a) Find $T$ when $m = 400$

$T =$ .....

**(3)**

The time, $T$ seconds, it takes a water heater to boil a constant mass of water is inversely proportional to the power, $P$ watts, of the water heater.

When $P = 1400$, $T = 360$

(b) Find the value of $T$ when $P = 900$

$T =$ .....

**(3)**

**Q11**

**(Total 6 marks)**

Leave blank

**12.**

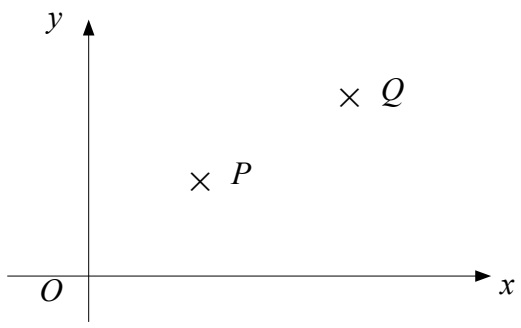



Diagram **NOT** accurately drawn

The diagram is a sketch.

$P$ is the point (2, 3)
$Q$ is the point (6, 6)

Write down the vector $\overrightarrow{PQ}$

Write your answer as a column vector $\begin{pmatrix} x \\ y \end{pmatrix}$

$\begin{pmatrix} \quad \\ \quad \end{pmatrix}$

**Q12**

**(Total 2 marks)**

Leave blank

**13.** The table and histogram show information about the length of time it took 165 adults to connect to the internet.

| Time ($t$ seconds) | Frequency |
|---|---|
| $0 < t \leqslant 10$ | 20 |
| $10 < t \leqslant 15$ | |
| $15 < t \leqslant 17.5$ | 30 |
| $17.5 < t \leqslant 20$ | 40 |
| $20 < t \leqslant 25$ | |
| $25 < t \leqslant 40$ | |

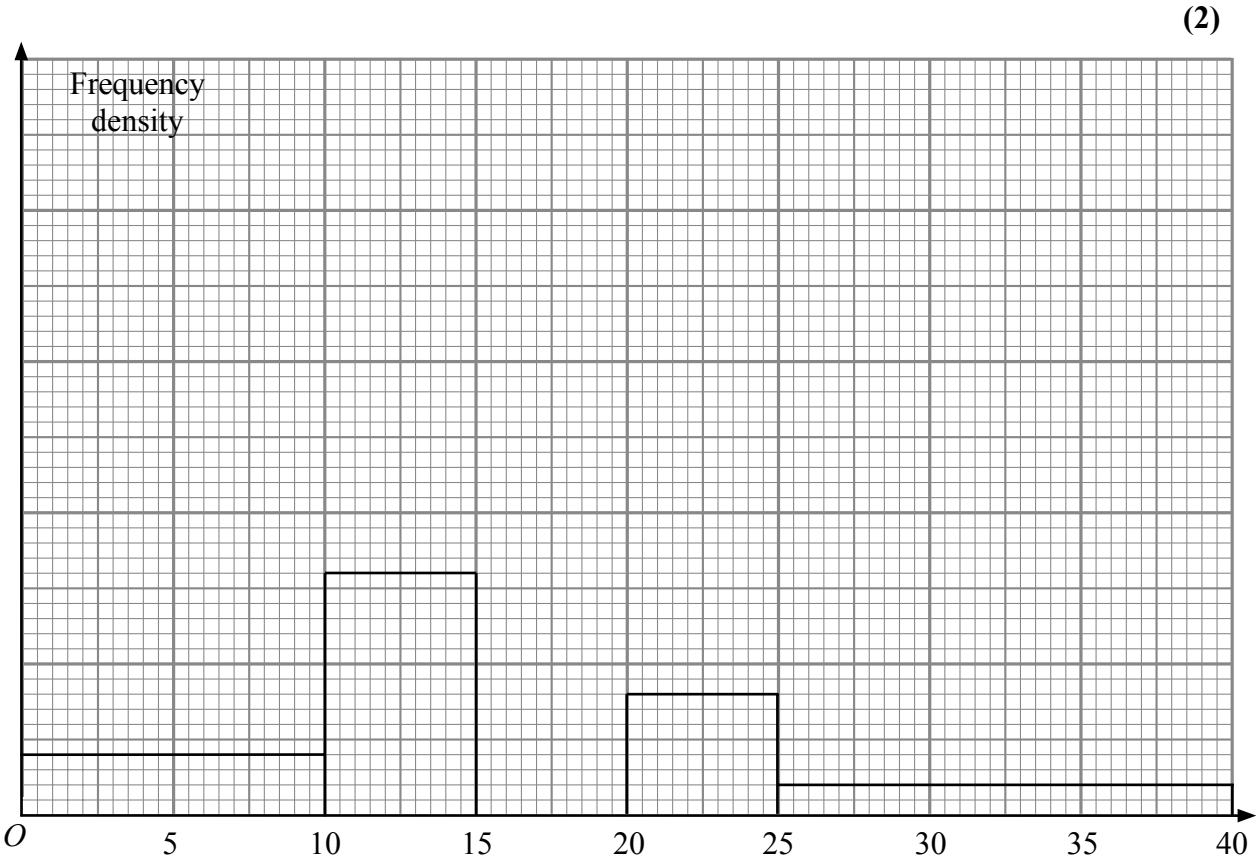
None of the adults took more than 40 seconds to connect to the internet.

(a) Use the table to complete the histogram.

**(2)**

(b) Use the histogram to complete the table.

**(2)**




**Q13**

**(Total 4 marks)**

Leave blank

**14.** (a) Write down the value of $8^{\frac{1}{3}}$

.....
**(1)**

$8\sqrt{8}$ can be written in the form $8^k$

(b) Find the value of $k$.

$k =$ .....
**(1)**

$8\sqrt{8}$ can also be expressed in the form $m\sqrt{2}$ where $m$ is a positive integer.

(c) Express $8\sqrt{8}$ in the form $m\sqrt{2}$

.....
**(2)**

(d) Rationalise the denominator of $\frac{1}{8\sqrt{8}}$

Give your answer in the form $\frac{\sqrt{2}}{p}$ where $p$ is a positive integer.

.....
**(2)** **Q14**

**(Total 6 marks)**

Leave blank

**15.**

$$P = \frac{n^2 + a}{n + a}$$

Rearrange the formula to make $a$ the subject.

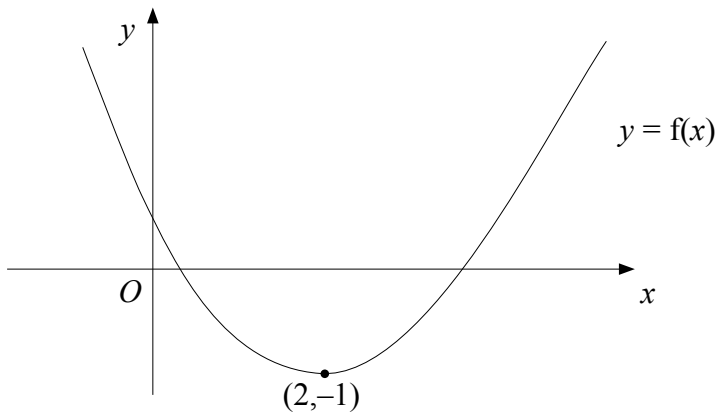
$a =$ .....

**Q15**

**(Total 4 marks)**

Leave blank

**16.**




The diagram shows part of the curve with equation $y = f(x)$
The minimum point of the curve is at (2,–1)

(a) Write down the coordinates of the minimum point of the curve with equation

(i) $y = f(x + 2)$

.....

(ii) $y = 3f(x)$

.....

(iii) $y = f(2x)$

.....

**(3)**

The curve $y = f(x)$ is reflected in the $y$ axis.

(b) Find the equation of the curve following this transformation.

$y =$ .....

**(1)**

The curve with equation $y = f(x)$ has been transformed to give the curve with equation $y = f(x) + 2$

(c) Describe the transformation.

.....

**(1)**

**(Total 5 marks)**

**Q16**

Leave blank

**17.** By eliminating $y$, find the solutions to the simultaneous equations

$$y - 2x = 3$$
$$x^2 + y^2 = 18$$

$x =$ ..... $y =$ .....

or $x =$ ..... $y =$ .....

**Q17**

**(Total 7 marks)**

**TOTAL FOR PAPER: 62 MARKS**

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