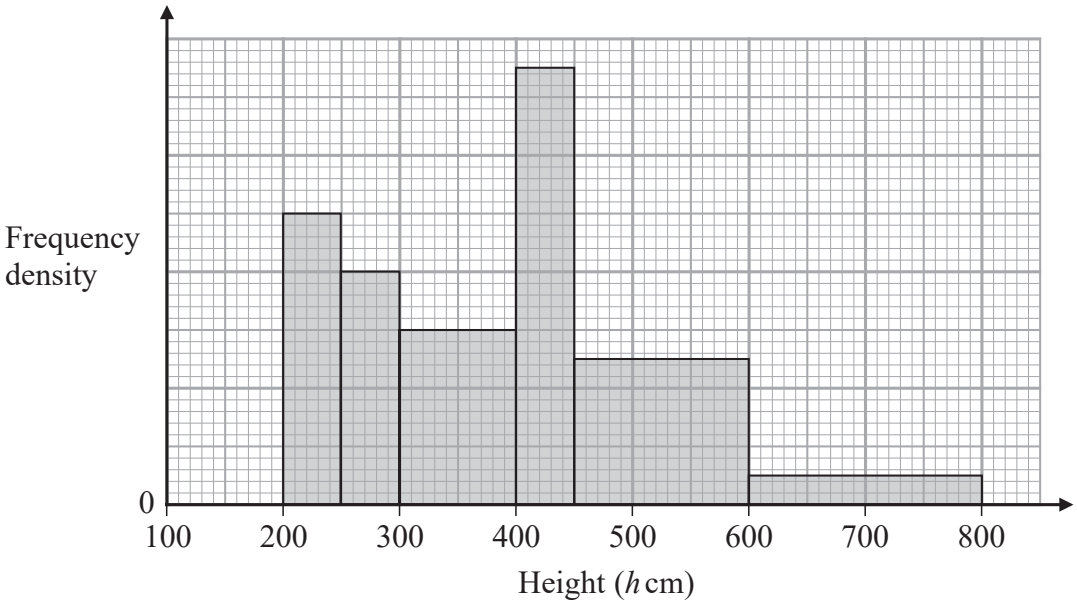
**19** The histogram gives information about the height, $h$ cm, of each tree in part of a forest.




There are no trees for which $h \leqslant 200$ and for which $h > 800$

The number of trees for which $300 < h \leqslant 400$ is 8 fewer than the number of trees for which $400 < h \leqslant 500$

Work out an estimate for the number of trees in this part of the forest that have a height greater than 500 cm.

.....

**(Total for Question 19 is 3 marks)**

**20** The diagram shows two similar metal statues.

Diagram **NOT** accurately drawn

**A**

**B**

The volume of statue **B** is 20% less than the volume of statue **A**

The surface area of statue **B** is $k$% less than the surface area of statue **A**

Work out the value of $k$
Give your answer correct to 3 significant figures.

$k$ = .....

**(Total for Question 20 is 4 marks)**

**21** Express $\dfrac{3+\sqrt{8}}{\left(\sqrt{2}-1\right)^2}$ in the form $p+\sqrt{q}$ where $p$ and $q$ are integers.

Show each stage of your working clearly.

.....

**(Total for Question 21 is 4 marks)**

**Turn over for Question 22**

**22** The diagram shows a sketch of part of the curve with equation $y = x^2 - \frac{p}{x}$ where $p$ is a positive constant.

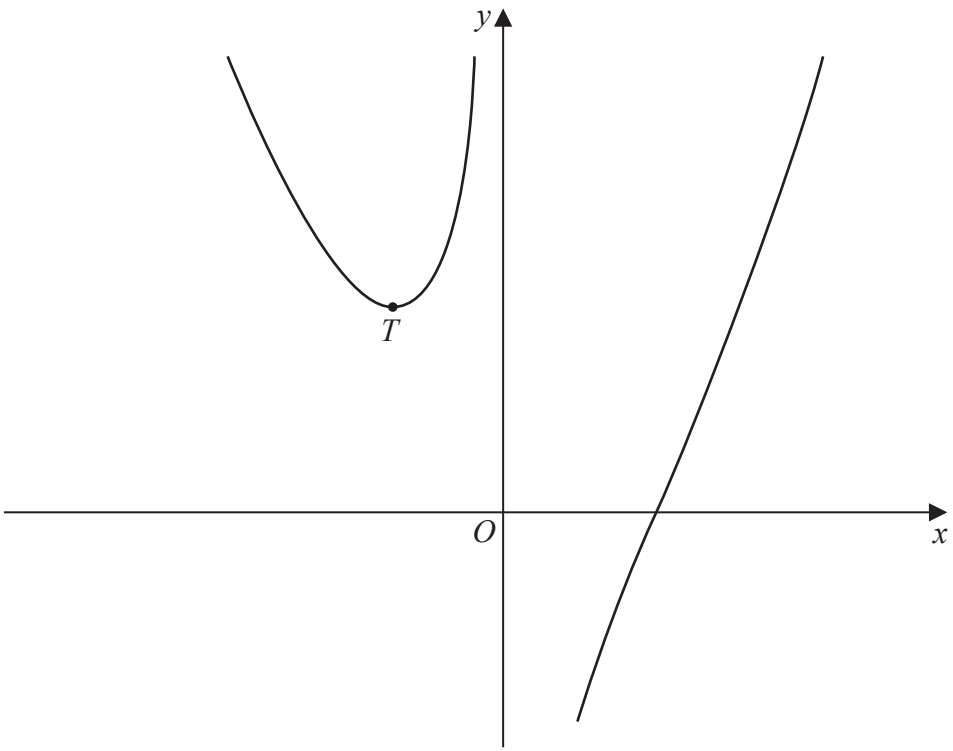



Diagram **NOT** accurately drawn

For all values of $p$, the curve has exactly one turning point and this turning point is a minimum shown as the point $T$ in the sketch.

For the curve where the $x$ coordinate of $T$ is $-3$

(a) find the value of $p$

$p =$ .....

**(4)**

The line with equation $y = k$ is a tangent to the curve with equation $y = x^2 - \frac{16}{x}$

(b) Find the value of $k$

$k =$ .....

**(3)**

**(Total for Question 22 is 7 marks)**

**Turn over for Question 23**

**23** (a) Express $2x^2 - 12x + 3$ in the form $a(x + b)^2 + c$ where $a$, $b$ and $c$ are integers.

.....

**(3)**

The curve **C** has equation $y = 2(x + 4)^2 - 12(x + 4) + 3$

The point $M$ is the minimum point on **C**

(b) Find the coordinates of $M$

(..... , .....)

**(2)**

**(Total for Question 23 is 5 marks)**

**24** Elliot has $x$ counters.

Each counter has one red face and one green face.

Elliot spreads all the counters out on a table and sees that the number of counters showing a red face is 5

Elliot then picks at random one of the counters and turns the counter over.
He then picks at random a second counter and turns the counter over.

The probability that there are still 5 counters showing a red face is $\frac{19}{32}$

Work out the value of $x$
Show clear algebraic working.

$x =$ .....

**(Total for Question 24 is 5 marks)**

**25** The sum of the first 10 terms of an arithmetic series is 4 times the sum of the first 5 terms of the same series.

The 8th term of this series is 45

Find the first term of this series.
Show clear algebraic working.

.....

**(Total for Question 25 is 5 marks)**

**TOTAL FOR PAPER IS 100 MARKS**