17 The table gives information about the areas, in hectares, of some farms in Spain.
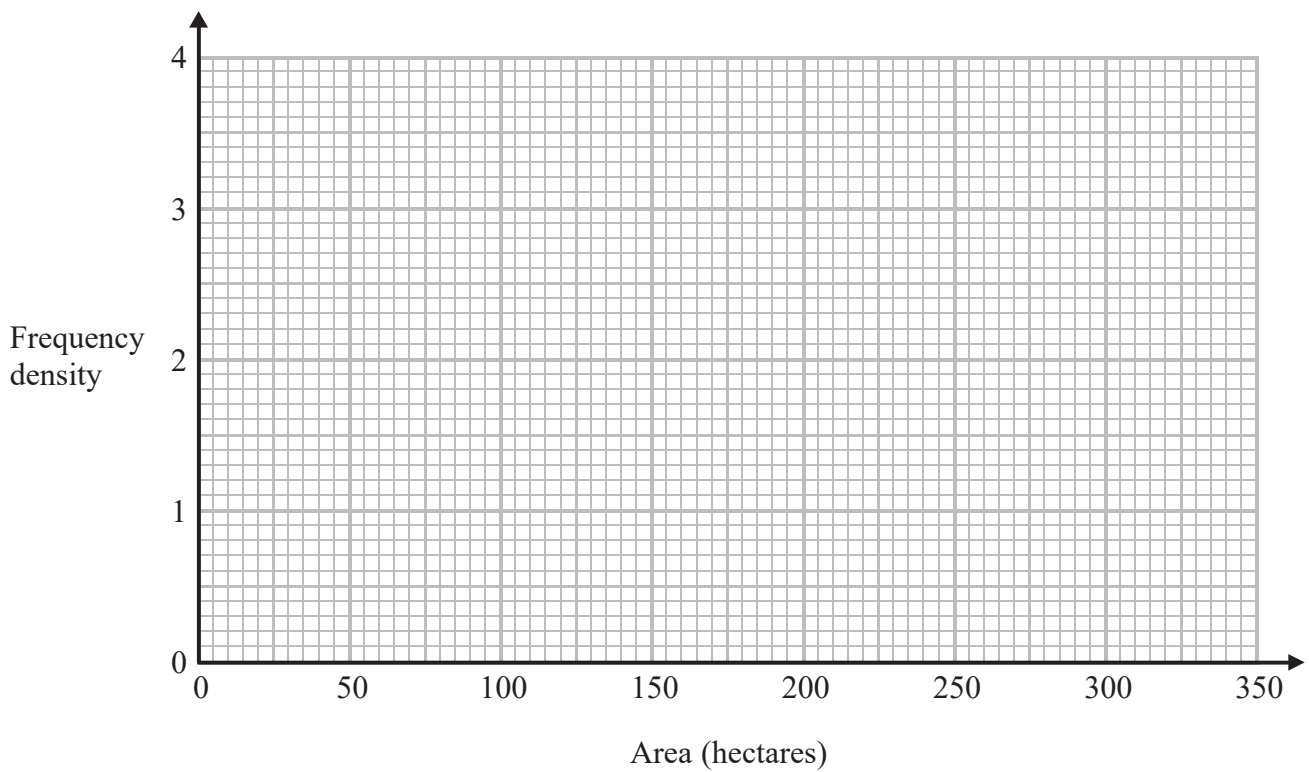
Area (*A* hectares)	Frequency
$0 < A \leqslant 20$	40
$20 < A \leqslant 50$	90
$50 < A \leqslant 100$	140
$100 < A \leqslant 300$	140
$300 < A \leqslant 350$	40

On the grid, draw a histogram for this information.

Area (hectares)

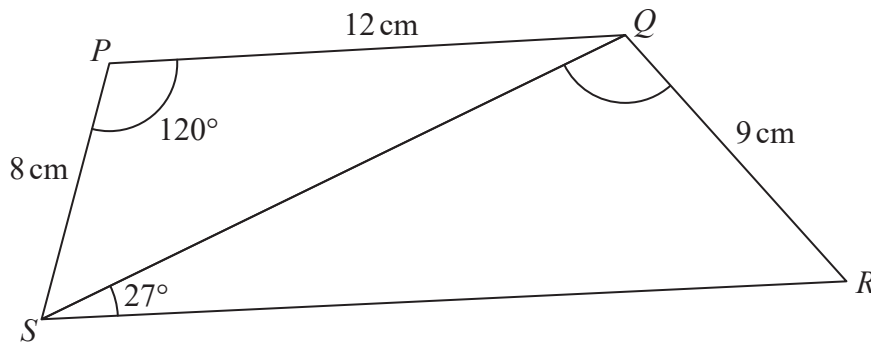**(Total for Question 17 is 3 marks)**

18 Here is a quadrilateral *PQRS*.

Diagram **NOT** accurately drawn

Angle *SRQ* is acute.

Work out the size of angle *SQR*.
Give your answer correct to 1 decimal place.

....°

(Total for Question 18 is 6 marks)

19 The curve shown in the diagram has equation

$$y = x^3 - 27x + k \text{ where } k \text{ is a positive constant with } k < 54$$

The curve has a maximum point at A (a, b)
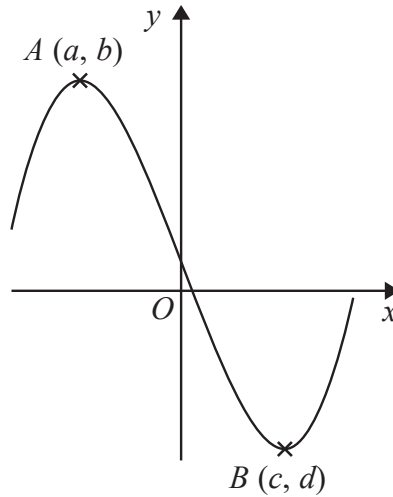The curve has a minimum point at B (c, d)

Diagram **NOT**
accurately drawn

Using differentiation, find the value of $b - d$
Show your working clearly.

....

(Total for Question 19 is 6 marks)

Turn over ▶

P 5 9 0 1 2 A 0 1 9 2 4

20 Two functions, f and g are defined as

$$f : x \mapsto 1 + \frac{1}{x} \qquad \text{for } x > 0$$

$$g : x \mapsto \frac{x+1}{2} \qquad \text{for } x > 0$$

Given that h = fg

express the inverse function h^{-1} in the form $h^{-1} : x \mapsto \dots$

$h^{-1} : x \mapsto$ ....

(Total for Question 20 is 4 marks)

21 (a) Show that $x(x - 1)(x + 1) = x^3 - x$

(1)

(b) Prove that the difference between a whole number and the cube of this number is always a multiple of 6

(3)

(Total for Question 21 is 4 marks)

22 A 3-D shape consists of a hollow sphere made of metal.

The diagram shows a cross section drawn through the centre, *O*, of the sphere.
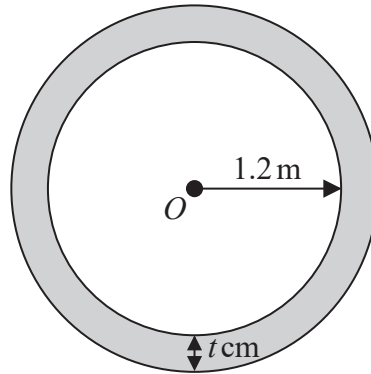
1.2 m

O

Diagram **NOT**
accurately drawn

t cm

The internal radius of the sphere is 1.2 m.
The thickness of the metal is *t* cm.

The density of the metal is 2700 kg per m³

The mass of the 3-D shape is 1980 kg.

Work out the value of *t*.
Give your answer correct to 2 significant figures.

t = ...

(Total for Question 22 is 5 marks)

23 Work out the sum of the multiples of 3 between 1 and 1000

....

(Total for Question 23 is 4 marks)

TOTAL FOR PAPER IS 100 MARKS