

Write your name here:

Surname:	Other Names:
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Mathematics

Practice Papers Set 1

Paper 2 (Calculator)

Higher Tier

Time: 1 hour 30 minutes

You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided
– there may be more space than you need.
- Diagrams are **NOT** accurately drawn, unless otherwise indicated.
- You must **show all your working out**.

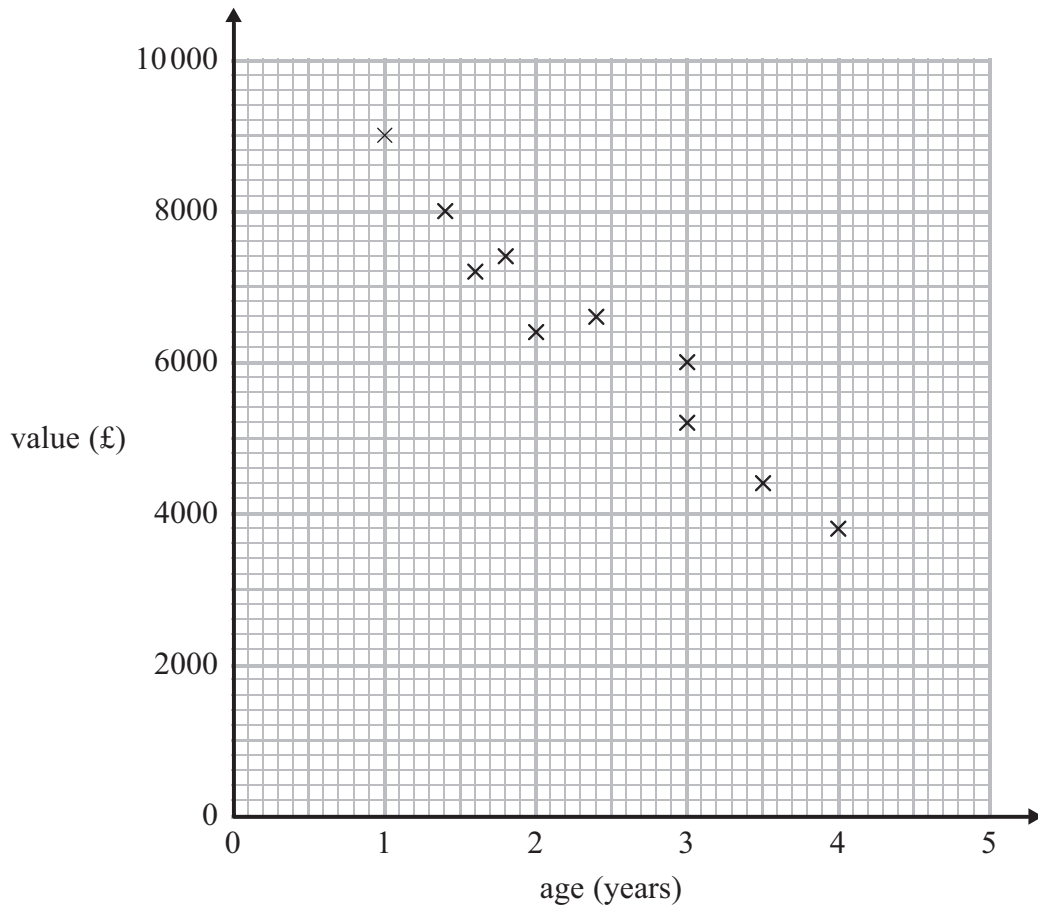
Information

- The total mark for this paper is 80
- The marks for **each** question are shown in brackets
– use this as a guide as to how much time to spend on each question.

Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

- 1 The scatter graph shows some information about 10 cars, of the same type and make.
The graph shows the age (years) and the value (£) of each car.



The table shows the age and the value of two other cars of the same type and make.

age (years)	1	3.5
value (£)	8200	5000

- (a) On the scatter graph, plot the information from the table. (1)
- (b) Describe the relationship between the age and the value of the cars.

(1)

A car of the same type and make is $2\frac{1}{2}$ years old.

- (c) Estimate the value of the car.

£

(2)

(Total for Question 1 is 4 marks)

2 Colin, Dave and Emma share some money.

Colin gets $\frac{3}{10}$ of the money.

Emma and Dave share the rest of the money in the ratio 3 : 2

What is Dave's share of the money?

.....
(Total for Question 2 is 4 marks)

3 An airline increases the prices of its flights by 8%.

(a) Before the increase, the price of a flight to Cairo was £475

Work out the price of a flight to Cairo after the increase.

£.....
(3)

(b) The increase in price of a flight to Mumbai was £48

Work out the price of a flight to Mumbai after the increase.

£.....
(3)

(Total for Question 3 is 6 marks)

4 $S = \{s, q, u, a, r, e\}$

$V = \{a, e, i, o, u\}$

List the members of the set

(i) $S \cap V$

.....

(ii) $S \cup V$

.....

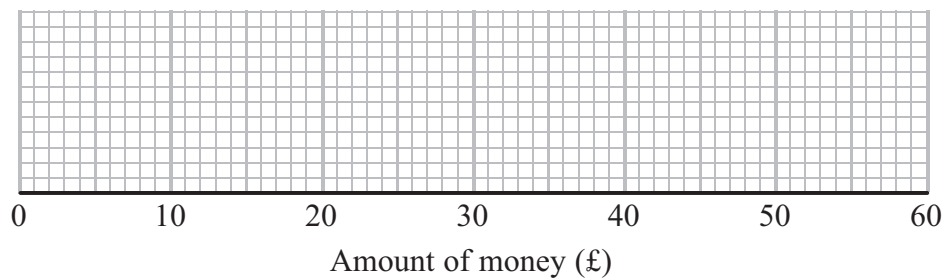
(Total for Question 4 is 2 marks)

5 Some girls did a sponsored swim to raise money for charity.

The table shows information about the amounts of money (£) the girls raised.

Least amount of money (£)	10
Greatest amount of money (£)	45
Median	25
Lower quartile	16
Upper quartile	42

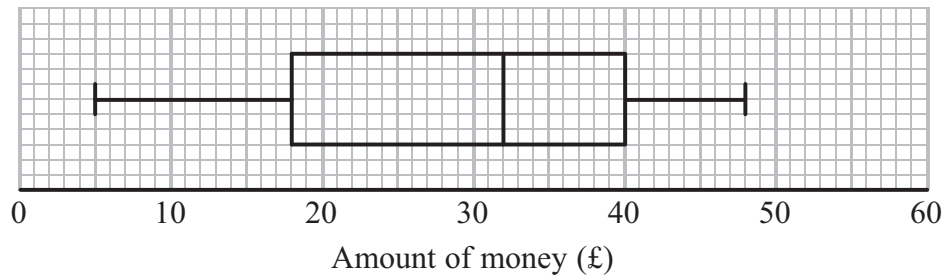
(a) On the grid, draw a box plot for the information in the table.



(2)

Some boys also did the sponsored swim.

The box plot shows information about the amounts of money (£) the boys raised.



(b) Compare the amounts of money the girls raised with the amounts of money the boys raised.

.....

.....

.....

.....

(2)

(Total for Question 5 is 4 marks)

6

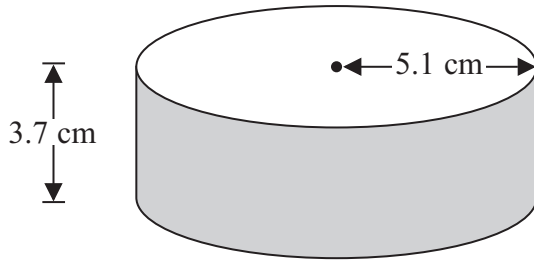


Diagram **NOT**
accurately drawn

A solid cylinder has a radius of 5.1 cm and a height of 3.7 cm.

Work out the **total** surface area of the cylinder.
Give your answer correct to 3 significant figures.

..... cm²

(Total for Question 6 is 3 marks)

7

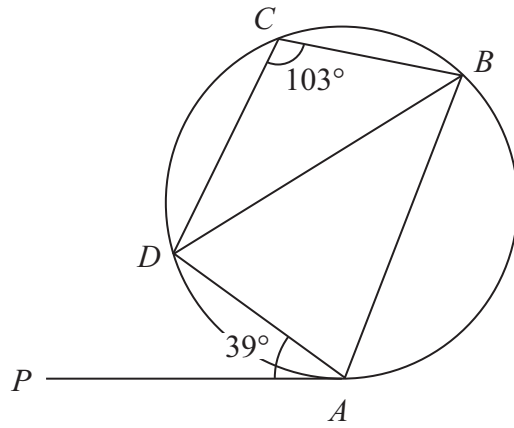


Diagram **NOT**
accurately drawn

A, B, C and D are points on a circle.
 PA is a tangent to the circle.
Angle $PAD = 39^\circ$
Angle $BCD = 103^\circ$

Calculate the size of angle ADB .

(Total for Question 7 is 3 marks)

8 (a) Simplify $4p^3q^5 \times 6p^2q$

.....
(2)

(b) Simplify $(5x^2y^4)^3$

.....
(2)

(c) Factorise $9a^2 - b^2$

.....
(2)

(Total for Question 8 is 6 marks)

9 Tame Valley is a company that makes yoghurt.

A machine fills trays of 20 pots with yoghurt.

In one hour, the machine fills a total of 15 000 pots.

Work out how many seconds the machine takes to fill each tray of 20 pots.

..... seconds

(Total for Question 9 is 4 marks)

10 Expand and simplify $(x - 6)(x + 2)(x + 1)$

.....
(Total for Question 10 is 2 marks)

11 (a) Solve $3(x - 2) = x + 7$

$x = \dots\dots\dots$
(2)

(b) Solve $\frac{2 - y}{5} = 1$

$y = \dots\dots\dots$
(2)

(Total for Question 11 is 4 marks)

12 The diagram shows a ladder leaning against a vertical wall.

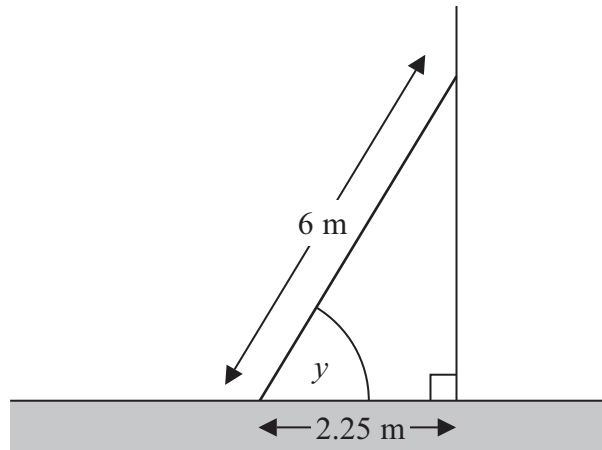


Diagram **NOT**
accurately drawn

The ladder stands on horizontal ground.

The length of the ladder is 6 m.

The bottom of the ladder is 2.25 m from the bottom of the wall.

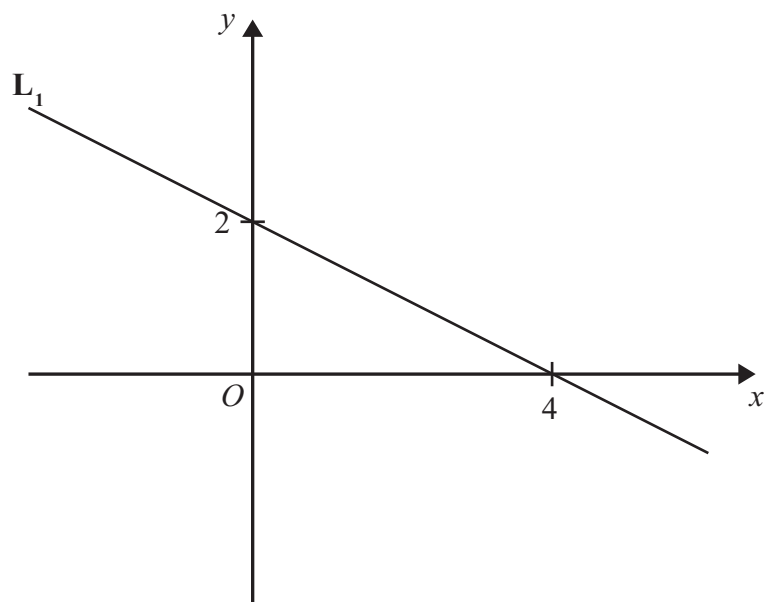
A ladder is safe to use when the angle marked y is about 75° .

Is the ladder safe to use?

You must show all your working.

(Total for Question 12 is 3 marks)

13 The diagram shows a straight line L_1



The line L_2 is perpendicular to L_1
 L_2 passes through the point $(3, 2)$.

Find an equation of the line L_2

.....
(Total for Question 13 is 3 marks)

14 $y = 180 - \frac{360}{x}$

(a) Make x the subject of the formula.

$x =$
.....
(2)

$$s = \frac{t}{t+2}$$

(b) (i) Find the value of s when $t = -6$

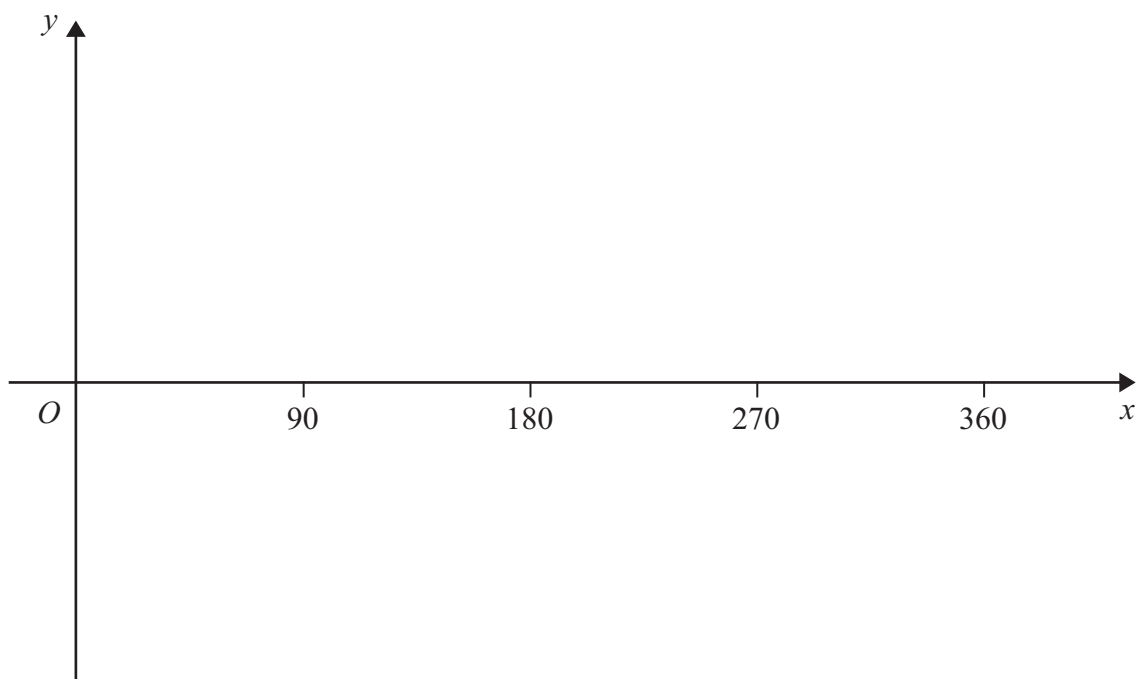
.....

(ii) Make t the subject of the formula.

$t =$
.....
(5)

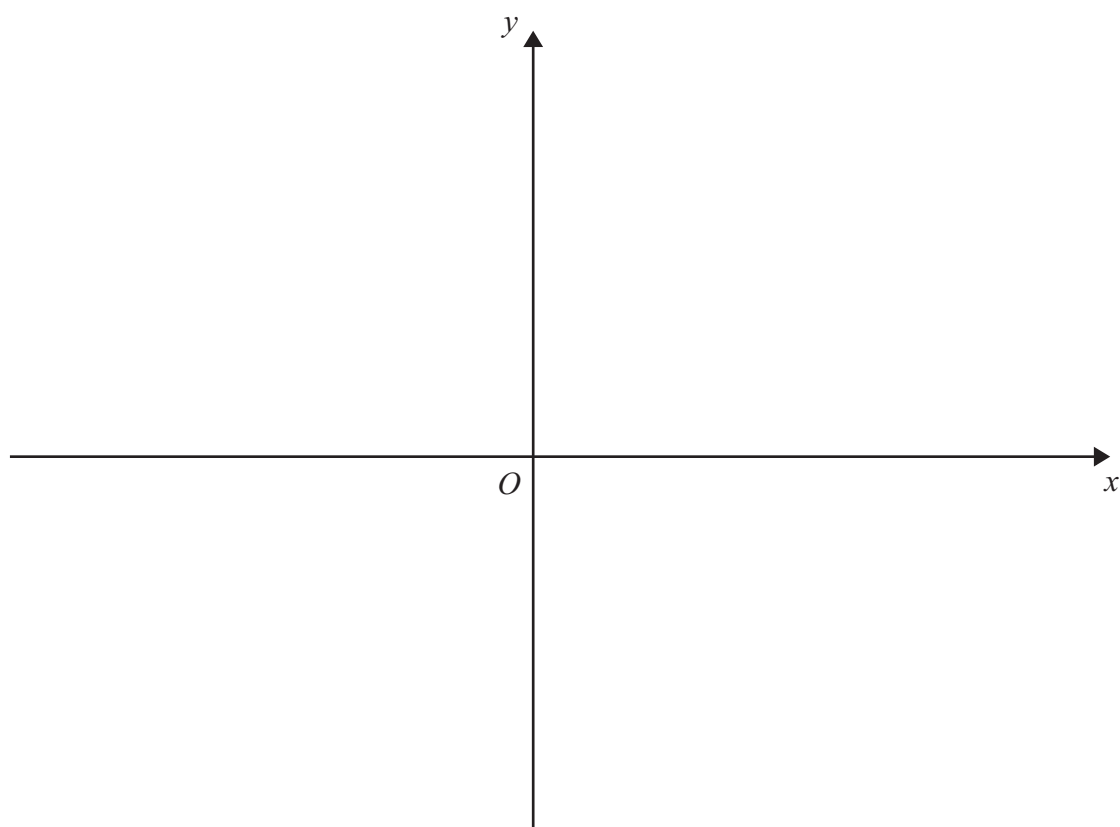
(Total for Question 14 is 7 marks)

15 (a) Sketch the graph of $y = \sin x^\circ$ for $0 \leq x \leq 360$



(2)

(b) Sketch the graph of $y = 2^x$



(2)

(Total for Question 15 is 4 marks)

16 Dan does an experiment to find the value of π .
He measures the circumference and the diameter of a circle.

He measures the circumference, C , as 170 mm to the nearest millimetre.
He measures the diameter, d , as 54 mm to the nearest millimetre.

Dan uses $\pi = \frac{C}{d}$ to find the value of π .

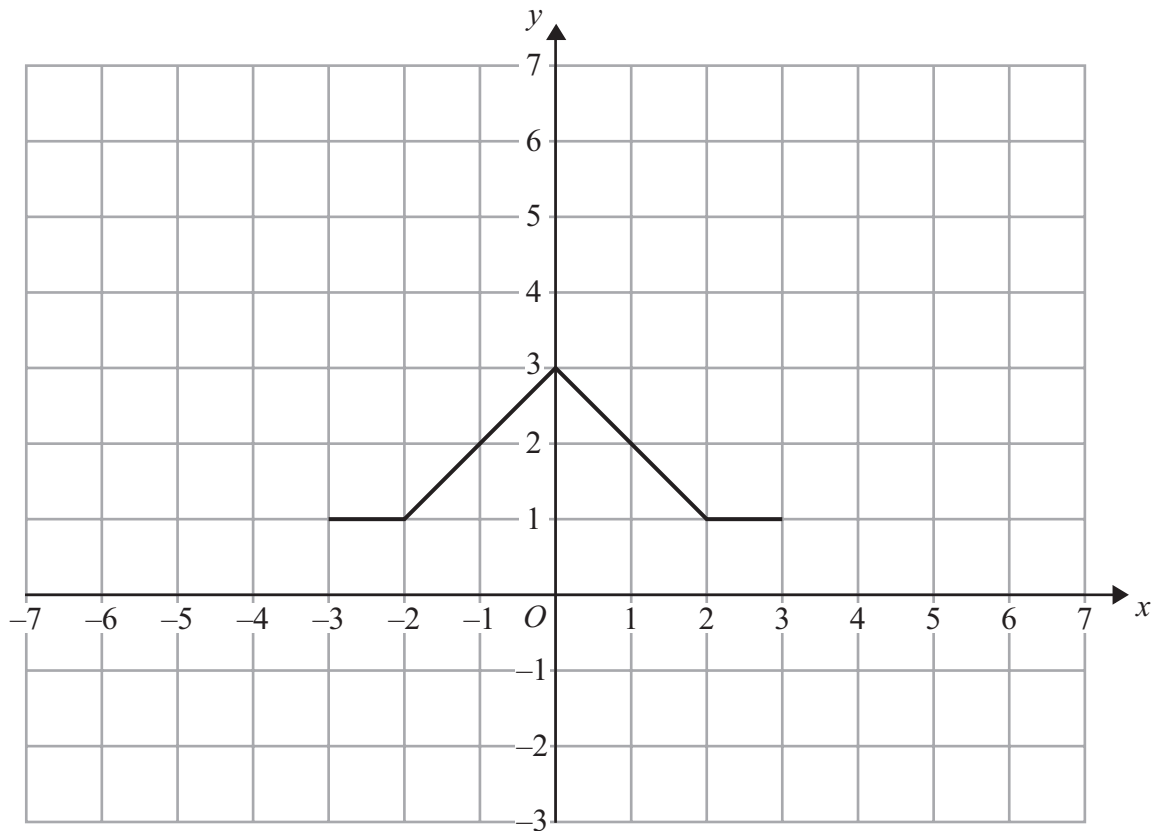
Calculate the upper bound and the lower bound for Dan's value of π .

upper bound =

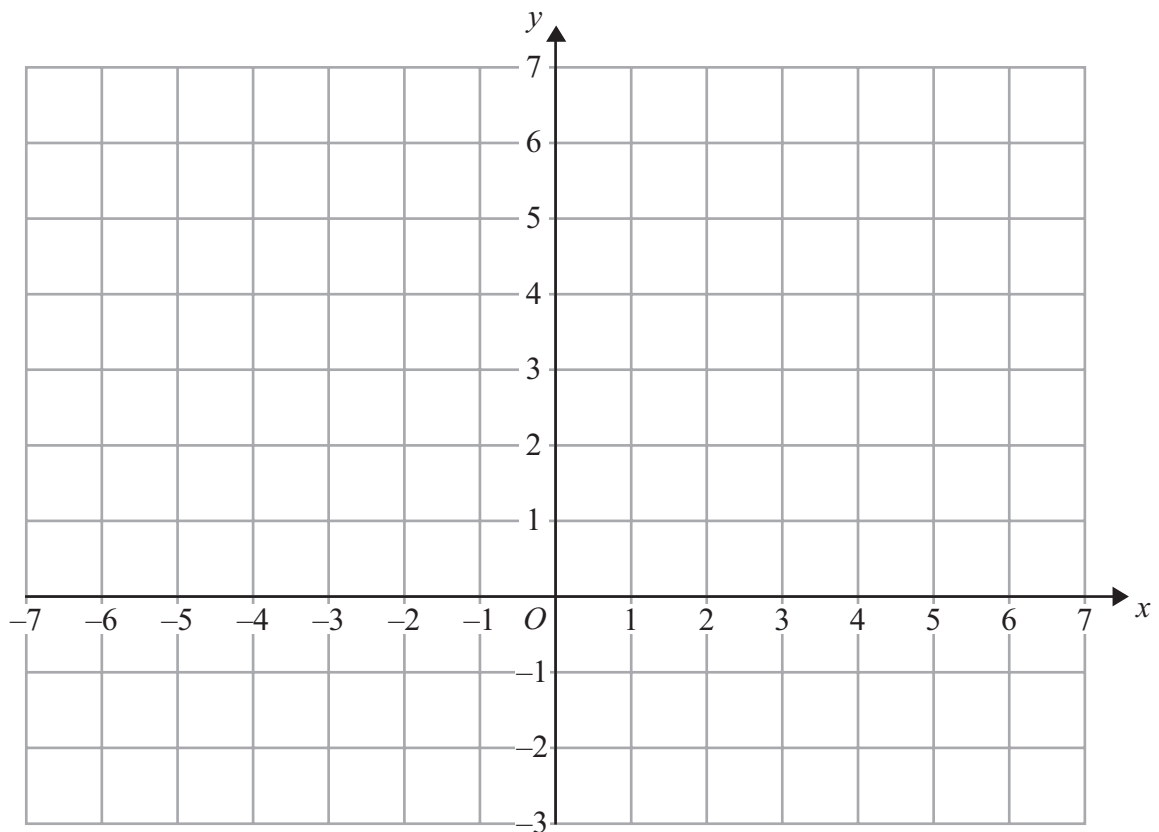
lower bound =

(Total for Question 16 is 4 marks)

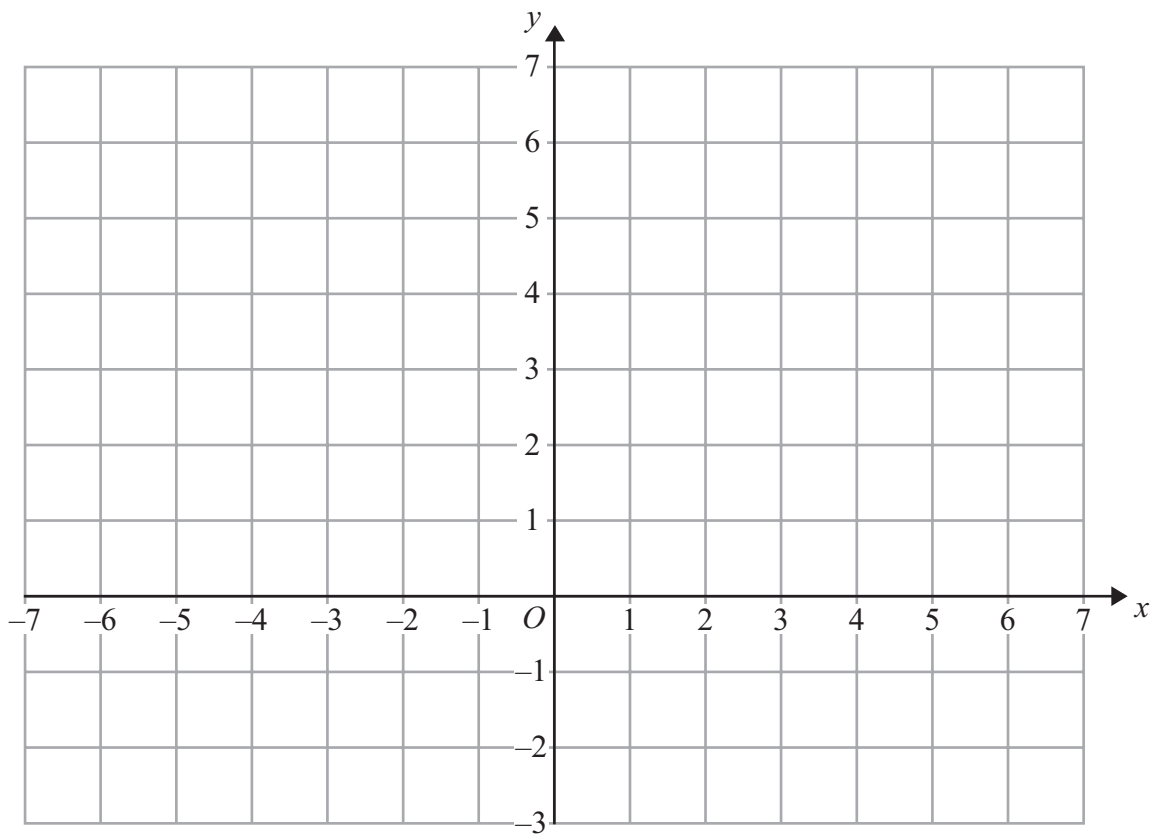
17 Here is the graph of $y = f(x)$.



(a) On the grid below, draw the graph of $y = 2f(x)$.



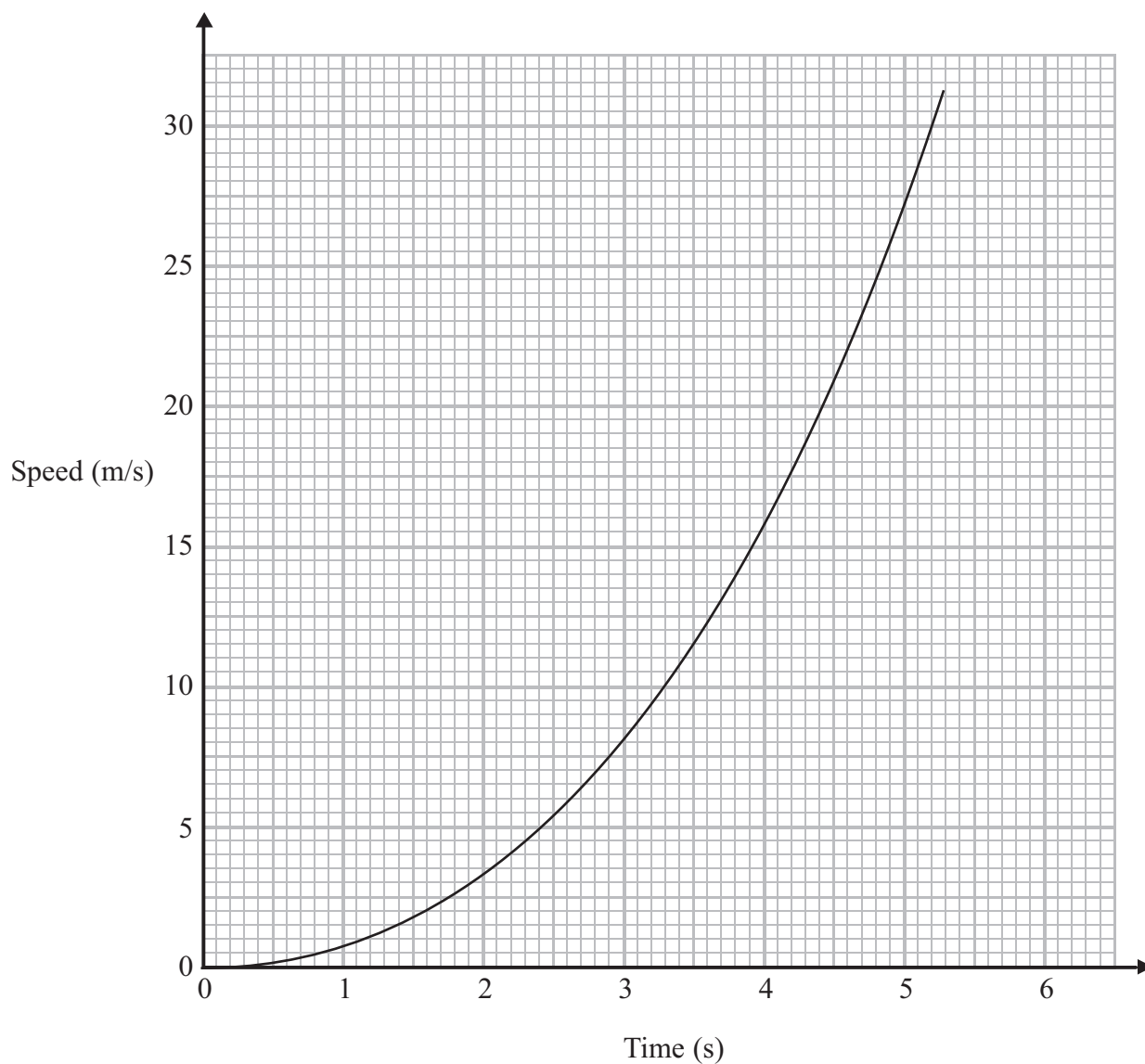
(b) On this grid, draw the graph of $y = f(x - 3)$.



(2)

(Total for Question 17 is 4 marks)

18 Here is a speed-time graph.



Estimate the acceleration after 3 seconds.

..... m/s^2

(Total for Question 18 is 2 marks)

- 19 The sides of triangle PQR are tangents to a circle.
 The tangents touch the circle at the points S , T and U .
 $QS = 6$ cm. $PS = 7$ cm.

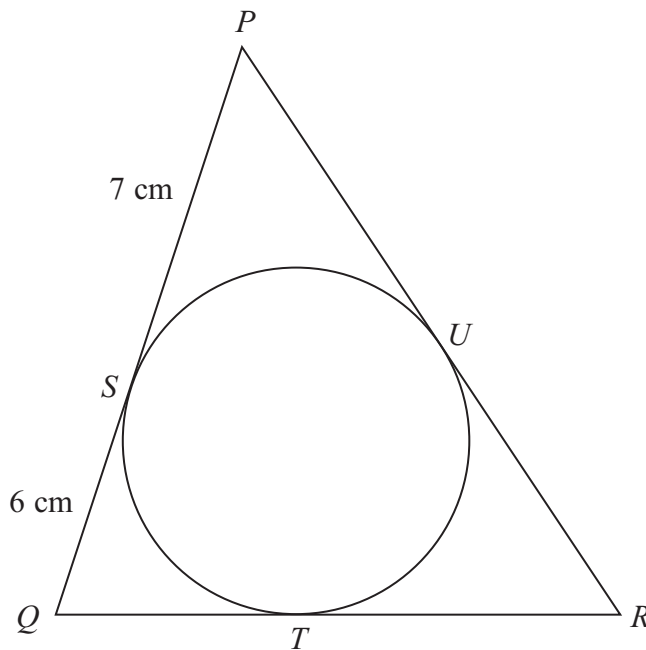


Diagram **NOT** accurately drawn

- (a) (i) Write down the length of QT .

..... cm

- (ii) Give a reason for your answer.

.....
 (2)

The perimeter of triangle PQR is 42 cm.

- (b) Calculate the size of angle PQR .
 Give your answer correct to 1 decimal place.

.....
 (4)

(Total for Question 19 is 6 marks)

20 The function f is defined as

$$f(x) = \frac{x - 6}{2}$$

(a) Find $f(8)$

.....
(1)

(b) Express the inverse function f^{-1} in the form $f^{-1}(x) = \dots$

$$f^{-1}(x) = \dots\dots\dots$$

(2)

The function g is defined as

$$g(x) = \sqrt{x - 4}$$

(c) Express the function gf in the form $gf(x) = \dots$
Give your answer as simply as possible.

$$gf(x) = \dots\dots\dots$$

(2)

(Total for Question 20 is 5 marks)