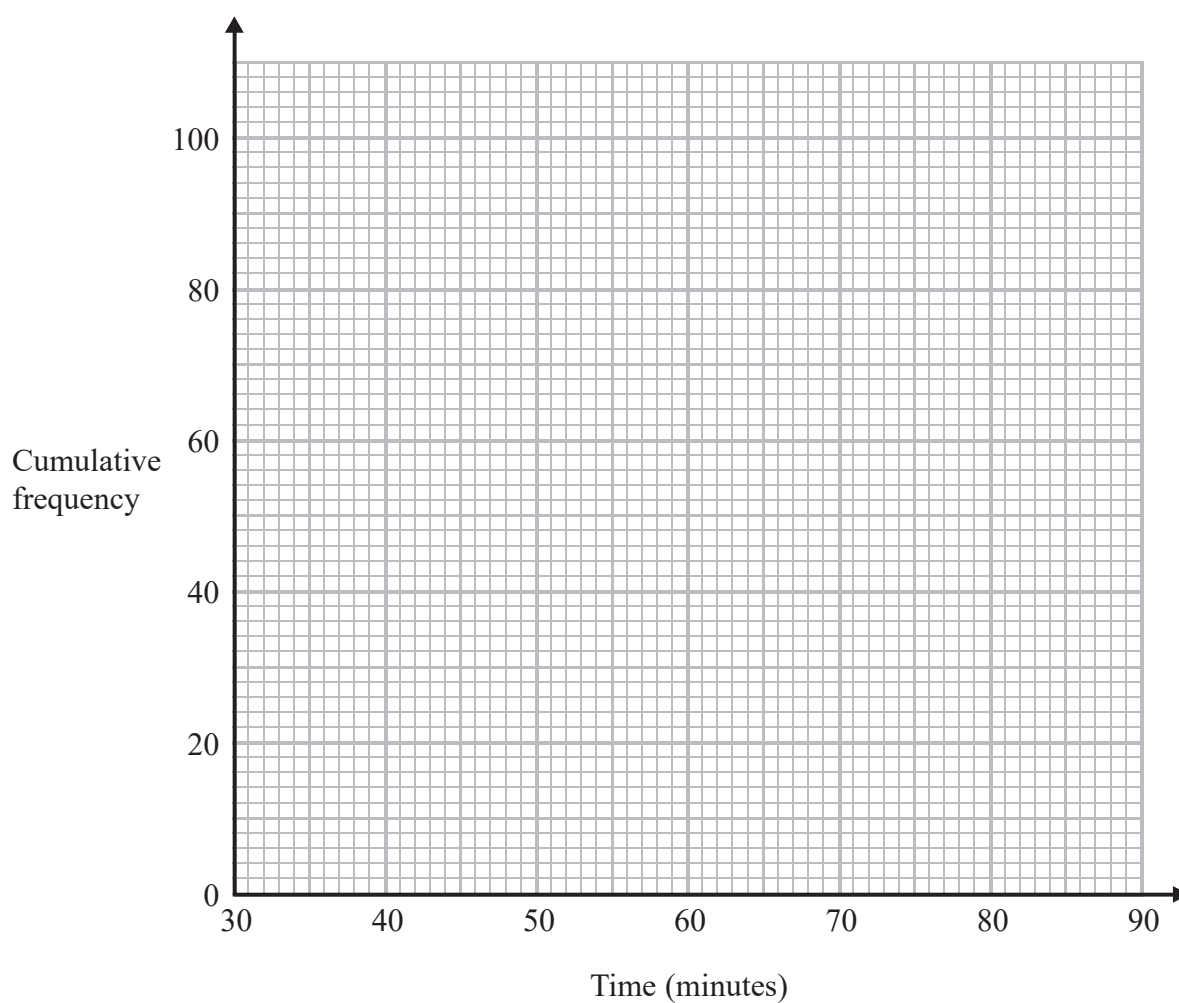


- 13 Sandeep recorded the length of time, in minutes, that each of 100 adults went for a walk one Saturday afternoon.

The cumulative frequency table gives information about these times.

| Time (t minutes) | Cumulative frequency |
|---------------------|----------------------|
| $30 < t \leq 40$ | 6 |
| $30 < t \leq 50$ | 20 |
| $30 < t \leq 60$ | 56 |
| $30 < t \leq 70$ | 84 |
| $30 < t \leq 80$ | 95 |
| $30 < t \leq 90$ | 100 |

- (a) On the grid, draw a cumulative frequency graph for the information in the table.



(2)



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(b) Use your graph to find an estimate for the median length of time that these adults went for a walk.

..... minutes
(2)

One of the 100 adults is chosen at random.

(c) Use your graph to find an estimate for the probability that this adult went for a walk for more than 72 minutes.

.....
(3)

(Total for Question 13 is 7 marks)



14 (a) Simplify fully $(x^{12}y^8)^{\frac{3}{4}}$

.....
(2)

Given that $3^n = \frac{3^x}{9^y}$

(b) find an expression for n in terms of x and y .

$n =$
(2)

(Total for Question 14 is 4 marks)

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15 A, B, C and D are points on a circle, centre O .

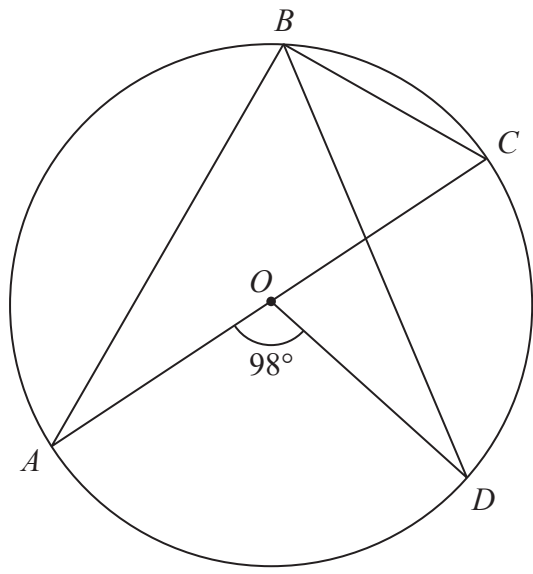


Diagram NOT accurately drawn

AOC is a diameter of the circle.

Angle $AOD = 98^\circ$

Work out the size of angle DBC .
Give a reason for each stage in your working.

.....
o

(Total for Question 15 is 4 marks)



- 16 The following table gives values of x and y where y is inversely proportional to the square of x .

| | | | | |
|-----|-----|---|---|------|
| x | 1.5 | 2 | 3 | 4 |
| y | 16 | 9 | 4 | 2.25 |

- (a) Find a formula for y in terms of x .

.....
(3)

Given that $x > 0$

- (b) find the value of x when $y = 144$

.....
(2)

(Total for Question 16 is 5 marks)



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17 The table gives information about the first six terms of a sequence of numbers.

| | | | | | | |
|-------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|
| Term number | 1 | 2 | 3 | 4 | 5 | 6 |
| Term of sequence | $\frac{1 \times 2}{2}$ | $\frac{2 \times 3}{2}$ | $\frac{3 \times 4}{2}$ | $\frac{4 \times 5}{2}$ | $\frac{5 \times 6}{2}$ | $\frac{6 \times 7}{2}$ |

Prove algebraically that the sum of any two consecutive terms of this sequence is always a square number.

(Total for Question 17 is 4 marks)



18 The functions f and g are defined as

$$f(x) = \frac{x}{4x - 3} \quad \text{and} \quad g(x) = x - 5$$

(a) State which value of x must be excluded from any domain of the function f .

.....
(1)

(b) Find $fg(x)$.
Simplify your answer.

$fg(x) =$
(2)

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

$f^{-1}(x) =$
(3)

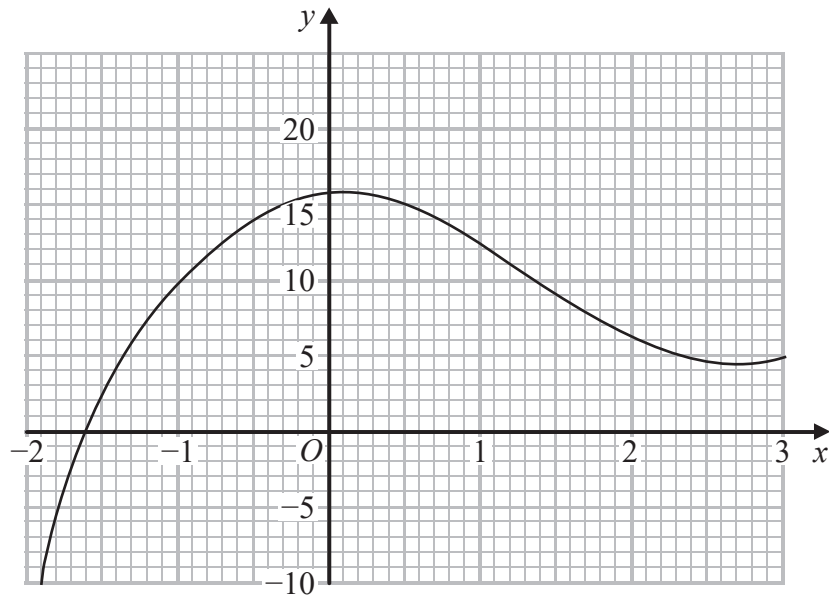


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Part of the curve with equation $y = h(x)$ is shown on the grid.



- (d) Find an estimate for the gradient of the curve at the point where $x = -0.5$.
Show your working clearly.

.....
(3)

(Total for Question 18 is 9 marks)

