



# EXAM PAPERS PRACTICE

GCSE OCR Math J560

Estimating Areas &  
Gradients of Graphs

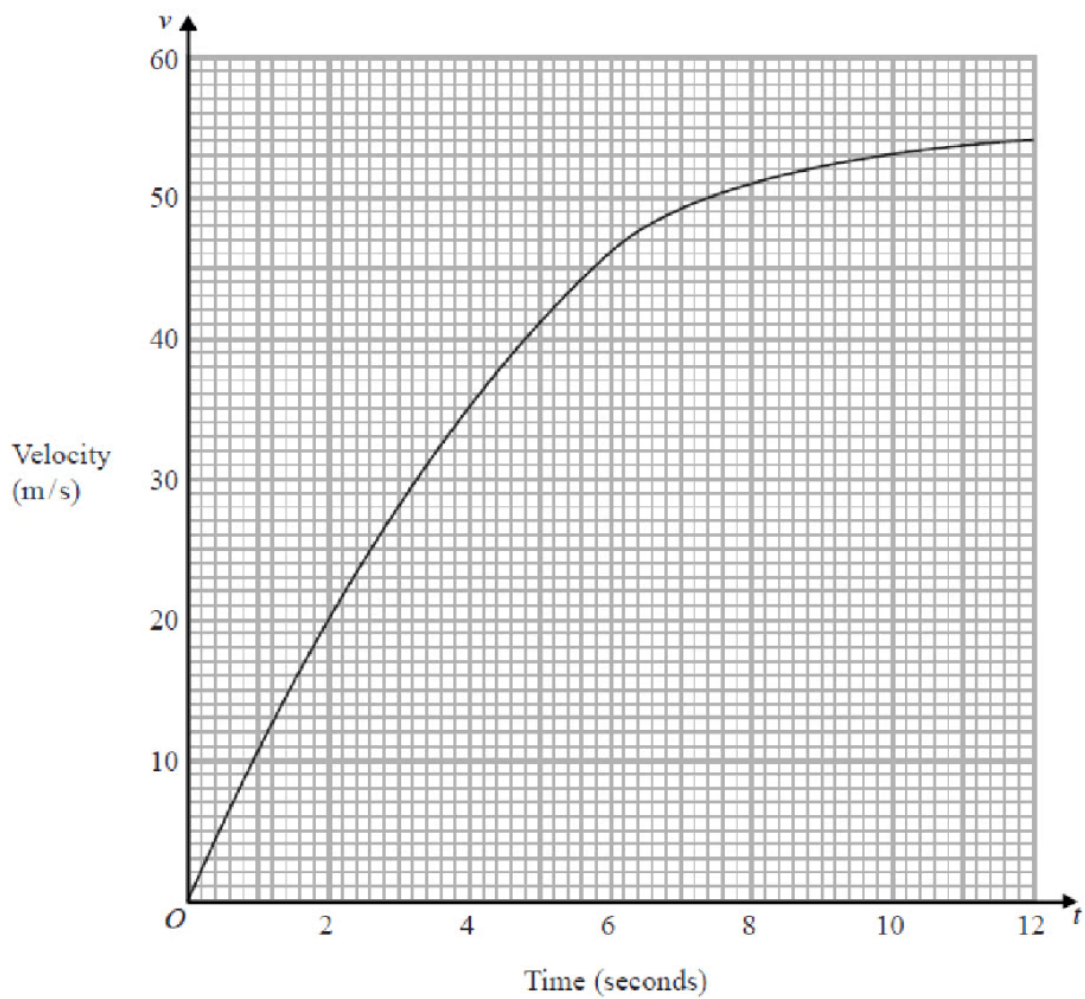
Question Paper

*"We will help you to  
achieve A Star "*



**Question 1**

The graph shows information about the velocity of a parachutist after jumping from a plane.



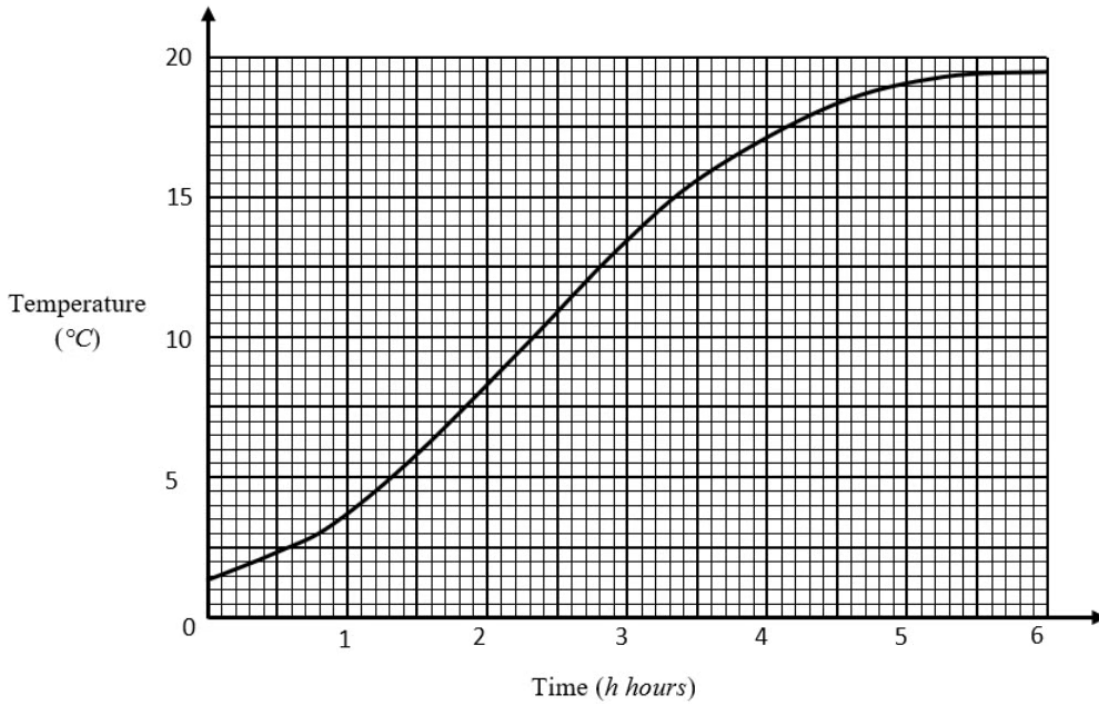
- (a) By drawing a suitable tangent, find an estimate of the gradient of the curve after 3 seconds.

[2 marks]



**Question 2**

The graph shows the temperature of a fish tank over the first 6 hours after a heater is added.



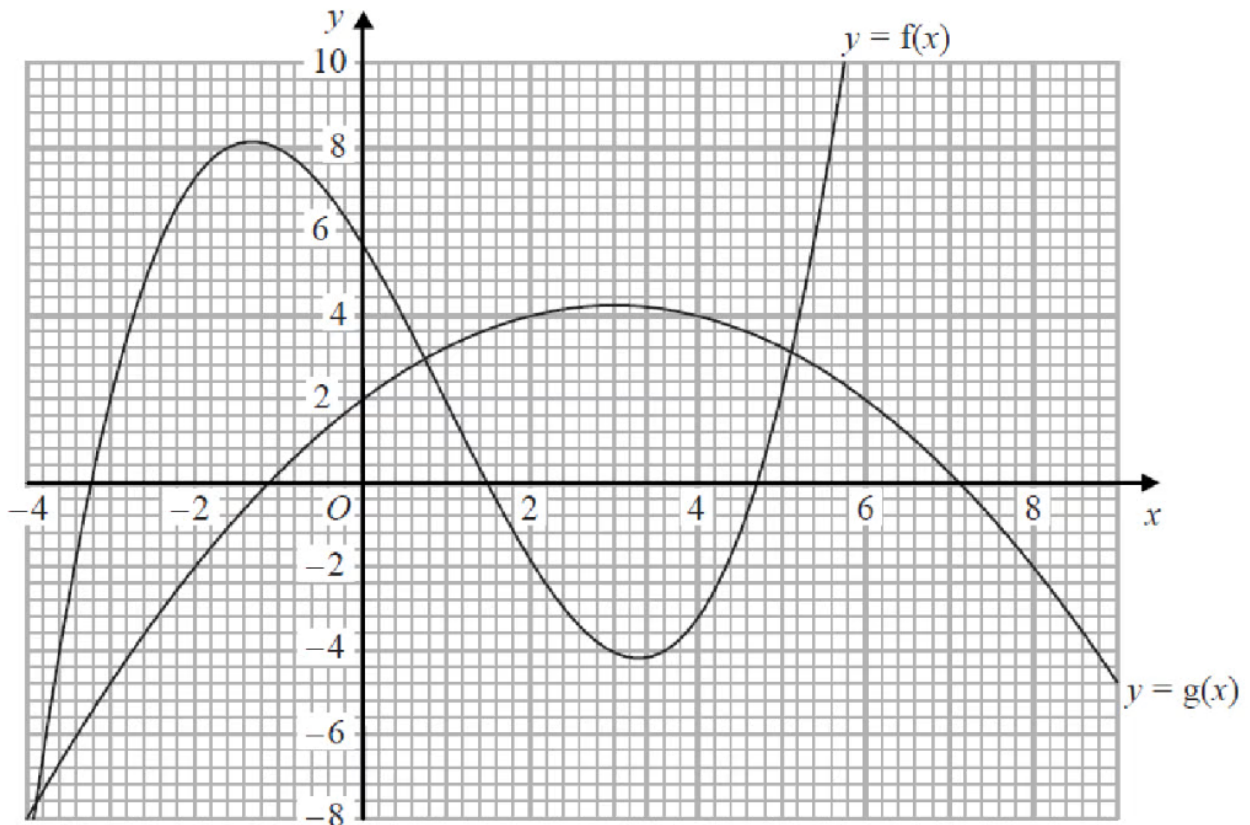
- (a) By drawing a suitable tangent, find an estimate of the gradient of the curve when  $h = 3$ .

[2 marks]



**Question 3**

The diagram shows parts of the graphs of  $y = f(x)$  and  $y = g(x)$ .



- (a) Write down the value of  $x$  where the gradient of the curve  $y = g(x)$  is zero.

[1 mark]



**Question 4**

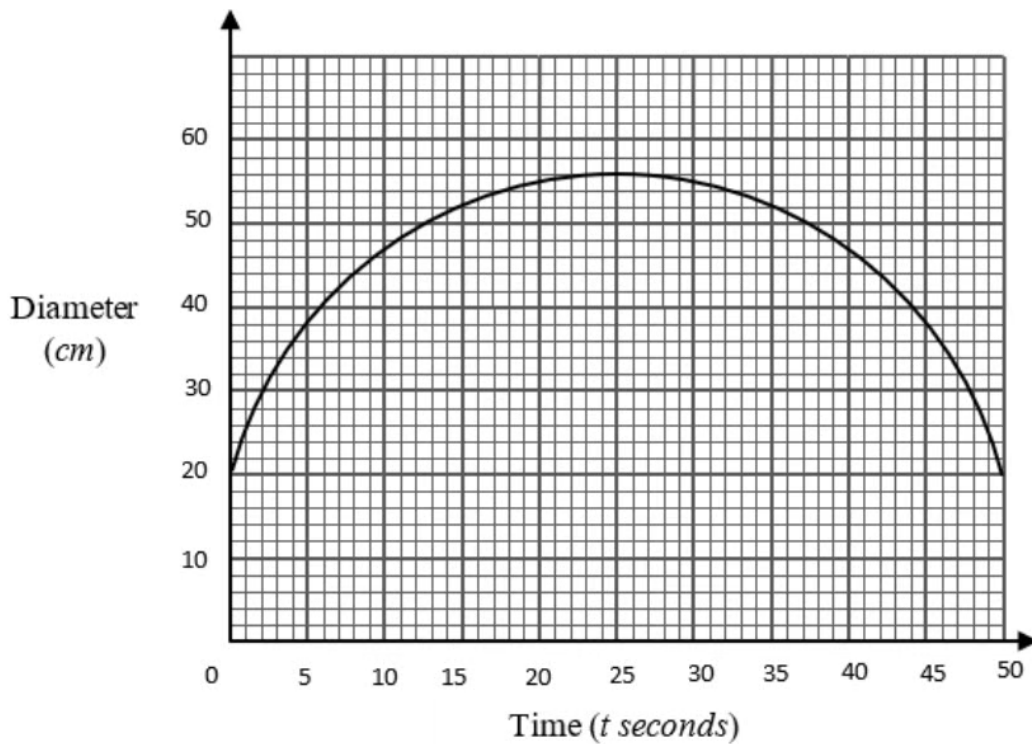
- (b) Calculate an estimate for the gradient of the curve  $y = f(x)$  at the point on the curve where  $x = 4$ .

**[2 marks]**

**Question 5**

A fish bowl is being filled with water.

The graph shows how the diameter of the surface of the water changes with time.



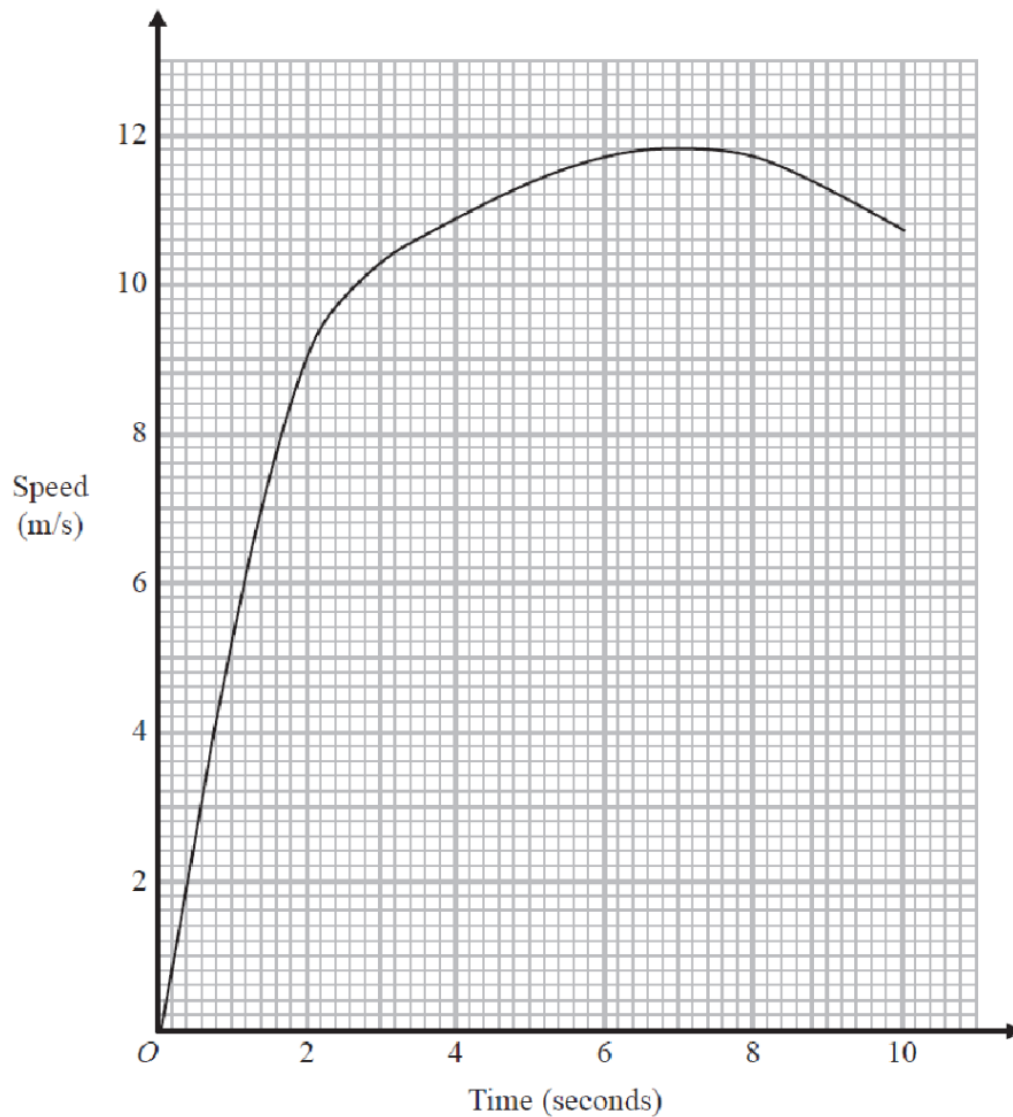
- (a) Find an estimate for the gradient at  $t = 10$ .

[2 marks]

**Question 6**

Olympic medallist Usain runs in a race.

The graph shows his speed, in metres per second (m/s), during the first 10 seconds of the race.



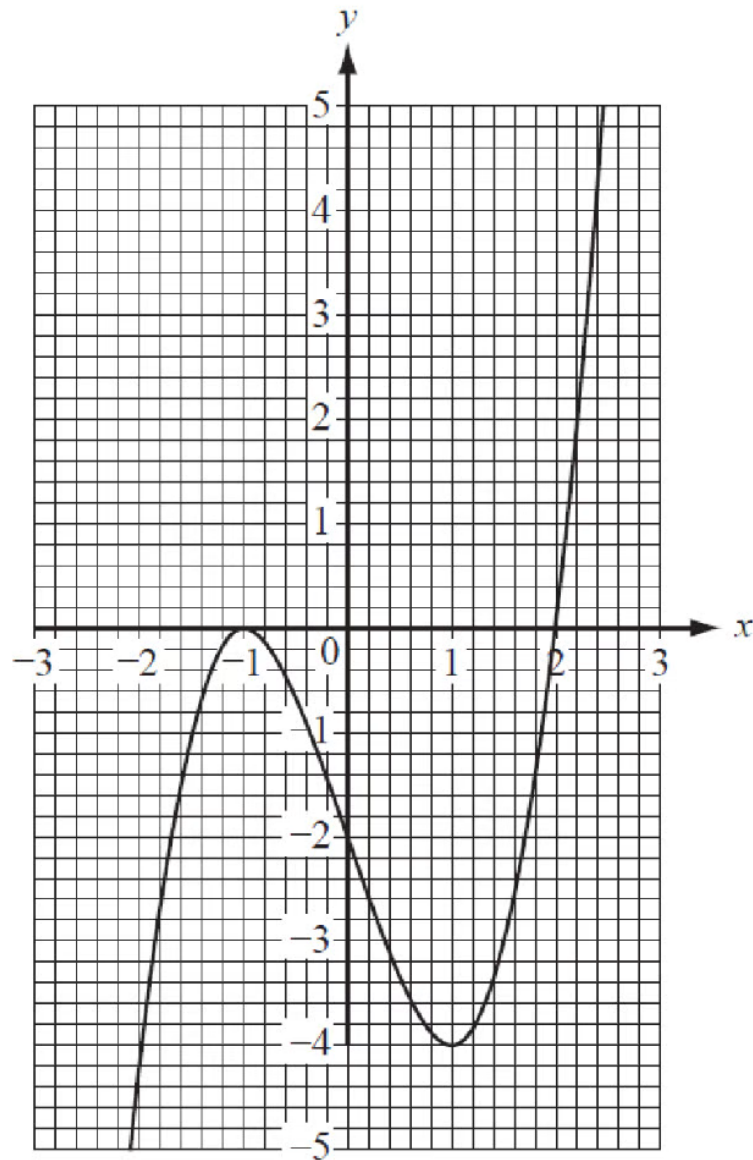
- (a) Use the graph to find how long it took Usain to reach his top speed.

[1 mark]



**Question 7**

The curve  $y = x^3 - 3x - 2$  is shown on the grid.



- (a) Write down the co-ordinates of the points where the gradient of the curve is zero.

[2 marks]





**Question 8**

(b) Write down the range of values of  $x$  when the gradient of the curve is negative.

[1 mark]

**Question 9**

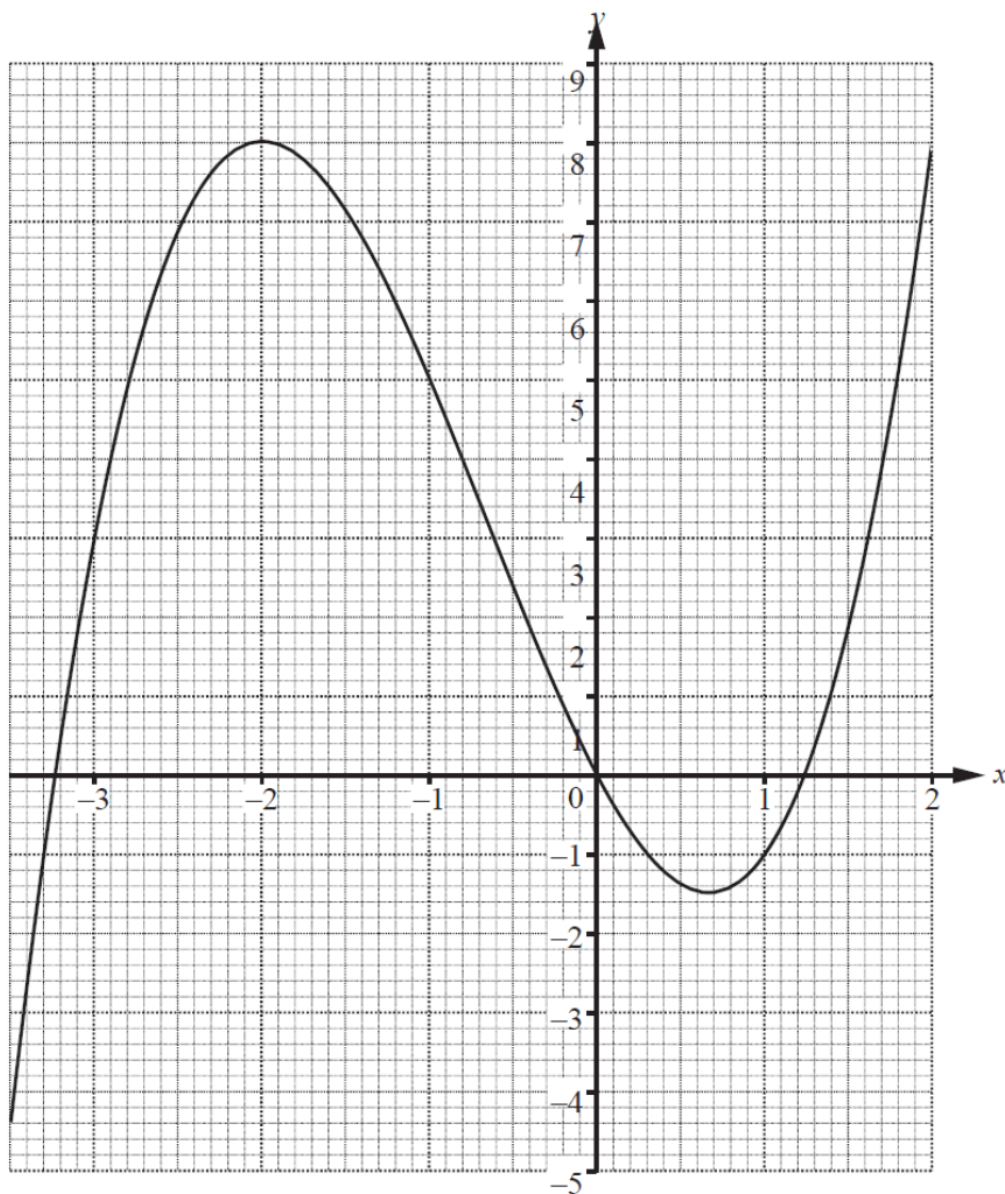
(c) Find an estimate of the gradient of the curve when  $x = 2$ .

[2 marks]



**Question 10**

The curve  $y = x^3 + 2x^2 - 4x$  is shown on the grid.



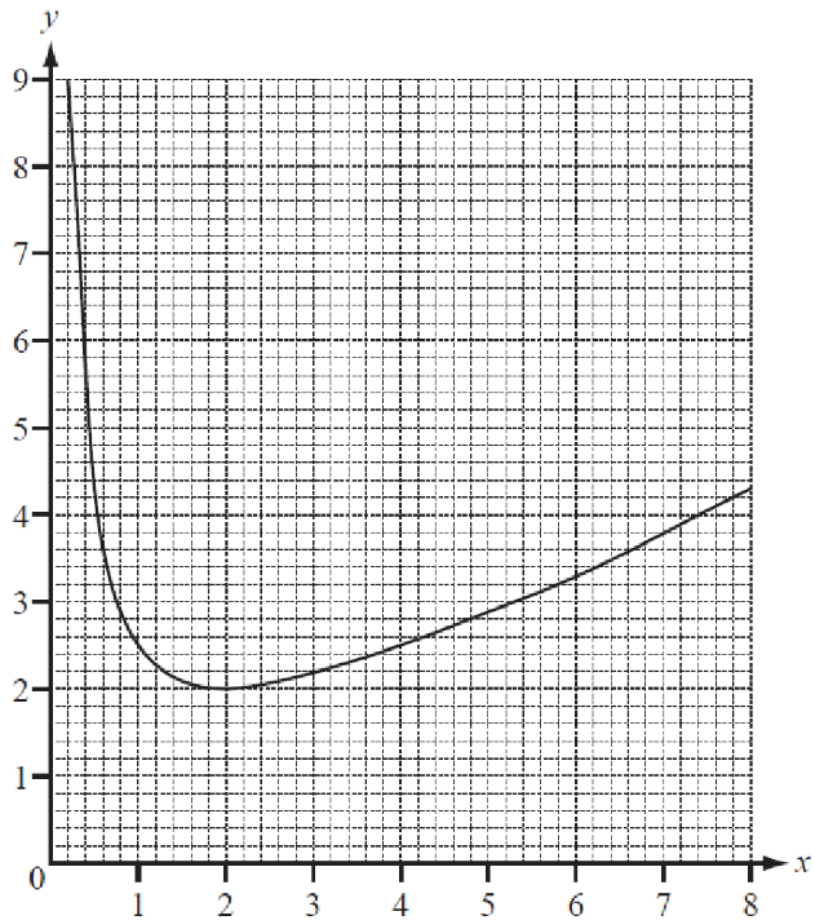
- (a) By drawing a suitable tangent, find an estimate of the gradient of the curve when  $x = 1$ .

[2 marks]



**Question 11**

The diagram shows the graph of  $y = \frac{x}{2} + \frac{2}{x}$  for  $0 < x \leq 8$ .



- (a) Use the graph to solve the equation  $\frac{x}{2} + \frac{2}{x} = 3$ .

[2 marks]

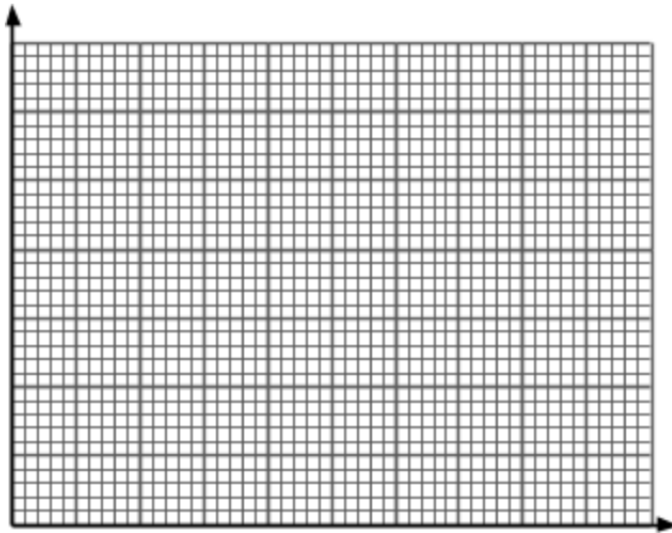


**Question 12**

Clare emptied a tank and recorded the depth of water each minute.

Time ( $t$ minutes)	0	1	2	3	4	5	6	7	8	9	10
Depth ( $m$ metres)	30	29.5	29	28	27	26	24.5	22.5	19.5	15	9

- (a) Plot the graph of depth against time.

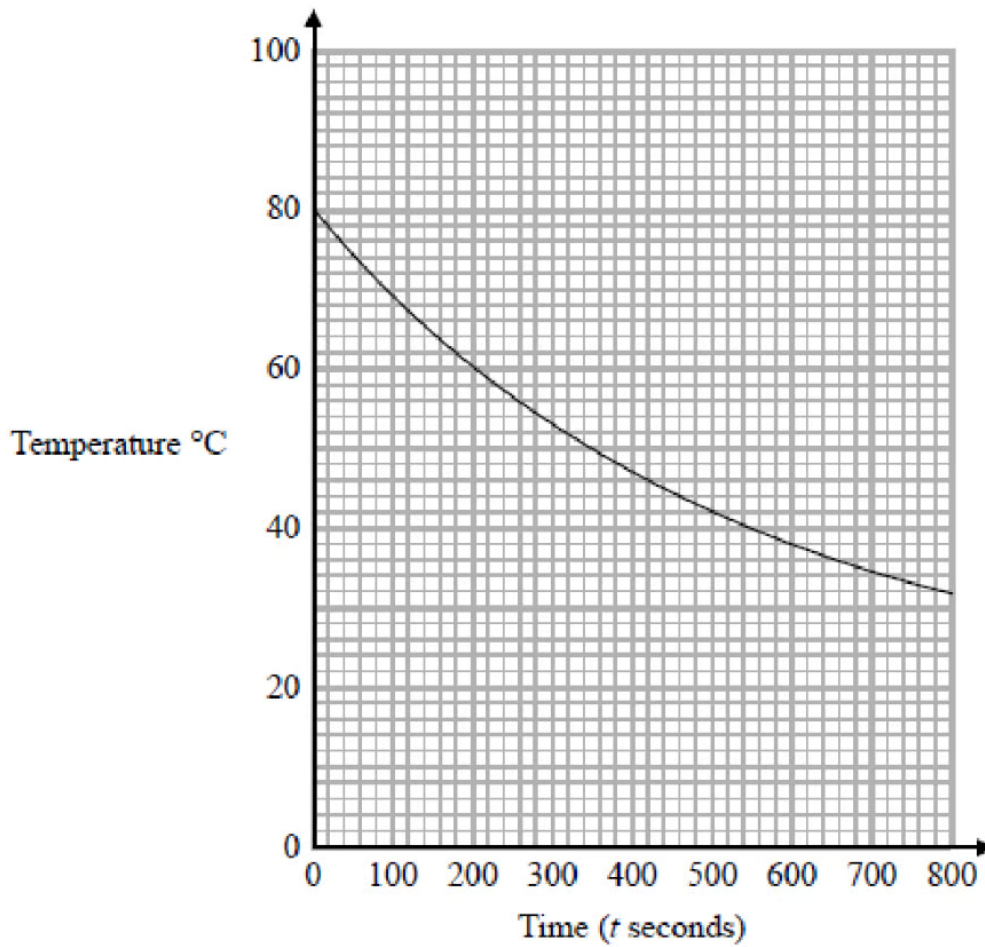


[2 marks]



**Question 13**

The graph gives information about the variation in the temperature of an amount of water that is left to cool from 80 °C.



- (a) Work out an estimate for the rate of decrease of temperature at  $t = 300$ .

[2 marks]



**Question 14**

- (b) Work out the average rate of decrease of the temperature of the water between  $t = 0$  and  $t = 800$ .

[2 marks]

**Question 15**

The instantaneous rate of decrease of the temperature of the water at time  $T$  seconds is equal to the average rate of decrease of the temperature of the water between  $t = 0$  and  $t = 800$ .

- (c) Find an estimate for the value of  $T$ .  
You must show how you got your answer.

[2 marks]