

GCSE Mathematics

H

Area Under a Graph & Rate of Change

Higher Tier | Grades 8-9

Total Marks	Time	Questions
40	40 min	20

Instructions:

- Do not use a calculator when you see: 
- Answer all questions in the spaces provided.
- Show all your working - marks are awarded for method as well as final answers.
- Cross through any work you do not want to be marked.
- Check your answers if you have time at the end.

© Teachably. This resource may not be copied or distributed without permission.

Want help from an expert maths tutor?

Book a free GCSE Maths consultation with our team at Teachably. Visit teachably.co.uk/book-call to get started.

Edexcel-style questions

Q1 

Grade 8Edexcel style

The table shows the speed, v (m/s), of a cyclist at time t (seconds). Use the trapezium rule with 4 strips to estimate the total distance travelled between $t = 0$ and $t = 8$.

t	0	2	4	6	8
v	0	3	5	4	2

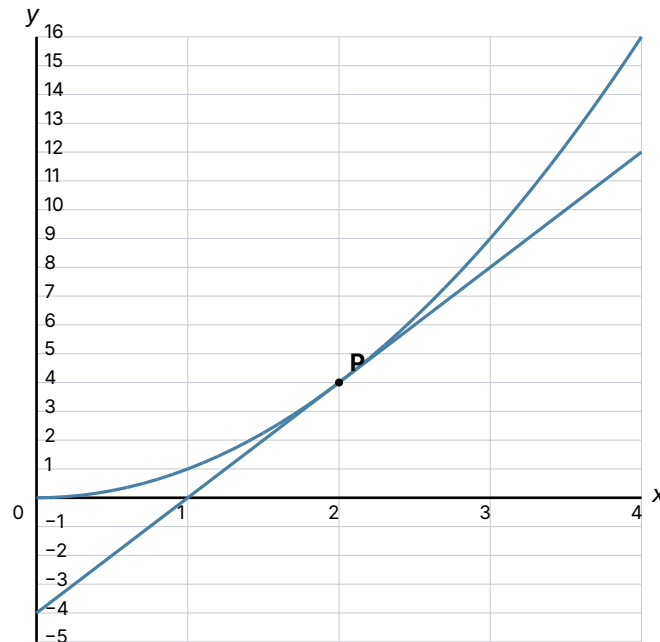
Answer _____

Q2

Grade 8

Edexcel style

The graph shows a curve with point P marked on it. The tangent to the curve at P passes through the points (1, 0) and (4, 12). Estimate the gradient of the curve at P.



Answer _____

teachably

[2 marks]

Q3

Grade 8

Edexcel style

A graph shows the speed of a cyclist, v (m/s), against time, t (seconds). State what the area between the graph and the t -axis represents, including its units.

Answer _____

teachably

[2 marks]

Q4

Grade 9

Edexcel style

A graph shows the volume of water in a tank, V (litres), against time, t (minutes), as the tank is filled. State what the gradient of the graph represents, including its units.

Answer _____

teachably

[2 marks]**Q5**

Grade 9

Edexcel style

A distance-time graph shows the journey of a rollercoaster. The gradient of the graph at point A is 2 m/s. At a later point B, the gradient is 7 m/s. State whether the speed is increasing or decreasing between A and B.

Answer _____

teachably

[2 marks]

AQA-style questions

Q6



Grade 8AQA style

The table shows the speed, v (km/h), of a train at time t (hours). Use the trapezium rule with 4 strips to estimate the total distance travelled between $t = 0$ and $t = 12$.

t	0	3	6	9	12
v	2	6	8	6	2

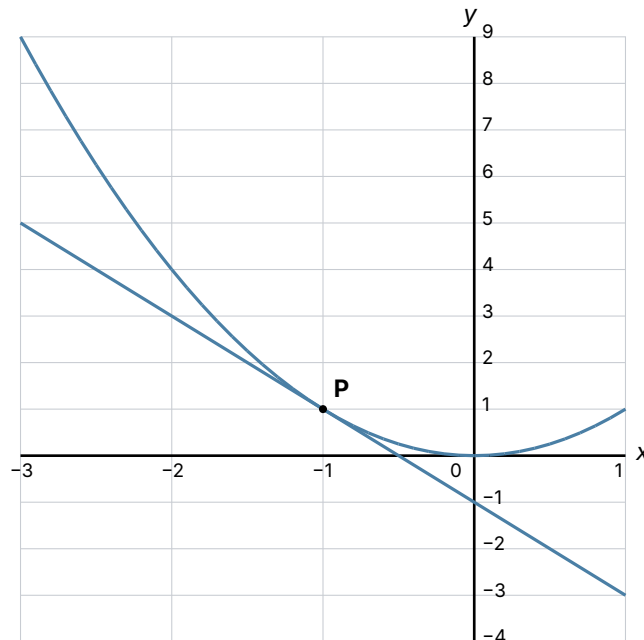
Answer _____

Q7

Grade 8

AQA style

The graph shows a curve with point P marked on it. The tangent to the curve at P passes through the points $(-3, 5)$ and $(1, -3)$. Estimate the gradient of the curve at P.



Answer _____

teachably

[2 marks]

Q8

Grade 8

AQA style

A graph shows the speed of a train, v (km/h), against time, t (hours). State what the area between the graph and the t -axis represents, including its units.

Answer _____

teachably

[2 marks]

Q9

Grade 9

AQA style

A graph shows the velocity of a car, v (m/s), against time, t (seconds). State what the gradient of the graph represents, including its units.

Answer _____

teachably

[2 marks]

Q10

Grade 9

AQA style

A distance-time graph shows the journey of a delivery van. The gradient of the graph at point A is 5 m/s. At a later point B, the gradient is 1 m/s. State whether the speed is increasing or decreasing between A and B.

Answer _____

teachably

[2 marks]

OCR-style questions

Q11 

Grade 8OCR style

The table shows the speed, v (mph), of a car at time t (hours). Use the trapezium rule with 4 strips to estimate the total distance travelled between $t = 0$ and $t = 16$.

t	0	4	8	12	16
v	0	5	8	5	0

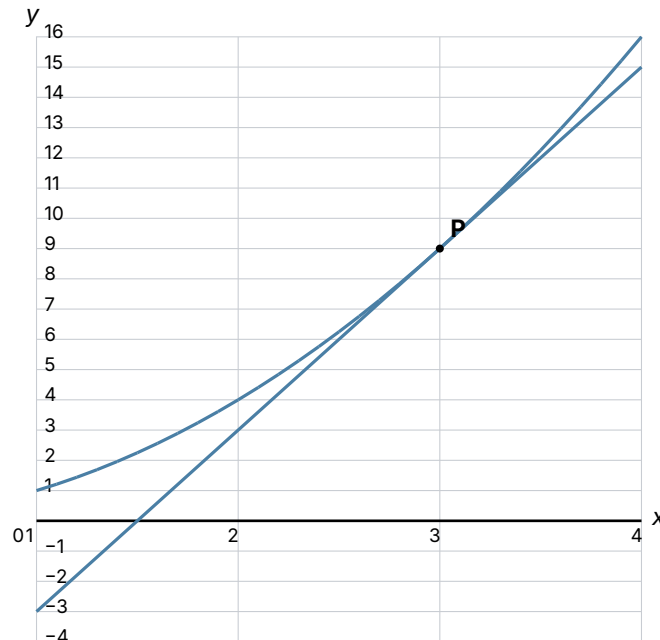
Answer _____

Q12

Grade 8

OCR style

The graph shows a curve with point P marked on it. The tangent to the curve at P passes through the points (1, -3) and (4, 15). Estimate the gradient of the curve at P.



Answer _____

teachably

[2 marks]

Q13

Grade 8

OCR style

A graph shows the speed of a car, v (mph), against time, t (hours). State what the area between the graph and the t -axis represents, including its units.

Answer _____

teachably

[2 marks]

Q14

Grade 9

OCR style

A graph shows the temperature of a liquid, T ($^{\circ}\text{C}$), against time, t (minutes), as it cools. State what the gradient of the graph represents, including its units.

Answer _____

teachably

[2 marks]**Q15**

Grade 9

OCR style

A volume-time graph shows water filling a tank. The gradient of the graph at point A is 4 litres/min. At a later point B, the gradient is 9 litres/min. State whether the flow rate is increasing or decreasing between A and B.

Answer _____

teachably

[2 marks]

Teachably-style questions

Q16



Grade 8

Teachably style

The table shows the rate, r (litres/min), at which water flows into a tank at time t (minutes). Use the trapezium rule with 4 strips to estimate the total volume of water that flows in between $t = 0$ and $t = 4$.

t	0	1	2	3	4
r	1	3	4	3	1

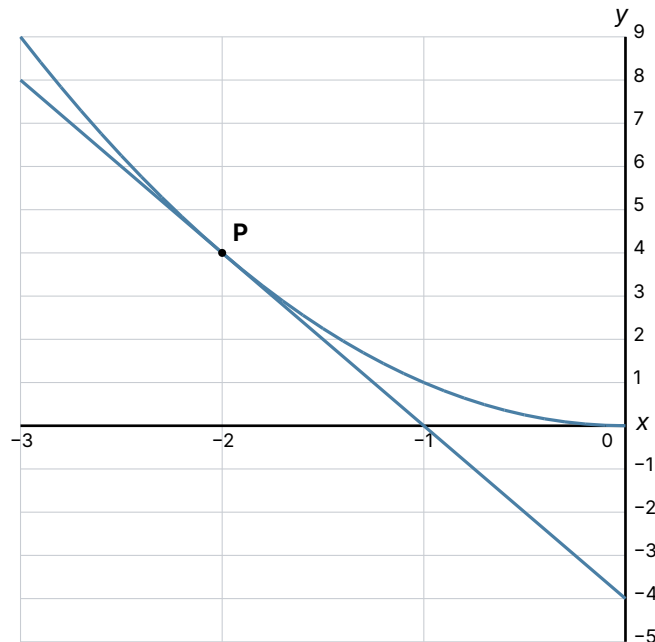
Answer _____

Q17

Grade 8

Teachably style

The graph shows a curve with point P marked on it. The tangent to the curve at P passes through the points $(-3, 8)$ and $(0, -4)$. Estimate the gradient of the curve at P.



Answer _____

teachably

[2 marks]

Q18

Grade 8

Teachably style

A graph shows the rate at which water leaves a tank, r (litres per minute), against time, t (minutes). State what the area between the graph and the t -axis represents, including its units.

Answer _____

teachably

[2 marks]

Q19

Grade 9

Teachably style

A graph shows the distance travelled by a runner, s (metres), against time, t (seconds). State what the gradient of the graph represents, including its units.

Answer _____

teachably

[2 marks]

Q20

Grade 9

Teachably style

A distance-time graph shows the journey of a cyclist. The gradient of the graph at point A is 10 m/s. At a later point B, the gradient is 3 m/s. State whether the speed is increasing or decreasing between A and B.

Answer _____

teachably

[2 marks]

END OF PAPER**Want help from an expert maths tutor?**

Book a free GCSE Maths consultation with our team at Teachably. Visit teachably.co.uk/book-call to get started.