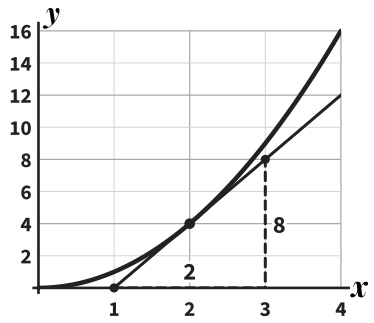
Gradient of a curve

ANSWERS

1

The tangent at $x = 2$ is drawn.
Find the gradient of the curve at $x = 2$.

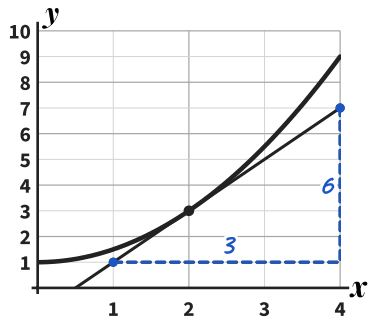


$8 \div 2 =$ 4

Answer 4

2

The tangent at $x = 2$ is drawn.
Find the gradient of the curve at $x = 2$.

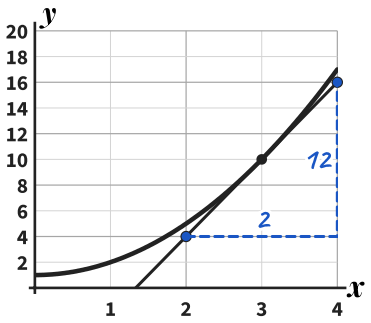


$6 \div 3 = 2$

Answer 2

3

The tangent at $x = 3$ is drawn.
Find the gradient of the curve at $x = 3$.

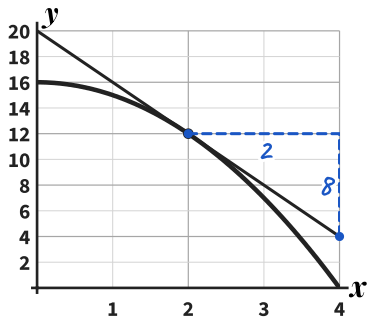


$12 \div 2 = 6$

Answer 6

4 *Notice the change!*

The tangent at $x = 2$ is drawn.
Find the gradient of the curve at $x = 2$.

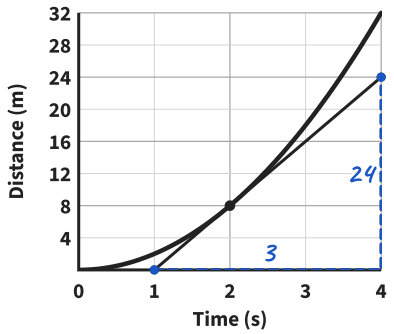


$-8 \div 2 = -4$

Answer −4

5

The tangent at 2 seconds is drawn.
Find the speed at 2 seconds.

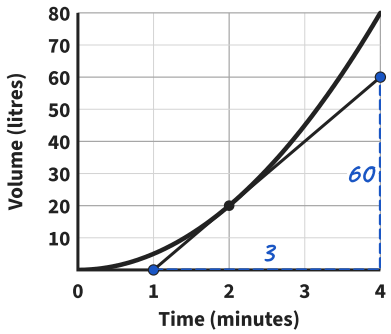


$24 \div 3 = 8$

Speed 8 m/s

6

Water fills a tank. Find how fast it is filling at 2 minutes.

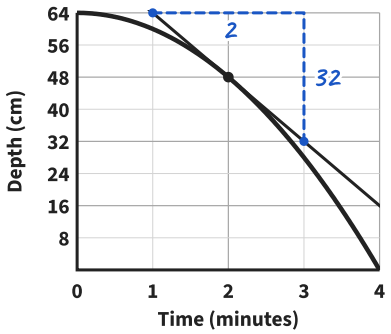


$60 \div 3 = 20$

Answer 20 litres per minute

7

A sink empties. Find how fast the depth is falling at 2 minutes.

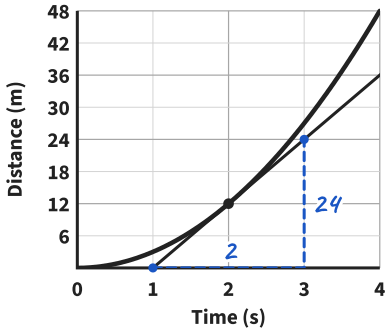


down 32, across 2: $32 \div 2$

Answer 16 cm per minute

8

Sam says the speed at 2 seconds is $12 \div 2 = 6$ m/s. Explain his mistake and find the speed.



the point, not the tangent: $24 \div 2$

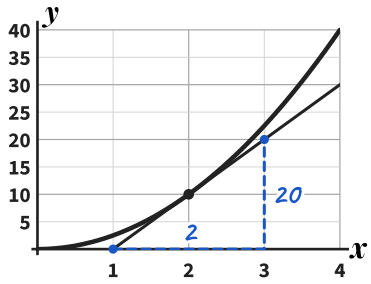
Speed 12 m/s

Gradient of a curve *further practice*

ANSWERS

9

The tangent at $x = 2$ is drawn.
Find the gradient of the curve at $x = 2$.



20 ÷ 2

Gradient 10

10

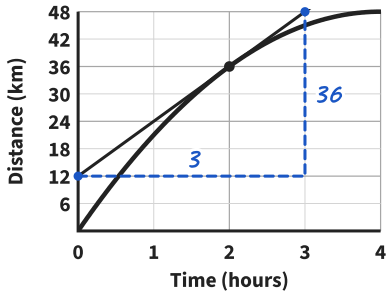
A tangent to a curve goes through (1, 4) and (4, 19). Find the gradient of the curve where the tangent touches it.

up 15, across 3: 15 ÷ 3

Gradient 5

11

A cyclist slows down. Find her speed at 2 hours.

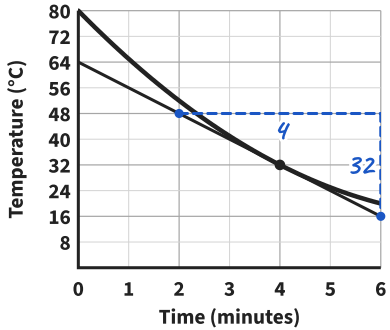


36 ÷ 3

Speed 12 km/h

12

A cup of tea cools. Find how fast its temperature is falling at 4 minutes.

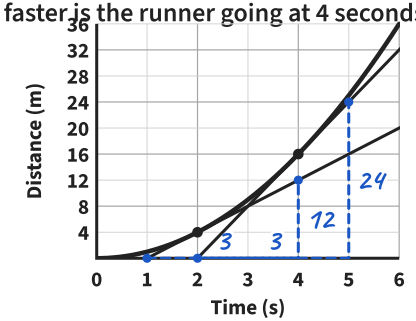


down 32, across 4

Answer 8 °C per minute

13

The tangents at 2 seconds and 4 seconds are drawn. How many times faster is the runner going at 4 seconds?



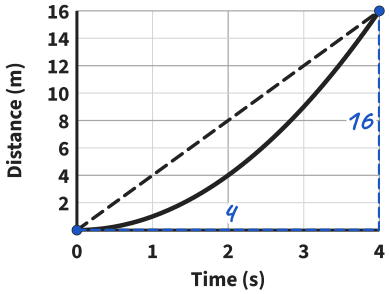
2 s: 12 ÷ 3 = 4 m/s

4 s: 24 ÷ 3 = 8 m/s

Answer 2 times

14

The dashed line joins the points at 0 and 4 seconds. Find the average speed over the 4 seconds.



16 ÷ 4

Speed 4 m/s

15

The tangent to a distance time graph at 5 seconds is horizontal. What is the speed at 5 seconds?
What is happening?

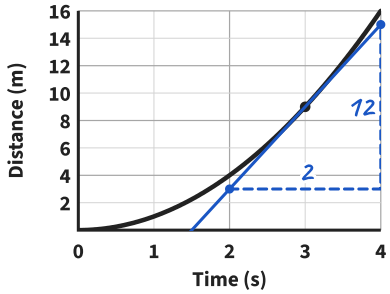
the gradient is 0: up 0

it is not moving at that moment

Speed 0 m/s

16

Draw the tangent at 3 seconds.
Use it to estimate the speed at 3 seconds.



12 ÷ 2

Speed 6 m/s (5 to 7)