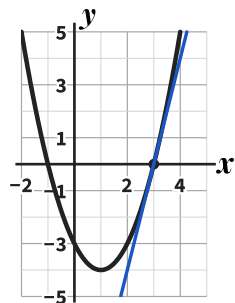


Gradient of a Curve *extend*

ANSWERS

1

Draw the tangent to $y = x^2 - 2x - 3$ at $(3, 0)$. Estimate its gradient and equation.



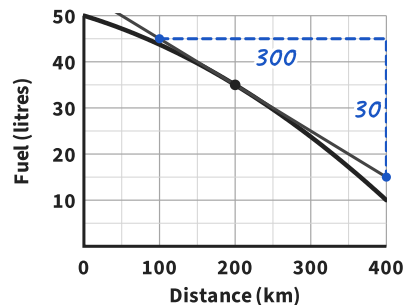
$(3, 0)$: gradient 3.5 to 4.5, $0 = 12 + C$

about 4, $y \approx 4x - 12$

Answer

2

The fuel in a car's tank is shown. How many km per litre is it doing after 200 km?



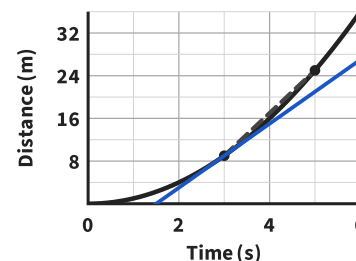
$30 \div 300 = 0.1$ litres per km, $1 \div 0.1$

10 km per litre

Answer

3

Leo uses the dashed chord to estimate the speed at 3 s. Find his estimate. Is it too big or too small? Explain.



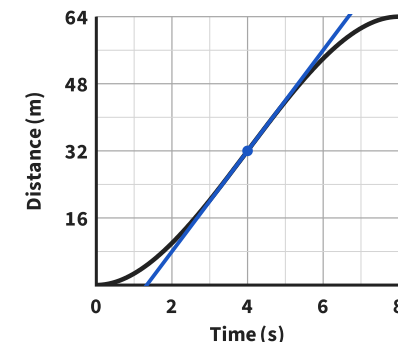
$(25 - 9) \div 2 = 8$, steeper than at 3 s

8 m/s, too big

Answer

4

Estimate the car's greatest speed, and when it happens.



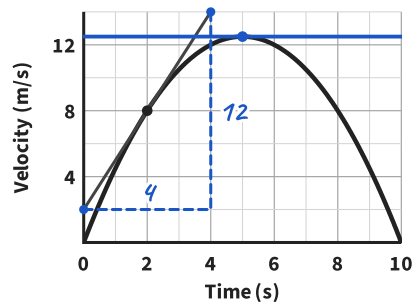
4 s (3.5 to 4.5), 10 to 14 m/s

about 12 m/s at 4 s

Answer

5

Find the acceleration at 2 seconds. When is the acceleration zero, and what is the velocity then?



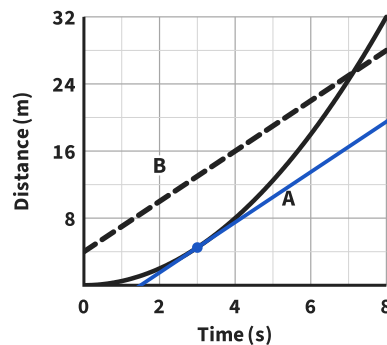
$12 \div 4 = 3$, flat tangent at the top

3 m/s^2 ; at 5 s, 12.5 m/s

Answer

6

When are runners A and B running at the same speed?



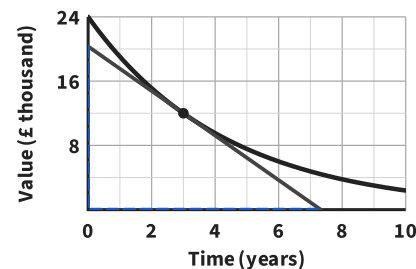
A's tangent parallel to B (2.5 to 3.5 s)

about 3 s

Answer

7

Estimate how fast the car loses value at 3 years. Why does this rate fall?



about $20 \div 7$ (£2300 to £3200)

the curve gets less steep

about £2800 a year

Answer

8

Prove that the chord joining the points on $y = x^2$ where $x = a$ and $x = b$ has gradient $a + b$.

$$\frac{b^2 - a^2}{b - a} = \frac{(b - a)(b + a)}{b - a}$$

$$= a + b$$

$$a + b$$

Reason