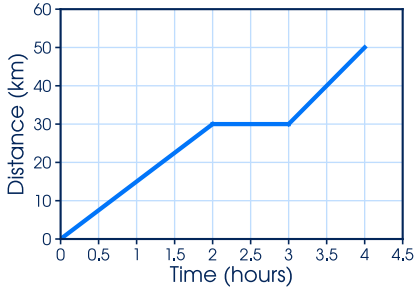
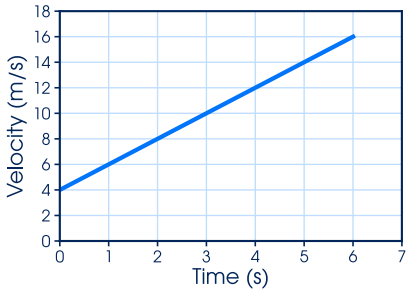
GCSE HIGHER · REVISION MAT 4

Gradients and areas under graphs

1 Find the speed between 3 and 4 hours.



2 Find the acceleration.

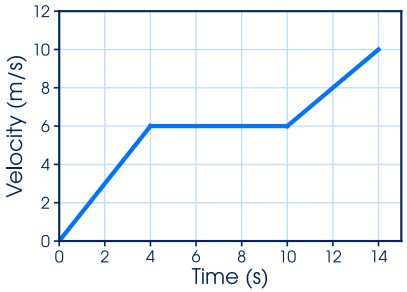


3 A velocity–time graph is horizontal at 9 m/s from $t = 5$ to $t = 12$.

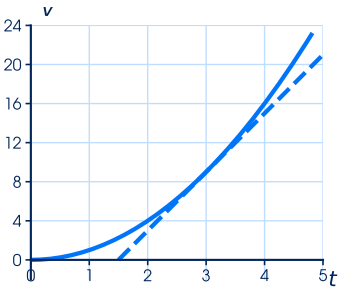
Ben says the object is stationary.

Explain why Ben is wrong.

4 Find the distance travelled in 14 seconds.



5 A tangent is drawn to $v = t^2$ at $t = 3$.



Show that the acceleration at $t = 3$ is about 6 m/s².

6 The table gives the velocity of a car.

t (s)	0	5	10	15	20
v (m/s)	0	8	12	14	15

Estimate the distance travelled in 20 s.

7 A ball moving at 30 m/s slows down at 2.5 m/s².

Show that it stops after 12 s, having travelled 180 m.

8 Car A travels at a constant 20 m/s.

Car B starts from rest beside it, accelerating at 2 m/s².

When has B travelled the same distance as A?

ANSWERS · REVISION MAT 4

Gradients and areas under graphs

1 20 km in 1 hour

20 km/h

2 $\frac{16 - 4}{6}$

2 m/s²

3 **It is moving at a constant 9 m/s; zero acceleration, not zero speed.**

4 $12 + 36 + \frac{1}{2}(6 + 10) \times 4$

80 m

5 Tangent through (1.5, 0) and (5, 21)

$\frac{21}{3.5} = 6$

6 $5 \times (\frac{1}{2}(0 + 15) + 8 + 12 + 14)$

≈ 207.5 m

7 $\frac{30}{2.5} = 12$ s

$\frac{1}{2} \times 12 \times 30$

= 180 m

8 A: $20t$, B: $\frac{1}{2} \times 2 \times t^2 = t^2$

$t^2 = 20t$

t = 20 s