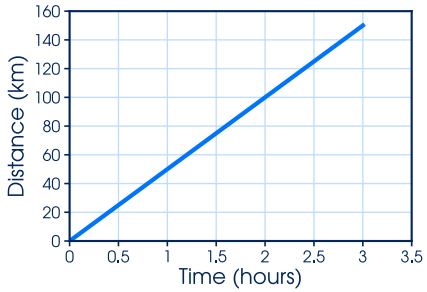
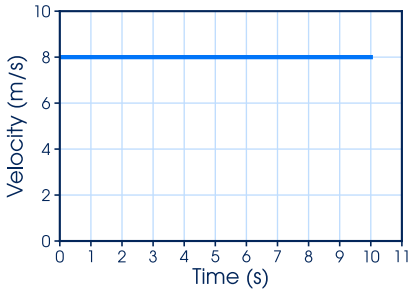
GCSE HIGHER · REVISION MAT 3

Gradients and areas under graphs

1 Find the speed.

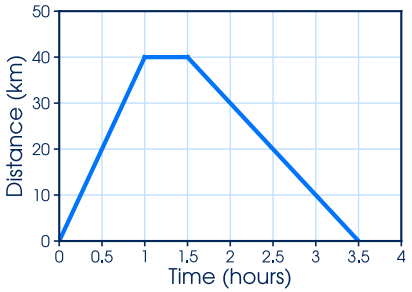


2 Find the distance travelled in 10 s.



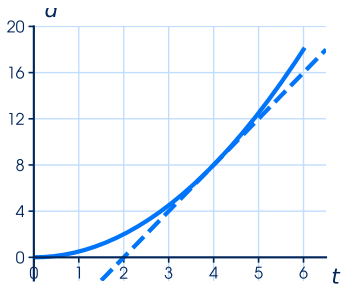
3 Explain what a negative gradient on a distance–time graph shows.

4 Find the average speed for the whole journey.



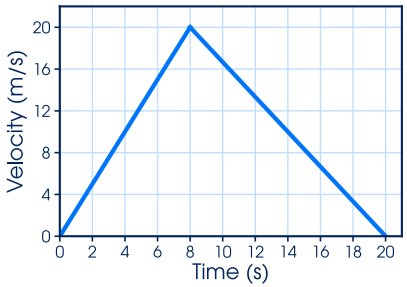
5 A tangent is drawn to

$$d = \frac{1}{2}t^2 \text{ at } t = 4$$



Show that the gradient at $t = 4$ is about 4.

6 Find the total distance and the average speed.



7 Explain why the area under a velocity–time graph gives the distance travelled.

8 The table gives the velocity of a particle.

t (s)	0	1	2	3
v (m/s)	12	6	4	3

Estimate the distance in 3 s.

Is this an over- or underestimate?

ANSWERS · REVISION MAT 3

Gradients and areas under graphs

1 $\frac{150}{3}$

50 km/h

2 8×10

80 m

3 **The object is moving back towards its starting point.**

4 Total distance 80 km

Total time 3.5 h

≈ 22.9 km/h

5 Tangent through (2, 0) and (6, 16)

$\frac{16}{4} = 4$

6 Area $= \frac{1}{2} \times 20 \times 20 = 200$ m

200 m; average speed 10 m/s

7 Area = velocity × time

m/s × s = m

Velocity × time = distance

8 $\frac{1}{2}(12 + 3) + 6 + 4 = 17.5$

≈ 17.5 m, an overestimate (the curve bends below the chords)

Mr&Mrs MATHS