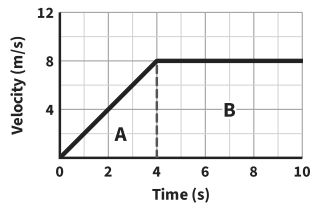


Area Under a Graph

ANSWERS

1 area under the graph = distance

Find the distance travelled.

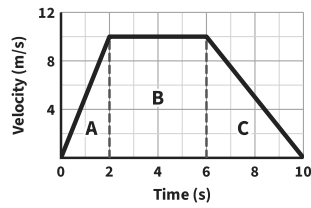


$$A = \frac{1}{2} \times 4 \times 8 = 16$$

$$B = 6 \times 8 = 48$$

Distance 64 m

2 Find the distance travelled.



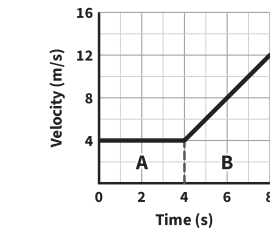
$$A = \frac{1}{2} \times 2 \times 10 = 10$$

$$B = 4 \times 10 = 40$$

$$C = \frac{1}{2} \times 4 \times 10 = 20$$

Distance 70 m

3 Find the distance travelled.

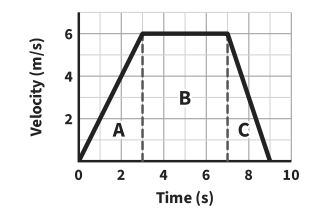


$$A = 4 \times 4 = 16$$

$$B = \frac{1}{2} \times (4 + 12) \times 4 = 32$$

Distance 48 m

4 Find the distance travelled.



$$A = \frac{1}{2} \times 3 \times 6 = 9$$

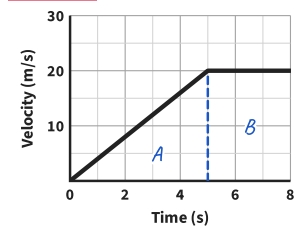
$$B = 4 \times 6 = 24$$

$$C = \frac{1}{2} \times 2 \times 6 = 6$$

Distance 39 m

5 Notice the change!

Find the distance travelled. Split the area into shapes first.

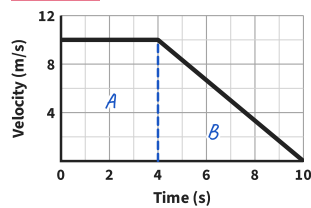


$$A = \frac{1}{2} \times 5 \times 20 = 50$$

$$B = 3 \times 20 = 60$$

Distance 110 m

6 Find the distance travelled. Split the area into shapes first.

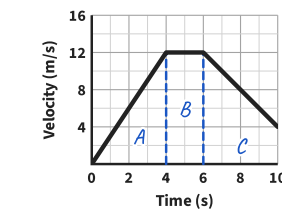


$$A = 4 \times 10 = 40$$

$$B = \frac{1}{2} \times 6 \times 10 = 30$$

Distance 70 m

7 Find the distance travelled.



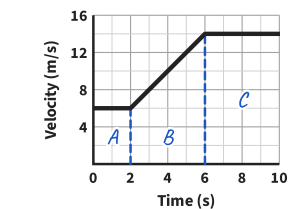
$$\frac{1}{2} \times 4 \times 12 = 24$$

$$2 \times 12 = 24$$

$$\frac{1}{2} \times (12 + 4) \times 4 = 32$$

Distance 80 m

8 Find the distance travelled.



$$2 \times 6 = 12$$

$$\frac{1}{2} \times (6 + 14) \times 4 = 40$$

$$4 \times 14 = 56$$

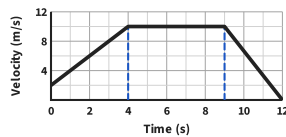
Distance 108 m

Area Under a Graph further practice

ANSWERS

9

Find the distance travelled.



$$\frac{1}{2} \times (2 + 10) \times 4 = 24, \quad 5 \times 10 = 50$$

$$\frac{1}{2} \times 3 \times 10 = 15$$

Answer 89 m

10

A cyclist speeds up steadily from rest to 8 m/s in 5 seconds. She rides at 8 m/s for 20 seconds, then slows down steadily and stops 4 seconds later. How far does she travel?

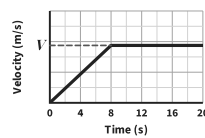
$$\frac{1}{2} \times 5 \times 8 + 20 \times 8 + \frac{1}{2} \times 4 \times 8$$

$$20 + 160 + 16 = 196$$

Answer 196 m

11

A runner travels 120 m in 20 seconds. Find her top speed, V m/s.



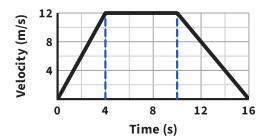
$$\frac{1}{2} \times 8 \times V + 12 \times V = 16V = 120$$

$$V = 7.5$$

Answer

12

The graph shows a scooter's journey. Find its average speed for the whole journey.



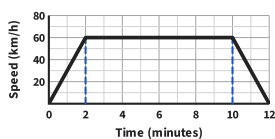
$$\text{distance } 24 + 72 + 36 = 132 \text{ m}$$

$$132 \div 16 = 8.25$$

Answer 8.25 m/s

13

The graph shows a train's journey between two stations. How far apart are the stations? Give your answer in km.



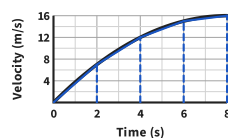
$$60 + 480 + 60 = 600$$

$$\text{minutes to hours: } 600 \div 60 = 10$$

Answer 10 km

14

Estimate the distance travelled in the first 8 seconds. Split the area into 4 strips of equal width.



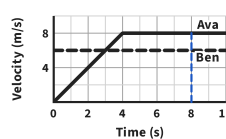
$$\text{heights } 0, 7, 12, 15 \text{ and } 16$$

$$7 + 19 + 27 + 31 = 84$$

Answer 84 m

15

Ava and Ben start a race together. The graph shows their speeds. How long does it take Ava to catch up with Ben?



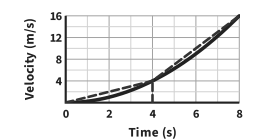
$$\text{after } t \text{ s: } \text{Ava } 16 + 8(t - 4), \text{ Ben } 6t$$

$$8t - 16 = 6t, \text{ so } t = 8$$

Answer 8 s

16

Lena estimates the distance travelled in 8 seconds with the two trapezia shown. Is her estimate too big or too small? Explain.



$$\text{the curve is below the straight tops,}$$

$$\text{so the trapezia hold extra area}$$

Answer too big