Topic: Distance, rate and time

Question: If Sam traveled at a speed of 25 mph for 3 hours, how far did Sam travel?

Answer choices:

A   75 mi

B   100 mi

C   25 mi

D   50 mi

Solution: A

We'll use the formula for distance.

$$\text{Distance} = \text{Rate} \times \text{Time}$$

$$D = RT$$

Sam's rate is 25 mph, and his time is 3 hours. Therefore,

$$\text{Distance} = 25 \, \frac{\text{miles}}{\text{hour}} \times 3 \text{ hours}$$

$$\text{Distance} = \frac{25 \cdot 3 \text{ miles} \cdot \text{hour}}{\text{hour}}$$

$$\text{Distance} = \frac{75 \text{ miles} \cdot \text{hour}}{\text{hour}}$$

$$\text{Distance} = 75 \text{ miles}$$

Topic: Distance, rate and time

Question: Joe and Henry were 80 miles apart. Henry started walking toward Joe at a rate of 4 mph at 8 a.m. Joe left 2 hours later, and they met at 4 p.m. How fast did Joe walk?

Answer choices:

A   Joe walked at a speed of 6 mph

B   Joe walked at a speed of 7 mph

C   Joe walked at a speed of 8 mph

D   Joe walked at a speed of 9 mph

Solution: C

We've been given information about distance, rate, and time, so we'll use the formula

$$\text{Distance} = \text{Rate} \times \text{Time}$$

$$D = RT$$

where D is the distance traveled, R is the rate, and T is the time. We can use subscripts to create unique equations for Joe and Henry; we'll use J for Joe and H for Henry.

Joe: $D_J = R_J T_J$

Henry: $D_H = R_H T_H$

We know that, in order to meet each other, they must have covered a distance of 80 miles between them. Therefore,

$$D_J + D_H = 80$$

Since we know that $D_J = R_J T_J$ and $D_H = R_H T_H$, we can substitute the known quantities (Henry's rate and time, and Joe's time) into the following equation:

$$R_J T_J + R_H T_H = 80$$

The problem tells us that Henry walked at a speed of 4 mph, and that he walked for 8 hours, since he walked from 8 a.m. until 4 p.m. So

$$R_J T_J + (4)(8) = 80$$

$$R_J T_J + 32 = 80$$

$$R_J T_J = 48$$

Joe left 2 hours after Henry, which means he started walking at 10 a.m., and he kept walking until they met at 4 p.m., which means he walked for 6 hours. So

$$R_J(6) = 48$$

$$R_J = 8$$

Which means that Joe walked at a speed of 8 mph.

Topic: Distance, rate and time

Question: Suppose a bullet travels at a speed of $1,000$ m/s for a distance of 8 m. In the same time period, how far would a bullet that's moving at a speed of 650 meters per second travel?

Answer choices:

A   4.6 m

B   4.8 m

C   5.0 m

D   5.2 m

Solution: D

We know that $D = RT$, which can be solved for T by dividing both sides of this equation by R:

$$T = \frac{D}{R}$$

Calculate the time for the first bullet.

$$T = \frac{8}{1,000} = 0.008 \text{ seconds}$$

Use $D = RT$ to find the distance traveled by the second bullet.

$$D = RT$$

$$D = 650 \cdot 0.008$$

$$D = 5.2 \text{ meters}$$