

What is Speed and Velocity?

Worksheet

Speed is the distance travelled per unit time, $v = d/t$ (a scalar). Velocity is the same idea but with direction, $v = x/t$ (a vector), measured in m/s.

$$v_{\text{avg}} = \frac{s}{t}$$

Questions

1. A car travels 240 km in 3 hours. What is its average speed?
A) 60 km/h
B) 80 km/h
C) 120 km/h
D) 720 km/h
2. Which quantity includes direction?
A) Speed
B) Distance
C) Velocity
D) Time
3. A jogger runs 100 m north then 100 m south in 40 s. Average velocity?
A) 5 m/s
B) 0 m/s
C) 2.5 m/s
D) 10 m/s
4. Speed is best described as a
A) Vector
B) Scalar
C) Force
D) Unit
5. A runner covers 400 m in 50 s. Find their average speed.
6. A car travels 180 km east in 2 hours. Find its velocity.
7. A cyclist moves at 5 m/s for 12 s. How far do they travel?
8. Define: What is speed?
9. Define: What is velocity?
10. Define: Can speed be constant while velocity changes?

Answer Key

1. B) $80 \text{ km/h} - v = d/t = 240/3 = 80 \text{ km/h}$.
2. C) Velocity - Velocity is a vector; speed is only magnitude.
3. B) 0 m/s - Net displacement is 0 m , so average velocity is 0 m/s (though average speed is not).
4. B) Scalar - Speed has magnitude only, no direction - a scalar.
5. $v = d/t$ $v = 400/50 = 8 \text{ m/s}$
6. $v = \text{displacement}/\text{time}$ $v = 180 \text{ km} / 2 \text{ h} = 90 \text{ km/h east}$
7. $d = v t$ $d = 5 \cdot 12 = 60 \text{ m}$
8. Distance travelled per unit time: $v = d/t$. A scalar - no direction.
9. Displacement per unit time, with direction: $v = x/t$. A vector.
10. Yes - moving in a circle at constant speed still changes velocity because direction changes.

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