KINEMATICS PRACTICE: VELOCITY

Example Problem

A sprint car travels a displacement of 160 meters east in 8 seconds. What is the velocity of the car during this time?

Solution: Velocity = Displacement / Time = 160 / 8 = 20 m/s east

1. A car travels a displacement of 150 meters east at a velocity of 15 m/s. How long does it take to complete the trip?

2. A bike moves a displacement of 60 meters north in 20 seconds. What is its velocity?

3. A plane travels at 200 km/h west for 1.5 hours. What is its displacement?

4. A runner completes a displacement of 400 meters in 50 seconds. What is the runner's velocity?

5. A train travels a displacement of 300 meters at a velocity of 25 m/s. How much time does the trip take?

KINEMATICS PRACTICE: ACCELERATION

Example Problem

A sprint car increases its velocity from 20 m/s to 60 m/s in 4 seconds. What is its acceleration?

Solution: Acceleration = (Final Velocity - Initial Velocity) / Time = (60 - 20) / 4 = 10 m/s2

6. A bike accelerates from rest to 12 m/s in 3 seconds. What is the acceleration?

7. A car accelerates at 5 m/s2 for 6 seconds. If the initial velocity was 10 m/s, what is the final velocity?

8. A plane decelerates from 80 m/s to 40 m/s at a rate of 4 m/s2. How long does it take to slow down?

9. A rocket accelerates from 0 to 200 m/s in 10 seconds. What is the acceleration?

10. A runner accelerates at 2 m/s2 for 5 seconds and reaches a final velocity of 15 m/s. What was the initial velocity?

11. Explain why velocity and acceleration are both vectors and how this is important for describing motion.

12. A sprint car travels in a straight line at a constant speed. Is it accelerating? Why or why not?

13. If two cars have the same acceleration but start at different velocities, will they reach the same speed in the same amount of time? Explain.

14. A car slows down as it approaches a stop sign. Is its acceleration positive or negative? Why?