

Chapter 2 Extra Credit

Name: _____ Date: _____

Directions: Show all work on a separate sheet of paper. Include formulas, substitutions, and units. Answers without work may receive reduced credit.

Part I — Displacement

1. A car begins at the 80-cm mark on a track. It moves -40 cm, then $+15$ cm. What is the car's final position?
2. A rectangular track measures 60 cm on each long side and 30 cm on each short side. The car begins at the starting point and travels exactly one complete lap.
 - a. What is the displacement?
 - b. What total distance did the car travel?
3. A car starts at the 80-cm mark and travels in the negative direction at 5 cm/s for 3 seconds. What is the car's displacement?
4. Using the information in Question 3, what is the car's final position on the track?
5. A football team loses 20 yards on one play, then gains 10 yards on the next play. What is the team's total displacement after both plays?

Part II — Velocity

$$v = \frac{\Delta x}{t}$$

Use the equation:

6. An airplane flies 525 km north in 1.25 hours. Find its velocity.
7. A soccer ball travels 6.5 m south with a velocity of 22 m/s. How long does the ball take to reach its destination?
8. A shopping cart moves 15.6 meters west in 5.2 seconds. Find its velocity.
9. A bus travels 79.7 km/h east for 1.45 hours. How far does the bus travel?

10. A Girl Scout troop hikes 5.8 km southeast in 1.5 hours. What is the troop's velocity?

Part III — Acceleration

$$a = \frac{v_f - v_i}{t}$$

Use the equation:

11. A driver slows from 24 m/s to 15 m/s in 12 seconds. Find the acceleration.
12. A helicopter increases its velocity from 25 m/s east to 60 m/s east in 5 seconds. Find its acceleration.
13. A motorcycle travels at 25 m/s and accelerates at 7.0 m/s² for 6.0 seconds. What is its final speed?
14. A car traveling at 30.0 m/s comes to a complete stop with a deceleration of -4.0 m/s². How long does it take to stop?
15. A skateboarder is traveling 7.0 m/s and comes to rest in 3.0 seconds. Find the skateboarder's acceleration.
16. A runner starts from rest and accelerates uniformly at 2.5 m/s² for 8.0 seconds.
- a. What is the runner's final speed?
 - b. If the runner maintains that speed for another 12.0 seconds, how far does the runner travel during those 12 seconds?