

Name \_\_\_\_\_

## Solving Mechanics Problems Answer Key

1. To calculate the net force, use the formula: net force = mass  $\times$  acceleration. In this case, net force =  $2 \text{ kg} \times 4 \text{ m/s}^2 = 8 \text{ N}$ .

2. To calculate the horizontal distance, use the formula: distance = velocity  $\times$  time. In this case, distance =  $10 \text{ m/s} \times 2 \text{ s} = 20 \text{ meters}$ .

3. To calculate mass, divide the force by the acceleration: mass = force / acceleration. In this case, mass =  $50 \text{ N} / 5 \text{ m/s}^2 = 10 \text{ kg}$ .

4. To calculate the acceleration due to gravity, divide the force by the mass: acceleration = force / mass. In this case, acceleration =  $4.9 \text{ N} / 0.5 \text{ kg} = 9.8 \text{ m/s}^2$ .

5. To calculate deceleration, use the formula: deceleration = (final velocity - initial velocity) / time. In this case, deceleration =  $(0 \text{ m/s} - 20 \text{ m/s}) / 5 \text{ s} = -4 \text{ m/s}^2$ .

6. To find the time, use the formula: time = (final velocity - initial velocity) / acceleration. In this case, time =  $(500 \text{ m/s} - 0 \text{ m/s}) / 50 \text{ m/s}^2 = 10 \text{ seconds}$ .

7. Momentum is calculated by multiplying mass and velocity: momentum = mass  $\times$  velocity. In this case, momentum =  $1000 \text{ kg} \times 25 \text{ m/s} = 25000 \text{ kg} \cdot \text{m/s}$ .

8. To find the resulting velocity, use the formula: final velocity = initial velocity + (acceleration  $\times$  time). In this case, final velocity =  $10 \text{ m/s} + (-2 \text{ m/s}^2 \times 4 \text{ s}) = 2 \text{ m/s}$  northwards.

9. To calculate acceleration, divide the force by the mass: acceleration = force / mass. In this case, acceleration =  $30 \text{ N} / 5 \text{ kg} = 6 \text{ m/s}^2$ .

10. To calculate deceleration, use the formula: deceleration = (final velocity - initial velocity) / time. In this case, deceleration =  $(0 \text{ m/s} - 400 \text{ m/s}) / 0.05 \text{ s} = -8000 \text{ m/s}^2$ .