Name _____

# Mechanics Problems Answer Key

1. To calculate mass, divide the force by the acceleration: mass = force / acceleration. In this case, mass = 500 N / 10 m/s² = 50 kg.

2. To find the time, use the formula: time = (final velocity - initial velocity) / acceleration. In this case, time = (0 m/s - 30 m/s) / (-5 m/s²) = 6 seconds.

3. Net force is calculated by subtracting the opposing forces: net force = applied force - opposing force. In this case, net force = 50 N - 100 N = -50 N.

4. To find the time, use the formula: time = √(2 × height / acceleration due to gravity). In this case, time = √(2 × 20 m / 9.8 m/s²) ≈ 2.03 seconds.

5. To calculate acceleration, divide the force by the mass: acceleration = force / mass. In this case, acceleration = 80 N / 20 kg = 4 m/s².

6. To calculate acceleration, use the formula: acceleration = (final velocity - initial velocity) / time. In this case, acceleration = (15 m/s - 5 m/s) / 2 s = 5 m/s².

7. Since there is no force acting on the object, its velocity remains constant. Therefore, the final velocity is also 10 m/s.

8. To calculate acceleration, divide the force by the mass: acceleration = force / mass. In this case, acceleration = 200 N / 60 kg ≈ 3.33 m/s².

9. To calculate deceleration, use the formula: deceleration = (final velocity - initial velocity) / time. In this case, deceleration = (0 m/s -25 m/s) / 10 s = -2.5 m/s².

10. To find the time, use the formula: time = (final velocity - initial velocity) / acceleration. Since the rocket reaches its maximum height, its final velocity is 0 m/s. Assuming acceleration due to gravity is 9.8 m/s², the time taken is: time = (0 m/s - 100 m/s) / (-9.8 m/s²) ≈ 10.2 seconds.