2008 Two Dimensions 5

Remember that a vector has magnitude and direction. A scalar has only magnitude (doesn't need direction).

1. Scalar or vector?

   A. ___Mass   C. ___ Velocity   E. ___ Acceleration
   B. ___Number of rocks   D. ___ Speed   F. ___ Temperature

2. A person walks 2G—F +2E—A.
   A. Draw the above path.
   B. Draw the resultant of the path, labeled "R".

Remember that vectors can be added in any order and they can be moved. Also, remember that a negative goes the opposite way.

3. On the diagram at the left, R is the path from the start to the finish. Give three ways you could make R with the available vectors.

4. Using the diagram at the left, add the two vectors together.

   A. $X_1 =$ B. $Y_1 =$

   C. $X_2 =$ D. $Y_2 =$

   E. $X_{total} =$ F. $Y_{total} =$

   G. Draw R.

   H. Calculate R's magnitude.

   I. Calculate R's direction.

$V_2 = 11$ m

$V_1 = 15$ m

$30°$

5. Use projectiles G and H above to answer the following:
   A. Which one will hit the ground first?
   B. Which one is has a faster Vx?
   C. Which one goes farther?

6. Use projectiles S and T at the right to answer the following:
   A. Which one is in the air for the longest time?
   B. Which one hits the ground first?
   C. Which one lands farther away?
   D. Which one goes higher up in the air?

7. X or Y direction for a projectile?
   A. Is at constant velocity?
   B. Has an acceleration of -9.8 m/s^2?
   C. Was me walking with the ball?
   D. Was me throwing the ball into the air?

8. Projectile Motion questions:
    A) At the top of its path, what is a projectile's velocity in the y-direction?
    B) At the top of its path, what is a projectile's acceleration in the x-direction?
    C) A projectile is launched from the ground and lands on the ground. If it has an initial y velocity (Vy_i)
       of 20 m/s, what is its final y velocity (Vy_f)?
    D) A projectile is launched from the top of a 12 m building, what is Δy?
    E) You want to know how high a projectile goes. What is the final y velocity (V_{yf}) of the object?
    F) How do you find initial Vx for a projectile?
    G) If you know the total time from ground to ground is 18 seconds,
       how long did it take to get to its highest point?
    H) What is the y-direction acceleration of any projectile?
    I) How do you find initial Vy for a projectile?
    J) If a projectile is launched from the ground and lands on the ground,
       what is Δy?
    K) If a projectile is launched from a 4 m cliff, what is Δy?
    L) If a projectile has an initial Vx of 25 m/s, what is its final Vx?

9. A cannonball is fired at 40 m/s at 50° to the horizon.
    A) $a_y = $ _____; $a_x = $ _____.
    B) Draw the vector of the initial velocity and resolve it into its x and y components. (Find Vx and Vy.)

    C) The y-direction is now just freefall. So, how long does it takes for the ball to come back to the earth? (Find t.)

    D) Find how far the cannonball will travel from where it was shot (x-displacement).