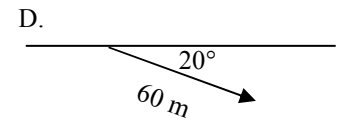
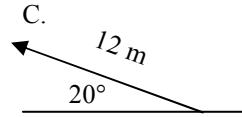
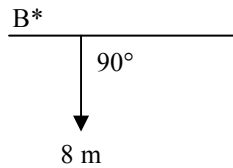
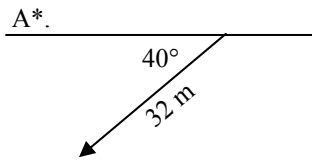
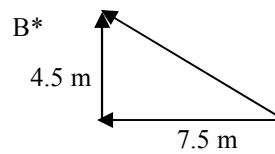
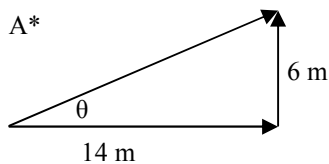


2010-11 PreAP Two Dimensions 2

1. Being sure to use correct directions (not just angles). Find the x and y components for each of the following vectors.
 (Questions with an asterisk (*) have answers on the bottom of the second page.)



2. Given the following x and y components, calculate the magnitude (hypotenuse) and direction of the vector.
 (BIG TANGENT HINT: remember to figure out what quadrant your arrow should be in. Add 180° if necessary.)



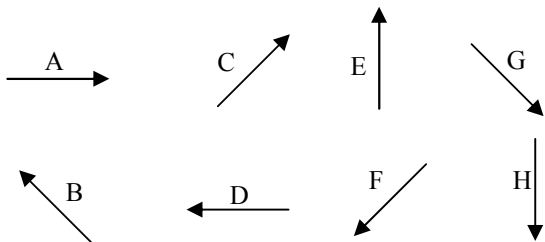
C. $X = 105 \text{ m}$
 $Y = 215 \text{ m}$

D. $X = 6.8 \text{ m}$
 $Y = -2.2 \text{ m}$

3. Are the following physical quantities vectors (magnitude and direction) or scalars (just magnitude)?

- A. ___ Mass in kg (*)
 B. ___ Force in N (a push or a pull) (*)
 C. ___ Heat in Joules
 D. ___ Speed in m/s

- E. ___ Velocity in m/s
 F. ___ Acceleration in m/s²
 G. ___ Pressure in Pascals or N/m²
 H. ___ Time in seconds



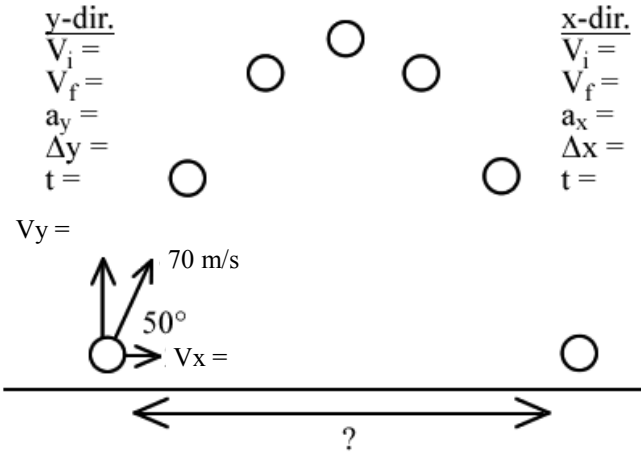
4. Use the arrows at the left to answer the following.

- A. ___ Which arrow has +x and -y components?
 (which is pointing in the +x and -y directions?)
 B. ___ Which arrow has -x and +y components?
 C. ___ Which arrow has +x and no y component?
 D. ___ Which arrow/s have no x component?
 E. ___ Which arrow is the negative of A?
 F. ___ Which arrow = -B?
 G. ___ Which arrow has -x and -y components?
 H. What does A + D equal? (If you walked the direction of A and then the direction of D, what would be your total displacement?)

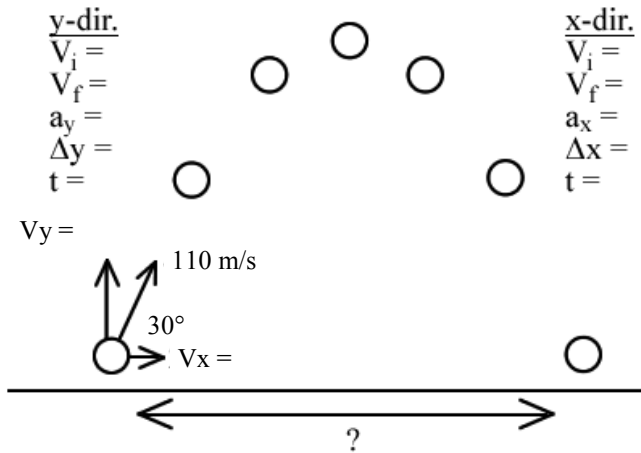
Still using the A-H arrows as displacement vectors (distances with directions)....

5. A. A strange person (named "Crazy") walks the direction of A, then C, then E, then 2D (D twice). Starting at the point marked "start" draw Crazy's path.
 B. A second person, standing at the same starting point, watches Crazy walk his crazy path, but being Lazy, walks to Crazy in a straight line. Use an arrow to show Lazy's path. Label this arrow "R" for the resultant.
6. Using the same story of Crazy and Lazy above...
 A. Draw Cray's path: $G + F + 2E - 2A$ [opposite of A, twice]. (It's OK if the path crosses.)
 B. Draw Lazy's path, labeling it "R".

●
Start



- Use your "Projectile Motion" notes only if necessary.
7. * A projectile is launched 70 m/s at an angle of 50°. It is shot from the ground, to the ground.
- You have the velocity and its angle, calculate the x and y components of the velocity.
 - Put V_x and V_y that you just calculated on the diagram.
 - Fill in as many of the variables as you can.
 - In the x-direction be sure to write the equation you will use.
 - Calculate the time it is in the air.
 - Using the time you just found, calculate the distance the projectile travels in the x-direction (*known as its range*).



8. * This time the projectile is launched at 30° going 110 m/s. Calculate the time in the air and how far away it lands.

Now on your own...

9. A rock is thrown at an angle of 20° and with a velocity of 35 m/s. If it is thrown from the ground and lands on the ground, calculate its range (how far away it lands).

1A. $x = -24.5$ m; $y = -20.6$ m 1B. $x = 0$ m; $y = -8$ m. 2A. $H = 15.2$ m; $\theta = 23.2^\circ$; 2B. $H = 8.7$ m; $\theta = 149^\circ$ (must be in 2nd quadrant; tan gives -31° so add 180°);

Q7 $V_{yi} = 53.6$ m/s (use sin); $V_x = 45$ (use cos). Use $V_f = V_i + at$ in y-direction to find $t = 10.9$ sec; in x-dir. $S = D/T$ So, $D = ST = 45 (10.9) = 490.5$ m

Q8 $V_{yi} = 55$ m/s; $V_x = 95.3$ m/s; $t = 11.2$ sec; $D = 1070$ m