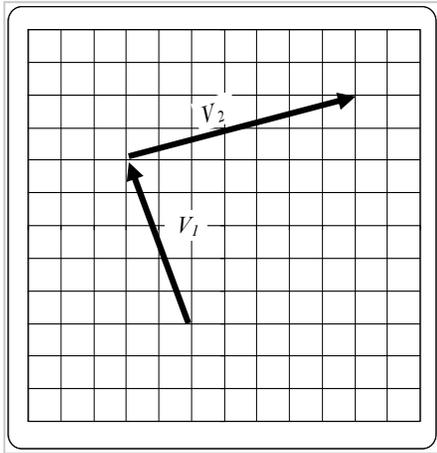


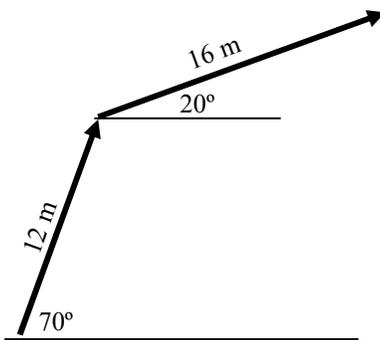
2009 Two Dimensions 5

- How can a vector have a vertical component that is equal to zero?
- How can a vector have equal x and y components?



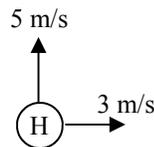
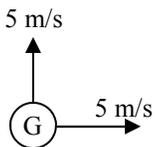
- Using the diagram at the left, add the two vectors together. *(Be sure to keep track of negatives and positives.)*
 - Below give the x and y components for each of the two vectors:

| | |
|---------------------|---------------------|
| $X_1 =$ _____ | $Y_1 =$ _____ |
| $X_2 =$ _____ | $Y_2 =$ _____ |
| $X_{total} =$ _____ | $Y_{total} =$ _____ |
 - Using the totals, calculate the resultant's magnitude (how far) and direction (at what angle).

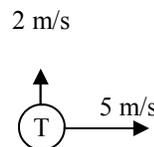
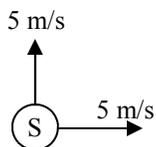


- Add the two vectors together.
 - Draw a line straight down from each arrow to show the y component of each vector.
 - Below give the x and y components for each of the two vectors:

| | |
|---------------------|---------------------|
| $X_1 =$ _____ | $Y_1 =$ _____ |
| $X_2 =$ _____ | $Y_2 =$ _____ |
| $X_{total} =$ _____ | $Y_{total} =$ _____ |
 - Using the totals, calculate the resultant's magnitude and direction (at what angle).



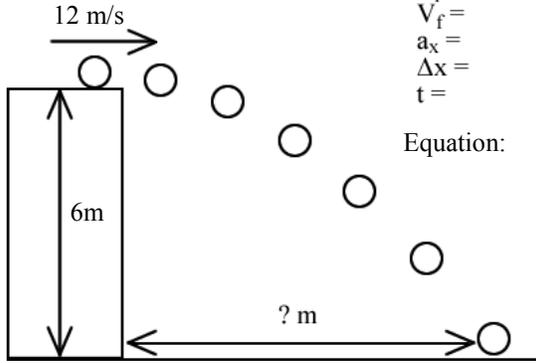
- Use projectiles G and H above to answer the following:
 - Which one will hit the ground first?
 - Which one has a faster V_x ?
 - Which one goes farther?



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

- Projectile Motion questions:
 - At the top of its path, what is a projectile's velocity in the y-direction?
 - At the top of its path, what is a projectile's acceleration in the x-direction?
 - A projectile is launched from the ground and lands on the ground. If it has an initial y velocity (V_{yi}) of 20 m/s, what is its final y velocity (V_{yf})?
 - A projectile is launched from the top of a 12 m building, what is Δy ?
 - You want to know how high a projectile goes. What is the final y velocity (V_{yf}) of the object?

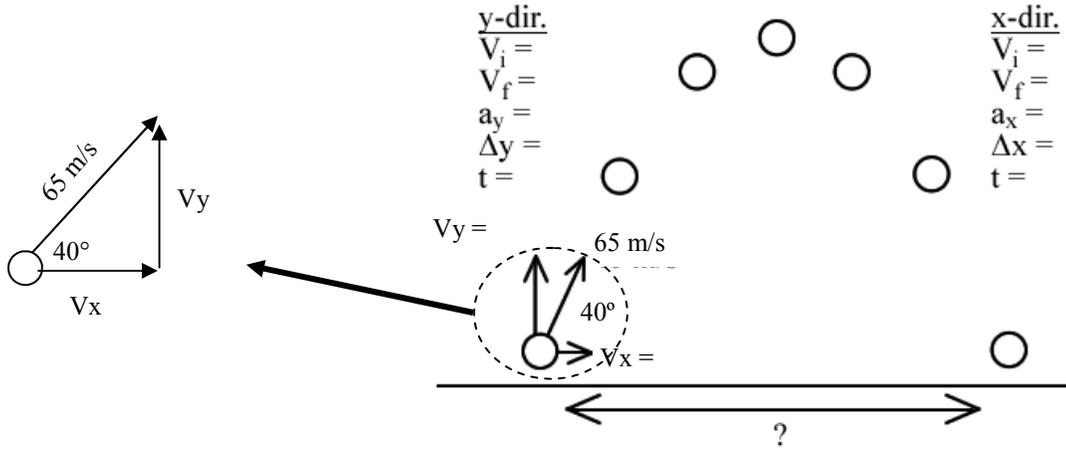
y-dir.
 $V_i =$
 $V_f =$
 $a_y =$
 $\Delta y =$
 $t =$



x-dir.
 $V_i =$
 $V_f =$
 $a_x =$
 $\Delta x =$
 $t =$

Equation:

8. A rock is thrown horizontally from the top of a 6 m tall cliff. How far away does it land?



y-dir.
 $V_i =$
 $V_f =$
 $a_y =$
 $\Delta y =$
 $t =$

x-dir.
 $V_i =$
 $V_f =$
 $a_x =$
 $\Delta x =$
 $t =$

9. A projectile is launched 65 m/s at an angle of 40°. It is shot from the ground to the ground. Calculate how far away it lands (calculate its range).

10. A bullet is fired horizontally from a gun aimed directly at a coconut dropped from a tree 5 meters away. The coconut is at the exact same height as the gun and drops at the exact same time the bullet is fired.
- Thinking about my demonstration of throwing a ball and dropping a ball at the same time. What is the initial y-velocity of both the coconut and the bullet?
 - What is the y-direction acceleration for both the bullet and the coconut?
 - Will the bullet hit the coconut?
 - Why or why not?

