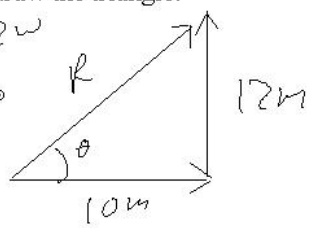
1. A person walks 15 m west, 10 m north, 25 m east, 6 m south, then another 8 m north.
Calculate the person's displacement (magnitude and direction, please).

A person walks 15 m west, 10 m north, 25 m east, 6 m south, then another 8 m north.

A) Xt = $-15+25$ $10m$ ✓ B) Yt = $+10-6+8$ $12m$ ✓ C) Using Xt and Yt, draw the triangle:

D) Calculate the resultant's magnitude and direction.

$R=\sqrt{100+144}=15.6m$ $\theta=\tan^{-1}\left(\frac{12}{10}\right)=50.2°$ ✓



2. Person A walks 55 m at 38°. Then the person turns and walks 20 m north. A Person B starts at the same place as Person A. What direction and distance does Person B have to walk to walk straight to Person A's final position?

8. Person A walks 55 m at 38°. Then the person turns and walks 20 m north. A Person B starts at the same place as Person A. What direction and distance does Person B have to walk to walk straight to Person A's final position?

$x_1 = 55\cos 38° = 43.3m$
$y_1 = 55\sin 38° = 33.9m$
$x_2 = 0m$
$y_2 = +20m$

$x_t = 43.3m$
$y_t = 53.9m$
$R = 69.1m$
$\theta = 51.2°$

3. A plane flies 200 mph for 2 hours going 20º. Then it flies 250 mph for 1.5 hours going 120º.
Calculate the planes total displacement (magnitude and direction, please).

3. A plane flies 200 mph for 2 hours going 20º. Then it flies 250 mph for 1.5 hours going 120º.
Calculate the planes total displacement (magnitude and direction, please).

U_1 400 mi at 20°
$x_1 = \cos = 375.9mi$
$y_1 = \sin = 136.8$

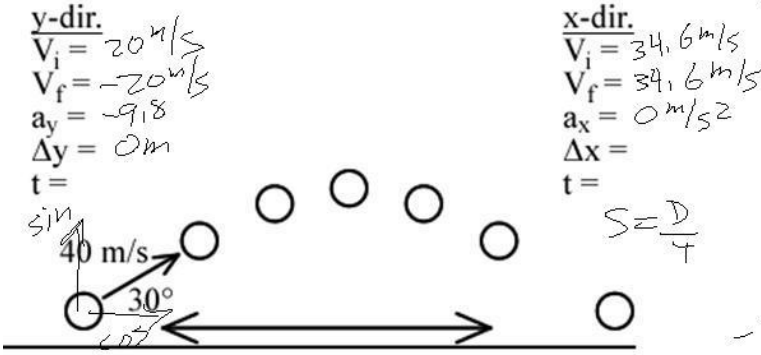
$U_2 = 375$ at 120°
$x_2 = \cos = -187.5\ mi$
$y_2 = \sin = 324.8\ mi$

totals
$= 188.4$
$= 461.6$

-2w

$R = \sqrt{x^2+y^2} = 498.5mi$
at 67.8°

An object (like, say, a pudding cup) is launched from the ground at an angle of 30º and a velocity of 40 m/s. If it lands back on the ground, calculate its range.



8. An object (like, say, a pudding cup) is launched from the ground at an angle of 30º and a velocity of 40 m/s. If it lands back on the ground, calculate its range.
   A. Use trig to find the initial x and y velocities.
   B. Write out the x and y variables.
   C. Solve for t in the y-direction.

$V_f = V_i + at$

$-20 = 20 - 9.8t$

$-40 = -9.8t$

−5w $t = 4.1$ sec

   D. Use this t to find Δx.

$D = ST$

−5w $D = 34.6(4.1) = 141.3$ m

1. An object is shot horizontally from a 24 m cliff going 65 m/s. How far away does it land? (This could also be a person running along a cliff and jumps horizontally, a plane dropping something horizontally, or any other example that says "horizontally".)

4. An object is shot horizontally from a 24 m cliff going 65 m/s. How far away does it land?

$\Delta y = (V_i t) + (\frac{1}{2} a t^2)$

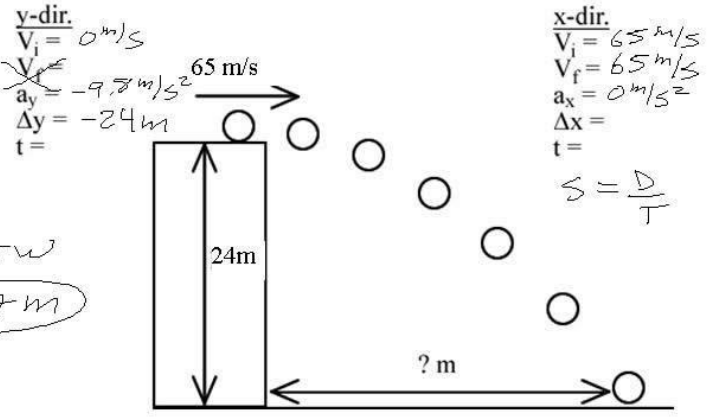
$-24 = 0 + (-4.9t^2)$

$t = 2.21$ sec −5w

$S = \frac{D}{T}$

−5w

$D = ST = 65(2.21) = 143.7$ m

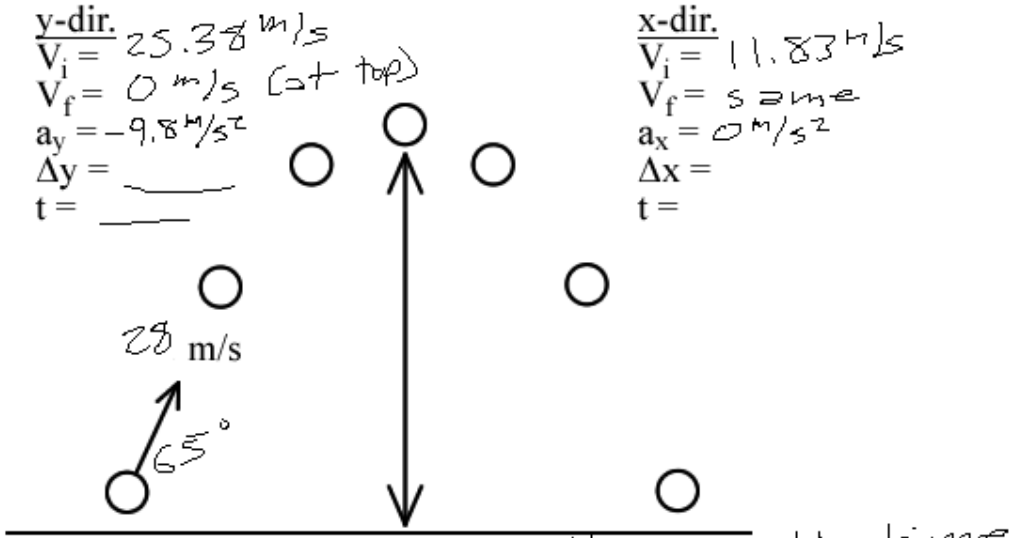


An object, like a monkey, is shot 28 m/s at an angle of 65°.

A) What is its final x-velocity?

B) How high in the air does it go? (Find "how high it goes" or "it's highest point" or "it goes thru a hoop at its top point" or "how high must the ceiling be".)

A) It's final x-velocity is the same as its initial x-velocity because it is at constant velocity in the x-direction and $a_x = 0$ m/s^2.



*Note: you don't need the time. Use the eq. without t.

$V_f^2 = V_i^2 + 2a\Delta y$

$0 = 25.38^2 - 19.6\Delta y$

$0 = 644.14 - 19.6\Delta y$

div. by −19.6

$-644.14 = -19.6\Delta y$

$\Delta y = 32.86$ m