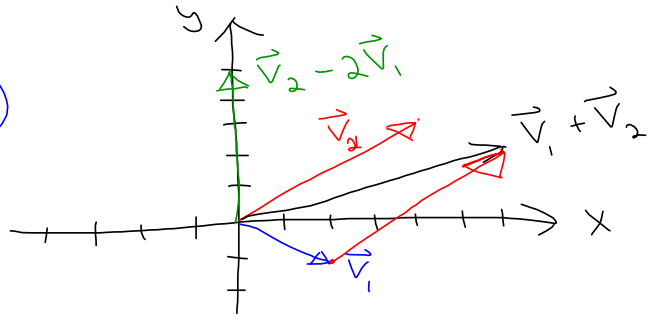
$\vec{v}_1 = (2, -1)$

$\vec{v}_2 = (4, 3)$




$\vec{v}_2 - 2\vec{v}_1 = (4,3) + (-4, 2) = (0, 5)$

$\vec{v}_1 + \vec{v}_2 = (6, 2)$

https://github.com/naharrison/graphical-vector-adder/releases

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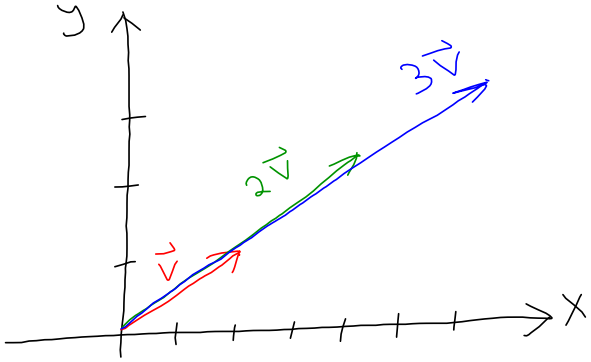
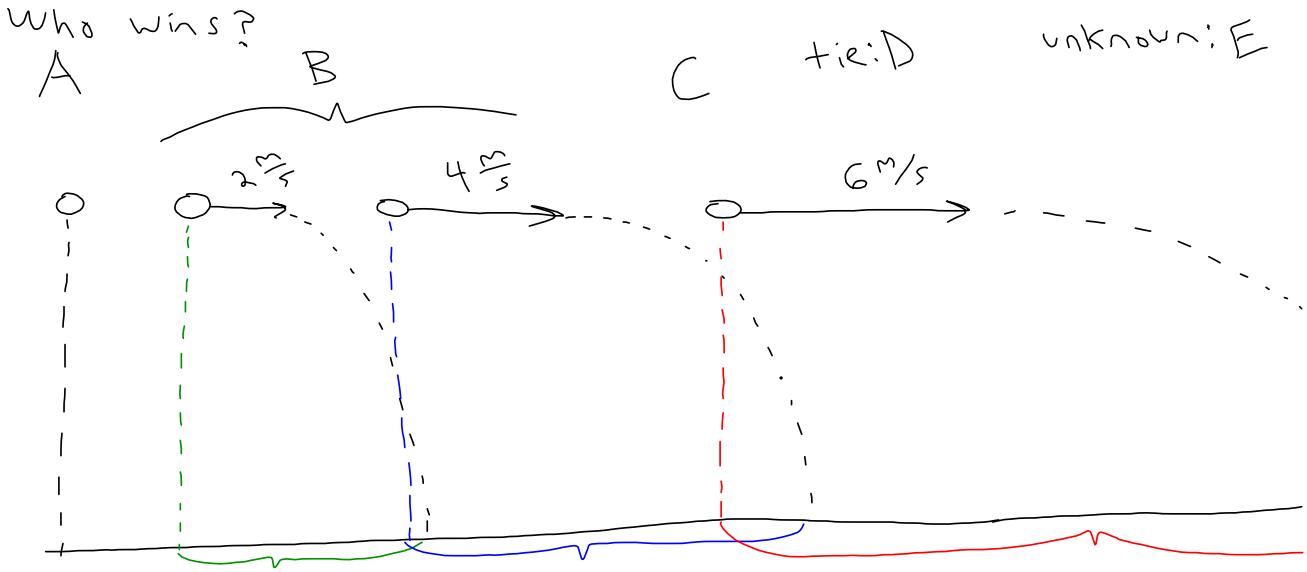
$\vec{v} = (2, 1)$ $2\vec{v} = (4, 2)$ $3\vec{v} = (6, 3)$




When a vector is multiplied by a scalar, the magnitude changes but the direction is preserved.

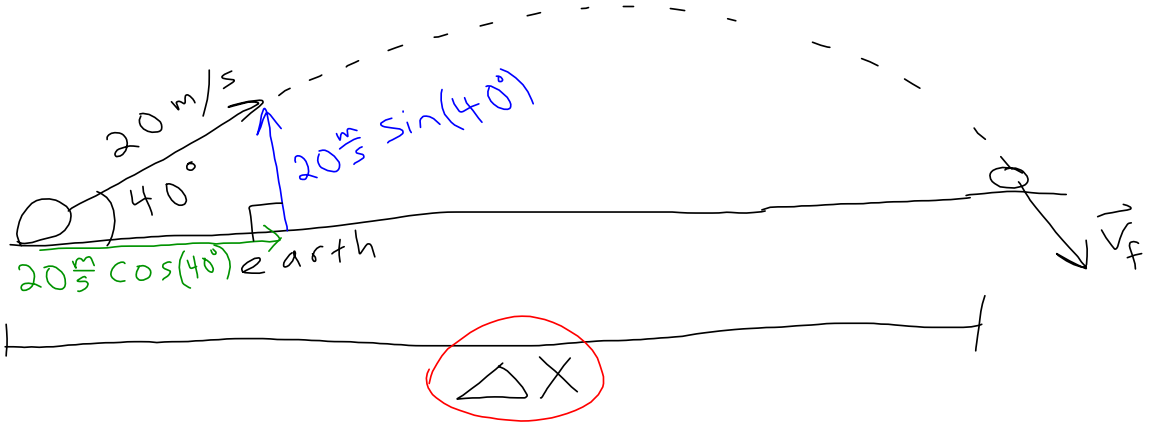
$|2\vec{v}| = 2|\vec{v}|$

in general $|a\vec{v}| = a|\vec{v}|$




TIE!

Example




Step 1: find hang time

Known

$y_i = 0$

$y_f = 0$

$a_y = -9.8\frac{m}{s^2}$

$V_{iy} = 20\frac{m}{s}\sin(40°)$

unknown

$t$

don't care

$V_{fy}$

$$y_f = y_i + V_{iy}t + \frac{1}{2}a_y t^2$$

$$0 = 20\sin(40)t - 4.9t^2$$

$$\frac{0}{t} = \frac{20\sin(40)t - 4.9t^2}{t}$$

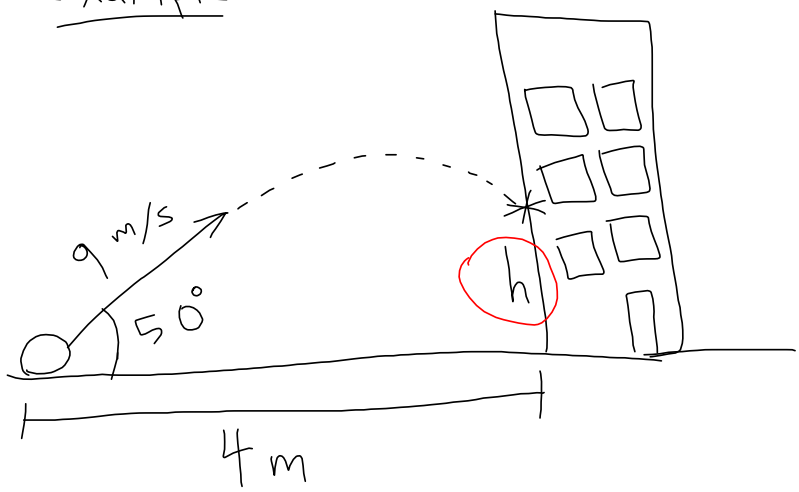
$$t = \frac{20\sin(40)}{4.9}$$

Step 2:

$$\Delta X = V_x t = \frac{(20\cos(40))(20\sin(40))}{4.9}$$

$$= 39.78\ m$$

Example




submit answer in meters.

Round to nearest tenth.