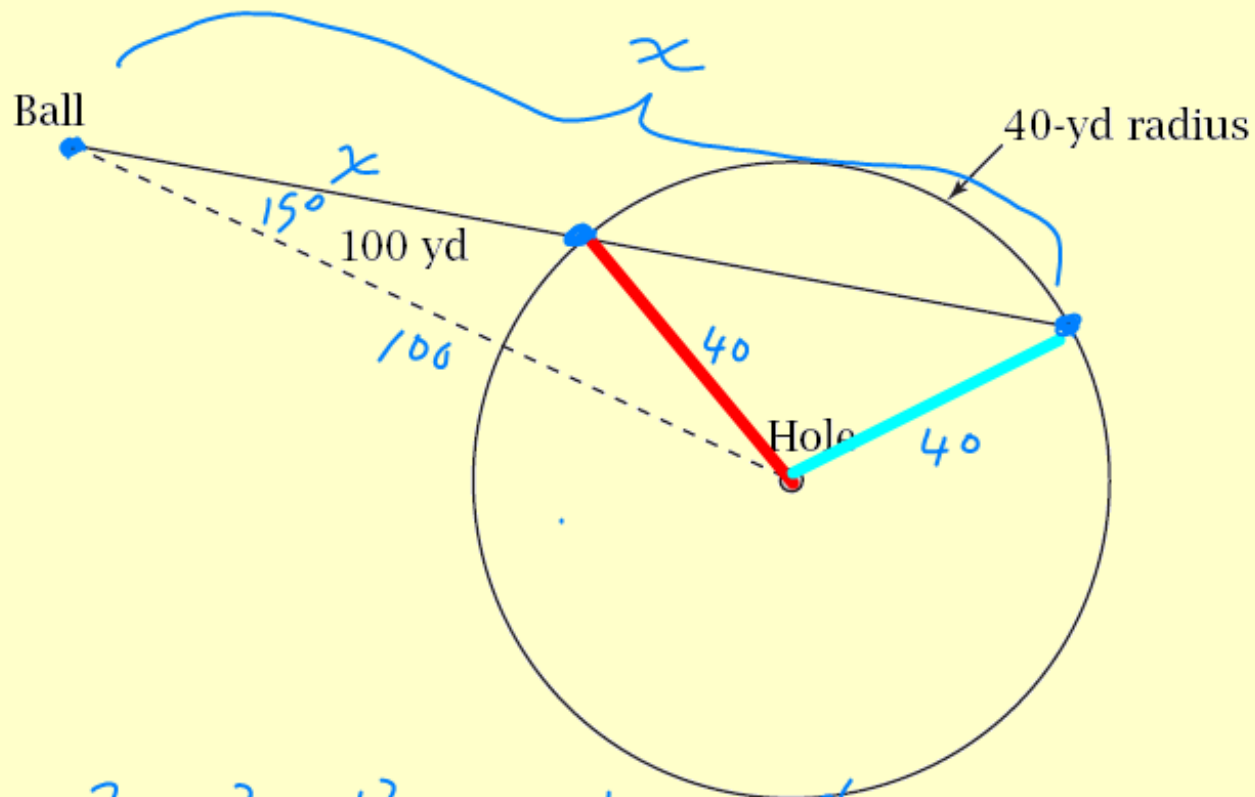


1.



$$c^2 = a^2 + b^2 - 2ab \cos C$$

2. Let x be the distance, in feet, the ball traveled.

$$40^2 = 100^2 + x^2 - 2 \cdot 100 \cdot x \cdot \cos 15^\circ$$

Law of cosines

$$x^2 - (200 \cos 15^\circ)x + 8400 = 0$$

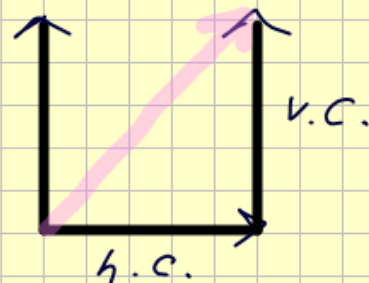
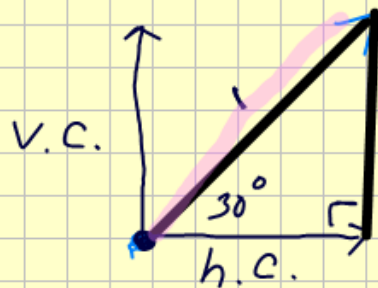
$$x = 127.0905\dots \text{ or } 66.0945\dots$$

Distances are about 127.09 ft and 66.09 ft.

resultant vector =
sum of 2 or more vectors

\vec{a}

add 2 components
get vector back



$$h.c. = 1 \cos 30^\circ = \frac{\sqrt{3}}{2}$$

$$v.c. = 1 \sin 30^\circ = \frac{1}{2}$$

$$\cos 30^\circ = \frac{h.c.}{1}$$
$$1 \cos 30^\circ = h.c.$$

$$\vec{a} = h.c. \vec{i} + v.c. \vec{j}$$

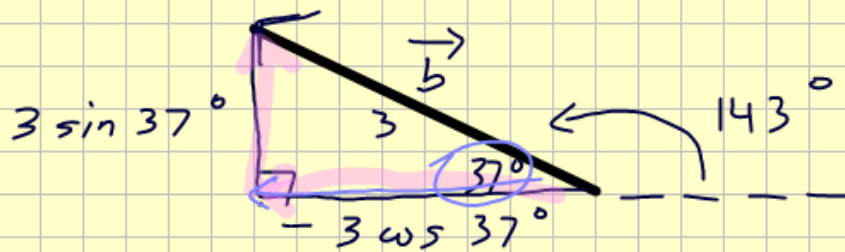
$$\vec{a} = \frac{\sqrt{3}}{2} \vec{i} + \frac{1}{2} \vec{j}$$

\vec{a} = magnitude of 1
w/ 30° above the horizontal

\vec{b} magnitude of 3
and direction of 143°

Find component form of \vec{b} .

$$\vec{b} = ? \vec{i} + ?? \vec{j}$$



$$\vec{b} = -3 \cos 37^\circ \vec{i} + 3 \sin 37^\circ \vec{j}$$

$$\vec{b} = -2.396 \vec{i} + 1.805 \vec{j}$$

2nd way

$$\vec{b} = |\vec{b}| \cos \theta \vec{i} + |\vec{b}| \sin \theta \vec{j}$$

\vec{a} mag of 5 direction 250°

Find component form of \vec{a}

$$\begin{aligned}\vec{a} &= |\vec{a}| \cos \theta \vec{i} + |\vec{a}| \sin \theta \vec{j} \\ &= 5 \cos(250^\circ) \vec{i} + 5 \sin(250^\circ) \vec{j}\end{aligned}$$

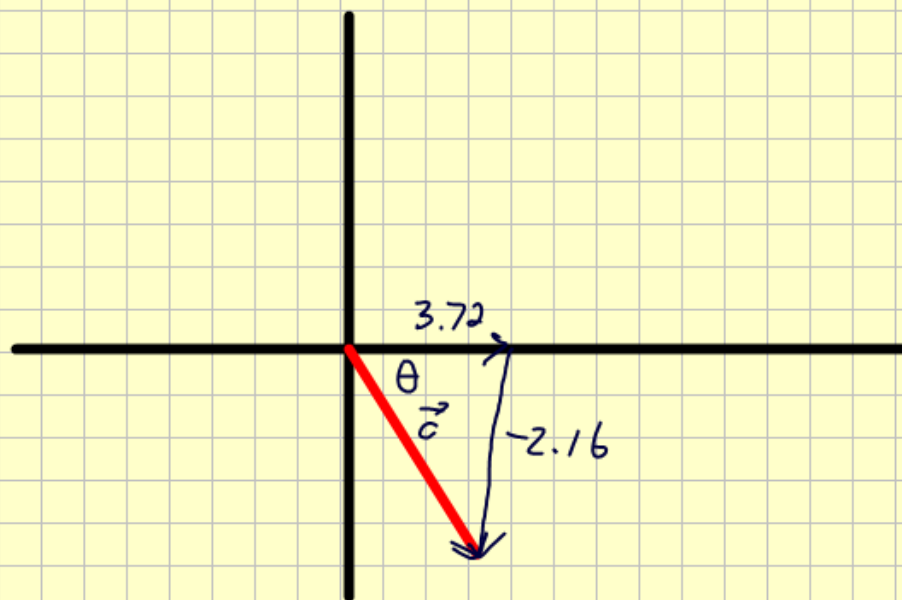
$$\vec{a} = -1.710 \vec{i} + -4.69 \vec{j}$$

$$\vec{b} = 5.430 \vec{i} + 2.53 \vec{j}$$

a new vector $\vec{a} + \vec{b} = \vec{c}$

$$\vec{c} = 3.72 \vec{i} + -2.16 \vec{j}$$

We want to find
 $|\vec{c}|$ (magnitude) of \vec{c}
direction of \vec{c}



$$\vec{c} = 3.72\vec{i} + -2.16\vec{j}$$

$$|\vec{c}| = \sqrt{(3.72)^2 + (-2.16)^2} = 4.3$$

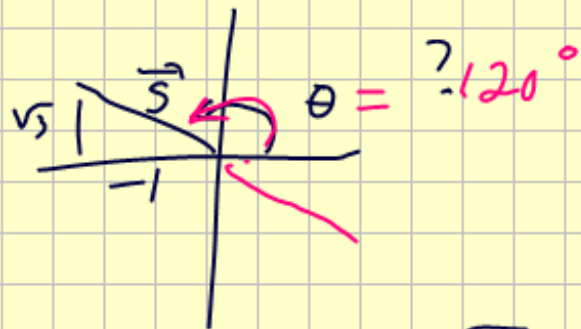
$$\theta = \tan^{-1}\left(\frac{-2.16}{3.72}\right) = -30.14^\circ$$

\vec{c} magnitude 4.3 angle of -30.14°

2nd or 3rd quad

$$\vec{s} = -1\vec{i} + \sqrt{3}\vec{j}$$

direction:



$$\theta = \tan^{-1} \frac{\sqrt{3}}{-1} + 180^\circ = 120^\circ$$

$$\theta = -60^\circ$$

$$\vec{a} = 3\vec{i} + 7\vec{j}$$

$$\vec{b} = 5\vec{i} + 3\vec{j}$$

find magnitude of $\vec{c} = \vec{a} + \vec{b}$

$$\vec{c} = 8\vec{i} + 10\vec{j}$$

1st quad: $\theta = \tan^{-1}\left(\frac{10}{8}\right) = 51.34^\circ$

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