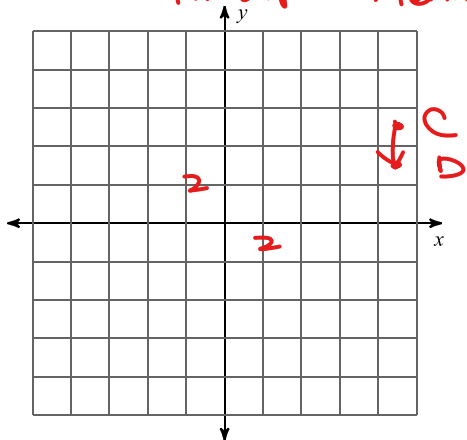


$$i = \langle 1, 0 \rangle \quad j = \langle 0, 1 \rangle$$

Vectors Intro Notes

Find the following information for each vector: ~~Graph~~, ~~component form~~, ~~linear combination~~, magnitude and direction angle.

1) \overrightarrow{CD} where $C = (9, 5)$ $D = (9, 3)$
starts at C and ends at D
initial pt → terminal pt



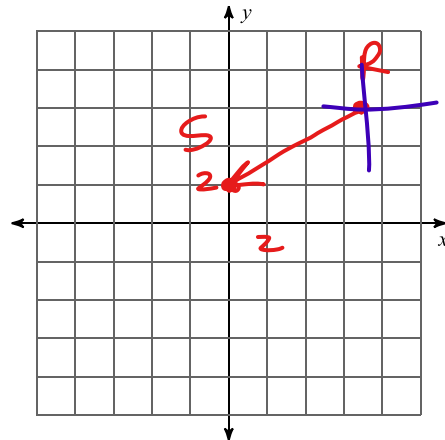
$$\overrightarrow{CD} = \langle 0, -2 \rangle \text{ or } 0i - 2j$$

Magnitude = 2

directional angle

$$270^\circ, -90^\circ, S$$

2) \overrightarrow{RS} where $R = (7, 6)$ $S = (0, 2)$



$$\overrightarrow{RS} = \langle -7, -4 \rangle$$

$$-7i - 4j$$

$$\text{Mag} = \sqrt{(-7)^2 + (-4)^2}$$

$$= \sqrt{49 + 16} = \sqrt{65}$$

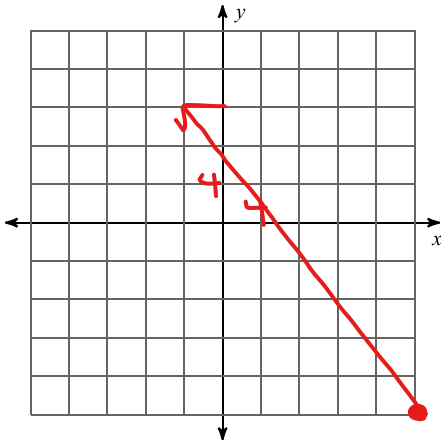
$$\tan^{-1}\left(\frac{4}{7}\right) = 29.744^\circ$$

$$180 + 29.744 = \boxed{209.744^\circ}$$

$$\begin{array}{ccc} 24 & 32 & 40 \\ 3 & 4 & 5 \end{array}$$

Find the following information for each vector, if not provided in the question: Graph, linear combination, magnitude and direction angle.

3) $\mathbf{v} = \langle -24, 32 \rangle$



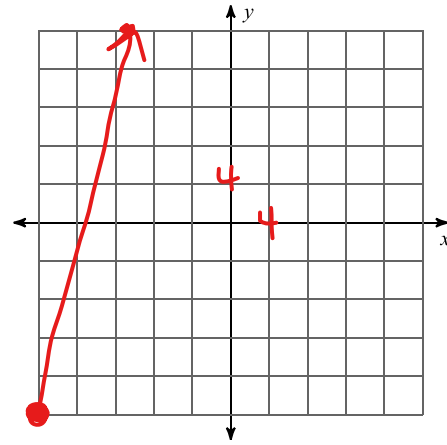
LC $-24\mathbf{i} + 32\mathbf{j}$

$$\sqrt{(24)^2 + (32)^2} = 40$$

$$\tan^{-1}\left(\frac{32}{24}\right) \rightarrow 53.13^\circ$$

$$180 - 53.13^\circ = 126.87^\circ$$

4) $\mathbf{a} = \langle 9, 40 \rangle$



LC $9\mathbf{i} + 40\mathbf{j}$

$$\sqrt{9^2 + 40^2} = \sqrt{1681} = 41$$

$$\tan^{-1}\left(\frac{40}{9}\right)$$

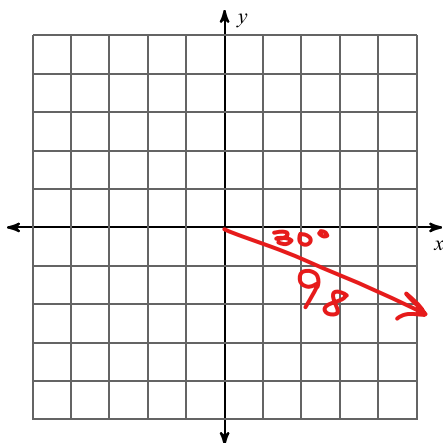
$$\approx 77.32^\circ$$



$$\sin \theta = \frac{y}{h} \text{ so } \boxed{h \sin \theta = y} \quad \cos \theta = \frac{x}{h}$$

Find the following information for each vector, if not provided in the question: Graph, component form, linear combination. $h \cos \theta = x$

5) $|\mathbf{n}| = 98, 330^\circ$



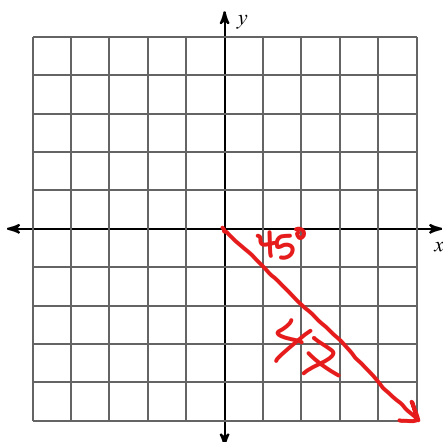
$$x \rightarrow 98 \cos 330^\circ \quad y \rightarrow 98 \sin 330^\circ$$

$$98 \frac{\sqrt{3}}{2} \quad \rightarrow 98 \left(-\frac{1}{2}\right)$$

$$49\sqrt{3} \quad \rightarrow -49$$

$\langle 49\sqrt{3}, -49 \rangle \text{ or } 49\sqrt{3}\mathbf{i} - 49\mathbf{j}$

6) $|\mathbf{r}| = 47, 315^\circ$



$$x \rightarrow 47 \cos 315^\circ \quad y \rightarrow 47 \sin 315^\circ$$

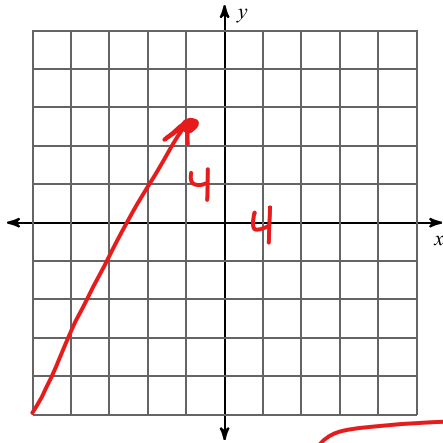
$$\frac{47\sqrt{2}}{2} \quad 47 \left(-\frac{\sqrt{2}}{2}\right)$$

$$\left\langle \frac{47\sqrt{2}}{2}, -\frac{47\sqrt{2}}{2} \right\rangle$$

$$\frac{47\sqrt{2}}{2} \mathbf{i} - \frac{47\sqrt{2}}{2} \mathbf{j}$$

Find the following information for each vector, if not provided in the question: Graph, component form, magnitude and direction angle.

7) $16i + 30j$

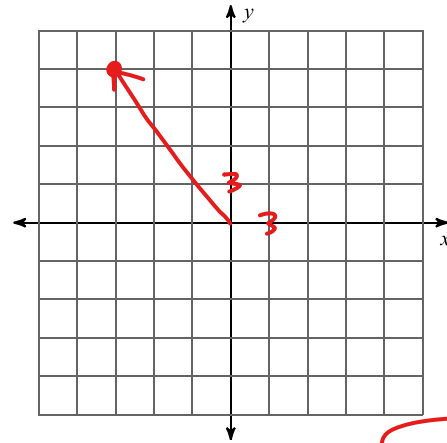


$16, 30, 34$
 $8, 15, 17$

$\text{mag} = 34$

$\tan^{-1}\left(\frac{30}{16}\right) = 61.928^\circ$

8) $-9i + 12j$



$9, 12, 15 = \text{mag}$
 $3, 4, 5$

$\tan^{-1}\left(\frac{4}{3}\right) = 53.13^\circ$

$180 - 53.13 = 126.87^\circ$