Vector Trivia

1 2 3

4 5 6

1. Fill in the blank:

a) A vector is a line segment that has both _____ and _____.

b) The result of adding two vectors is called a _____.

c) The length of a vector is called _____.

1a) magnitude and direction

b) resultant

c) magnitude

2. Given vector $\overrightarrow{HI}$ having points H(-2, 4) and I(1, -2) ...

a) Write the component form.

b) Write as a sum of unit vectors.

c) Sketch the vector is standard position.

d) Find the magnitude. (simplified radical)

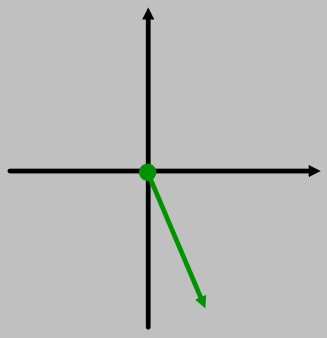
e) Find the direction. (nearest 100th)

2. H(-2, 4) and I(1, -2)

a) $\langle 3, -6 \rangle$

b) $3\vec{i} - 6\vec{j}$

c)



d) $\sqrt{9+36} = \sqrt{45} = 3\sqrt{5}$

e) $\theta' = \tan^{-1}(-2) = -63.43° = 63.43°$
$\theta = 296.57°$

3. Given: $\vec{a} = \langle -3, -2 \rangle$ and $\vec{b} = \langle -1, 4 \rangle$

Find:

a) $-4\vec{a} - \vec{b}$

b) $\frac{1}{2}\vec{a} + 3\vec{b}$

3. $\vec{a} = \langle -3, -2 \rangle \quad \vec{b} = \langle -1, 4 \rangle$

a) $-4\vec{a} - \vec{b} = \langle 12, 8 \rangle + \langle 1, -4 \rangle = \langle 13, 4 \rangle$

b) $\frac{1}{2}\vec{a} + 3\vec{b} = \left\langle -\frac{3}{2}, -1 \right\rangle + \langle -3, 12 \rangle = \left\langle -\frac{9}{2}, 11 \right\rangle$

4. Find a unit vector that is in the same direction as vector $3\vec{i} - 9\vec{j}$.

4. $3\vec{i} - 9\vec{j}$

$$\vec{u} = \frac{3\vec{i} - 9\vec{j}}{\sqrt{90}}$$

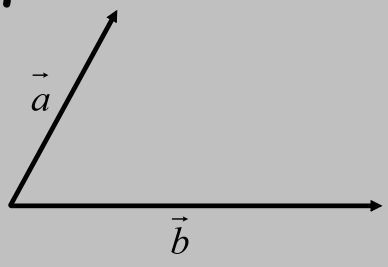
$$= \frac{3\vec{i} - 9\vec{j}}{3\sqrt{10}}$$

$$= \frac{1}{\sqrt{10}}\vec{i} - \frac{3}{\sqrt{10}}\vec{j}$$

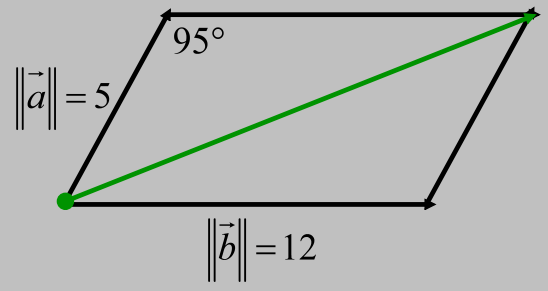
$$= \frac{\sqrt{10}}{10}\vec{i} - \frac{3\sqrt{10}}{10}\vec{j}$$

5. Given: $\|\vec{a}\| = 5$ and $\|\vec{b}\| = 12$ and the angle between the vectors is 85° ...

a) Find the length of the resultant. (nearest 100th)

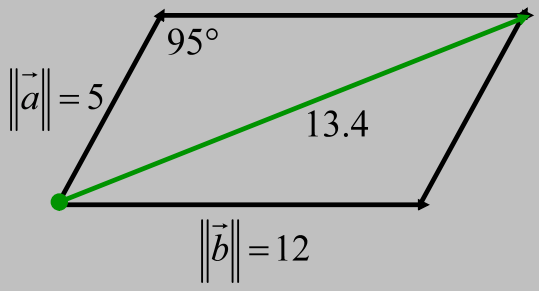


5.

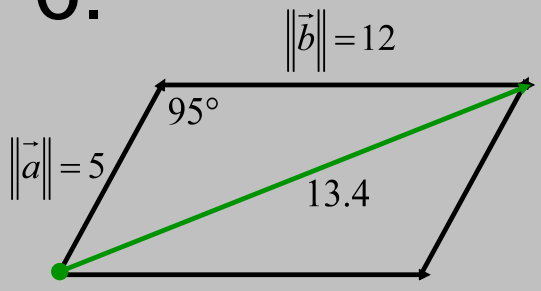


$$\|\vec{a}+\vec{b}\| = \sqrt{5^2+12^2-2(5)(12)\cos 95^\circ} = 13.40$$

6. Now find the measure of the angle between $\vec{a}$ and the resultant. (nearest 100th)



6.



$$12^2 = 5^2 + 13.4^2 - 2(5)(13.4)\cos B$$

$$-60.56 = -134\cos B$$

$$\frac{-60.56}{-134} = \cos B$$

$$B = \cos^{-1}\left(\frac{-60.56}{-134}\right) = 63.13°$$