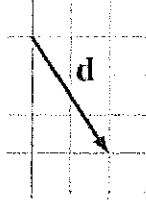
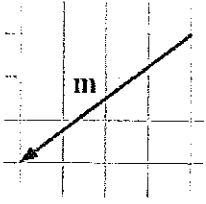


Vector Review

1) Vectors are graphed below.
Write the vectors in component form.



2) Given vectors \vec{a} , and \vec{b} . $\vec{a} = \begin{pmatrix} 1 \\ -4 \end{pmatrix}$, $\vec{b} = \begin{pmatrix} 3 \\ -2 \end{pmatrix}$.

Find $3\vec{b} - 4\vec{a}$ algebraically.

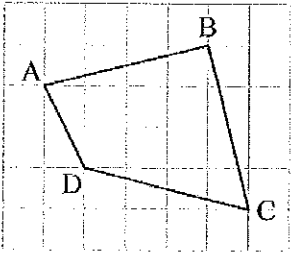
3)
Find the length of:

a $\begin{pmatrix} 2 \\ 7 \end{pmatrix}$

b $\begin{pmatrix} 0 \\ -5 \end{pmatrix}$

c $\begin{pmatrix} -8 \\ -3 \end{pmatrix}$

4)



- a** Find in component form:
 i \vec{BC} ii \vec{BD}
b Simplify $\vec{AD} + \vec{DC}$.
c Find $|\vec{AC}|$.

5) Show that $\begin{pmatrix} -2 \\ 4 \end{pmatrix} \begin{pmatrix} 8 \\ 4 \end{pmatrix}$ is orthogonal

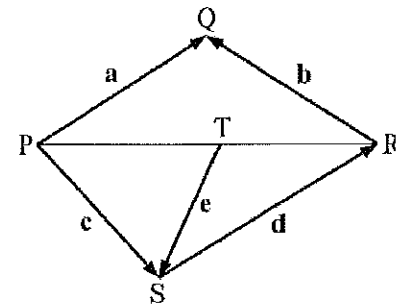
6) Simplify.

$$\begin{pmatrix} 8 \\ 2 \end{pmatrix} + \begin{pmatrix} 3 \\ 4 \end{pmatrix} - \begin{pmatrix} 5 \\ -1 \end{pmatrix}$$

7)

Find in terms of **a**, **b**, **c**, **d**, and **e**:

- a** \vec{TR} **b** \vec{PR}
c \vec{PT} **d** \vec{TQ}



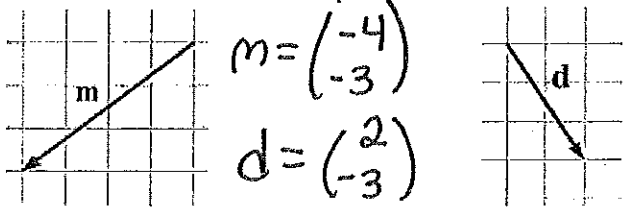
8) Give the four vectors

\vec{a} , \vec{b} , \vec{c} , and \vec{d} . $\vec{a} = \begin{pmatrix} -1 \\ 2 \end{pmatrix}$, $\vec{b} = \begin{pmatrix} 4 \\ 2 \end{pmatrix}$, $\vec{c} = \begin{pmatrix} -4 \\ -2 \end{pmatrix}$, $\vec{d} = \begin{pmatrix} -12 \\ 24 \end{pmatrix}$

- a) Show **at least** one pair of vectors that are parallel.
 b) Show **at least** one pair of vectors that are orthogonal.
 c) Which pair of vectors are **opposite vectors**?

Vector Review

1) Vectors are graphed below. Write the vectors in component form.



2) Given vectors \vec{a} , and \vec{b} . $\vec{a} = \begin{pmatrix} 1 \\ -4 \end{pmatrix}$, $\vec{b} = \begin{pmatrix} 3 \\ -2 \end{pmatrix}$.

Find $3\vec{b} - 4\vec{a}$ algebraically.

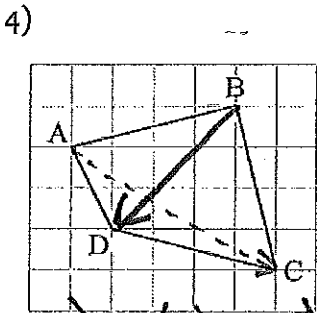
$$3\begin{pmatrix} 3 \\ -2 \end{pmatrix} - 4\begin{pmatrix} 1 \\ -4 \end{pmatrix} = \begin{pmatrix} 9 \\ -6 \end{pmatrix} - \begin{pmatrix} 4 \\ -16 \end{pmatrix} = \begin{pmatrix} 5 \\ 10 \end{pmatrix}$$

3) Find the length of:

a $\begin{pmatrix} 2 \\ 7 \end{pmatrix}$
 $\sqrt{4+49} = \sqrt{53}$

b $\begin{pmatrix} 0 \\ -5 \end{pmatrix}$
 $\sqrt{0^2+5^2} = 5$

c $\begin{pmatrix} -8 \\ -3 \end{pmatrix}$
 $\sqrt{(-8)^2+(-3)^2} = \sqrt{64+9} = \sqrt{73}$



$\vec{BC} = \begin{pmatrix} 1 \\ -4 \end{pmatrix}$ $\vec{BD} = \begin{pmatrix} -3 \\ -3 \end{pmatrix}$

a Find in component form:

i \vec{BC} ii \vec{BD}

b Simplify $\vec{AD} + \vec{DC} = \vec{AC}$

c Find $|\vec{AC}|$. $\vec{AC} = \begin{pmatrix} 5 \\ -3 \end{pmatrix}$
 $|\vec{AC}| = \sqrt{25+9}$
 $|\vec{AC}| = \sqrt{34}$

5) Show that $\begin{pmatrix} -2 \\ 4 \end{pmatrix} \begin{pmatrix} 8 \\ 4 \end{pmatrix}$ is orthogonal (Dot Product = 0)
 $-2 \cdot 8 + 4 \cdot 4$
 $-16 + 16 = 0$

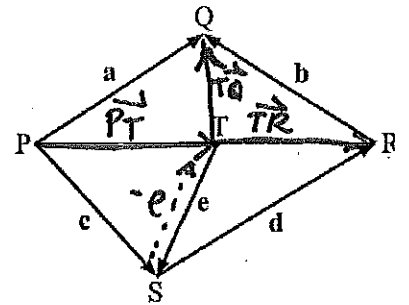
6) Simplify.

$$\begin{pmatrix} 8 \\ 2 \end{pmatrix} + \begin{pmatrix} 3 \\ 4 \end{pmatrix} - \begin{pmatrix} 5 \\ -1 \end{pmatrix} = \begin{pmatrix} 8+3-5 \\ 2+4-(-1) \end{pmatrix} = \begin{pmatrix} 6 \\ 7 \end{pmatrix}$$

7)

Find in terms of a, b, c, d, and e:

- a $\vec{TR} = e + d$ b $\vec{PR} = c + d$
 c $\vec{PT} = c - e$ d $\vec{TQ} = e + d + b$



8) Give the four vectors

\vec{a} , \vec{b} , \vec{c} , and \vec{d} . $\vec{a} = \begin{pmatrix} -1 \\ 2 \end{pmatrix}$, $\vec{b} = \begin{pmatrix} 4 \\ 2 \end{pmatrix}$, $\vec{c} = \begin{pmatrix} -4 \\ -2 \end{pmatrix}$, $\vec{d} = \begin{pmatrix} -12 \\ 24 \end{pmatrix}$

a) Show at least one pair of vectors that are parallel.

$12\vec{a} = \begin{pmatrix} -12 \\ 24 \end{pmatrix} = \vec{d}$ { \vec{a} & \vec{d} are parallel. }

b) Show at least one pair of vectors that are orthogonal.

$\vec{a} \cdot \vec{b} = (-1)(4) + 2 \cdot 2 = -4 + 4 = 0$ $\vec{a} \perp \vec{b}$ { $\vec{a} \cdot \vec{c} = (-1)(-4) + 2(-2) = 4 - 4 = 0$, $\vec{a} \perp \vec{c}$ } Also $\vec{b} \perp \vec{d}$ and $\vec{c} \perp \vec{d}$

c) Which pair of vectors are opposite vectors?

\vec{b} & \vec{c} are opposite vectors