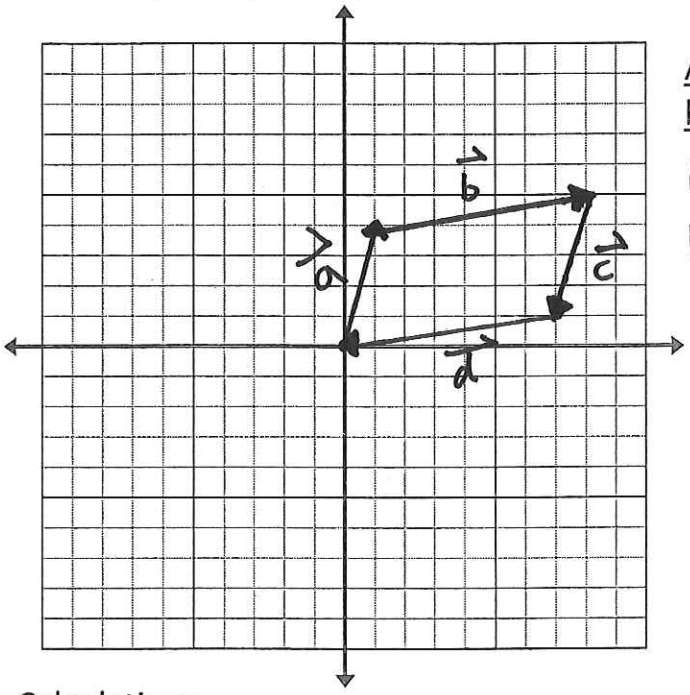
Unit 2: Coordinate Geometry Version A Name Key

SHOW ALL OF YOUR WORK.

a) Graph vectors ***A+B+C+D*** when $\vec{a}=\begin{pmatrix}1\\4\end{pmatrix},\vec{b}=\begin{pmatrix}7\\1\end{pmatrix},\vec{c}=\begin{pmatrix}-1\\-4\end{pmatrix},\vec{d}=\begin{pmatrix}-7\\-1\end{pmatrix}$ on the graph below.

b) Identify any properties of the quadrilateral using magnitudes (distances) and parallel/perpendicular vectors.

c) Classify the type of quadrilateral.



<u>After making calculations, identify properties below:</u>

$|\vec{a}|=|\vec{c}|$ Opposite vectors are equal.

$|\vec{b}|=|\vec{d}|$ Opposite sides are equal.

No vectors are orthogonal, so no sides meet at 90°.

$\vec{a}\parallel\vec{c}$ Opposite sides are parallel.

$\vec{b}\parallel\vec{d}$

Quadrilateral
Parallelogram

<u>Calculations</u>

Magnitudes (lengths):

$|\vec{a}|=\sqrt{1^2+4^2}=\sqrt{1+16}=\sqrt{17}$

$|\vec{b}|=\sqrt{7^2+1^2}=\sqrt{49+1}=\sqrt{50}$

$|\vec{c}|=\sqrt{(-1)^2+(-4)^2}=\sqrt{1+16}=\sqrt{17}$

$|\vec{d}|=\sqrt{(-7)^2+(-1)^2}=\sqrt{49+1}=\sqrt{50}$

Parallel or Perpendicular Vectors:

$\vec{a}\cdot\vec{b}\neq 0$
$\vec{b}\cdot\vec{c}\neq 0$
$\vec{c}\cdot\vec{d}\neq 0$
$\vec{d}\cdot\vec{a}\neq 0$
} No orthogonal vectors

$\vec{a}=-\vec{c}$
$\vec{b}=-\vec{d}$
} Parallel Vectors

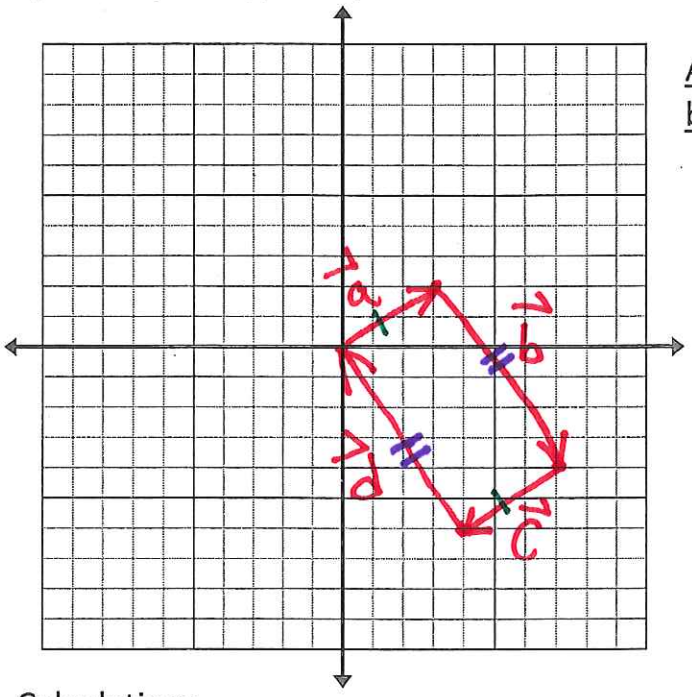
Unit 2: Coordinate Geometry Version B Name Key

SHOW ALL OF YOUR WORK.

a) Graph vectors ***A+B+C+D*** when $\vec{a}=\begin{pmatrix}3\\2\end{pmatrix},\vec{b}=\begin{pmatrix}4\\-6\end{pmatrix},\vec{c}=\begin{pmatrix}-3\\-2\end{pmatrix},\vec{d}=\begin{pmatrix}-4\\6\end{pmatrix}$ on the graph below.

b) Identify any properties of the quadrilateral using magnitudes (distances) and parallel/perpendicular vectors.

c) Classify the type of quadrilateral.



<u>After making calculations, identify properties below:</u>

2 pairs of congruent magnitudes (opposite sides are ≅)

4 orthogonal vectors that form 4 right angles.

Quadrilateral
Rectangle

<u>Calculations</u>

Magnitudes (lengths):

$|\vec{a}| = \sqrt{9+4} = \sqrt{13}$

$|\vec{b}| = \sqrt{16+36} = \sqrt{52} = 2\sqrt{13}$

$|\vec{c}| = \sqrt{9+4} = \sqrt{13}$

$|\vec{d}| = \sqrt{16+36} = \sqrt{52} = 2\sqrt{13}$

Equal size

Equal size

Parallel or Perpendicular Vectors:

$\vec{a} = -\vec{c}$
$\vec{b} = -\vec{d}$
} Parallel Vectors!

$\vec{a}\cdot\vec{b} = 3(4)+2(-6) = 0$

$\vec{b}\cdot\vec{c} = 4(-3)+-2(-6) = 0$

$\vec{c}\cdot\vec{d} = -3(-4)+-2(6) = 0$

$\vec{d}\cdot\vec{a} = -4(3)+6(2) = 0$

} orthogonal Vectors

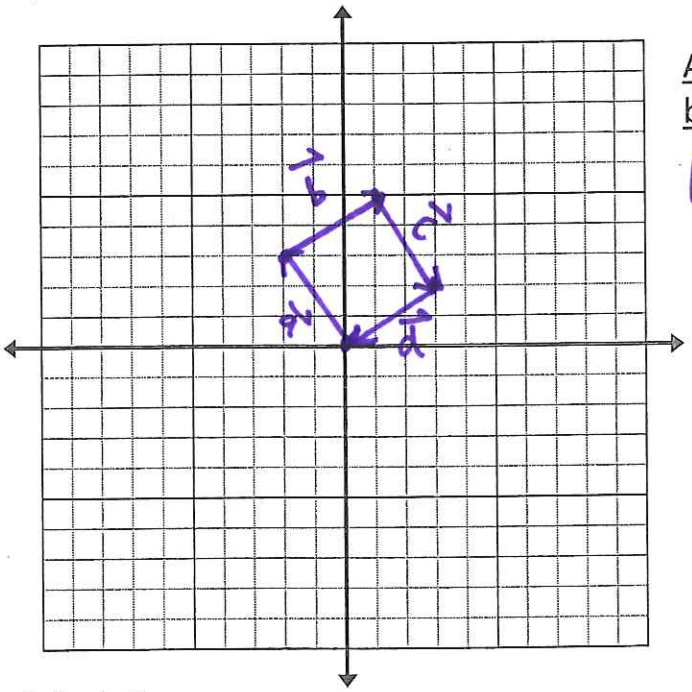
Unit 2: Coordinate Geometry Version C Name Key

SHOW ALL OF YOUR WORK.

a) Graph vectors ***A+B+C+D*** when $\vec{a}=\begin{pmatrix}-2\\3\end{pmatrix},\vec{b}=\begin{pmatrix}3\\2\end{pmatrix},\vec{c}=\begin{pmatrix}2\\-3\end{pmatrix},\vec{d}=\begin{pmatrix}-3\\-2\end{pmatrix}$ on the graph below.

b) Identify any properties of the quadrilateral using magnitudes (distances) and parallel/perpendicular vectors.

c) Classify the type of quadrilateral.



After making calculations, identify properties below:

$|\vec{a}|=|\vec{b}|=|\vec{c}|=|\vec{d}|$ All sides are equal.

$\vec{a}\perp\vec{b}$, $\vec{b}\perp\vec{c}$, $\vec{c}\perp\vec{d}$, $\vec{d}\perp\vec{a}$ Each vector is perpendicular to the next. Sides meet at 90° angles.

$\vec{a}\parallel\vec{c}$, $\vec{b}\parallel\vec{d}$ Opposite sides are parallel

Quadrilateral
Square

Calculations

Magnitudes (lengths):

$|\vec{a}|=\sqrt{(-2)^2+3^2}=\sqrt{4+9}=\sqrt{13}$

$|\vec{b}|=\sqrt{3^2+2^2}=\sqrt{9+4}=\sqrt{13}$

$|\vec{c}|=\sqrt{2^2+(-3)^2}=\sqrt{4+9}=\sqrt{13}$

$|\vec{d}|=\sqrt{(-3)^2+(-2)^2}=\sqrt{9+4}=\sqrt{13}$

Parallel or Perpendicular Vectors:

$\vec{a}\cdot\vec{b}=-2(3)+3(2)=-6+6=0$

$\vec{b}\cdot\vec{c}=3(2)+2(-3)=6-6=0$

$\vec{c}\cdot\vec{d}=2(-3)+(-3)(-2)=-6+6=0$

$\vec{d}\cdot\vec{a}=-3(-2)+(-2)(3)=6-6=0$

$\vec{a}\cdot\vec{c}=-2(2)+3(-3)=-4-9=-13$

$\vec{b}\cdot\vec{d}=3(-3)+2(-2)=-9-4=-13$

$\vec{a}=-\vec{c}$, $\vec{b}=-\vec{d}$ } Parallel Vectors

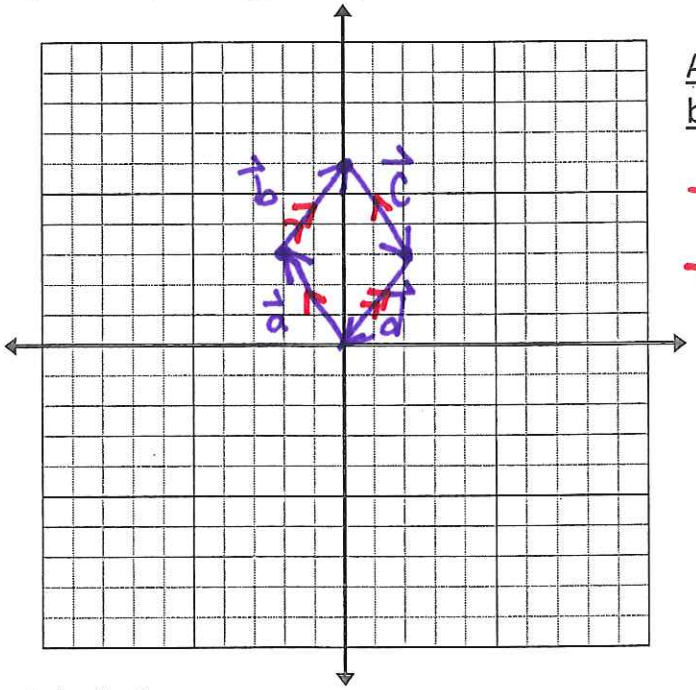
Unit 2: Coordinate Geometry Version D Name Key

SHOW ALL OF YOUR WORK.

a) Graph vectors ***A+B+C+D*** when $\vec{a}=\begin{pmatrix}-2\\3\end{pmatrix},\vec{b}=\begin{pmatrix}2\\3\end{pmatrix},\vec{c}=\begin{pmatrix}2\\-3\end{pmatrix},\vec{d}=\begin{pmatrix}-2\\-3\end{pmatrix}$ on the graph below.

b) Identify any properties of the quadrilateral using magnitudes (distances) and parallel/perpendicular vectors.

c) Classify the type of quadrilateral.



<u>After making calculations, identify properties below:</u>

- 2 pairs of parallel vectors
- 4 congruent magnitudes

Equilateral Parallelogram!

Quadrilateral
RHOMBUS

<u>Calculations</u>

Magnitudes (lengths):

$|\vec{a}| = \sqrt{4+9} = \sqrt{13}$

$|\vec{b}| = \sqrt{4+9} = \sqrt{13}$

$|\vec{c}| = \sqrt{4+9} = \sqrt{13}$

$|\vec{d}| = \sqrt{4+9} = \sqrt{13}$

Parallel or Perpendicular Vectors:

$\vec{a}\cdot\vec{b} \neq 0$

$\vec{b}\cdot\vec{c} \neq 0$

$\vec{c}\cdot\vec{d} \neq 0$

$\vec{d}\cdot\vec{a} \neq 0$

} No orthogonal vectors

$\vec{a} = -\vec{c}$

$\vec{b} = -\vec{d}$

} Parallel vectors

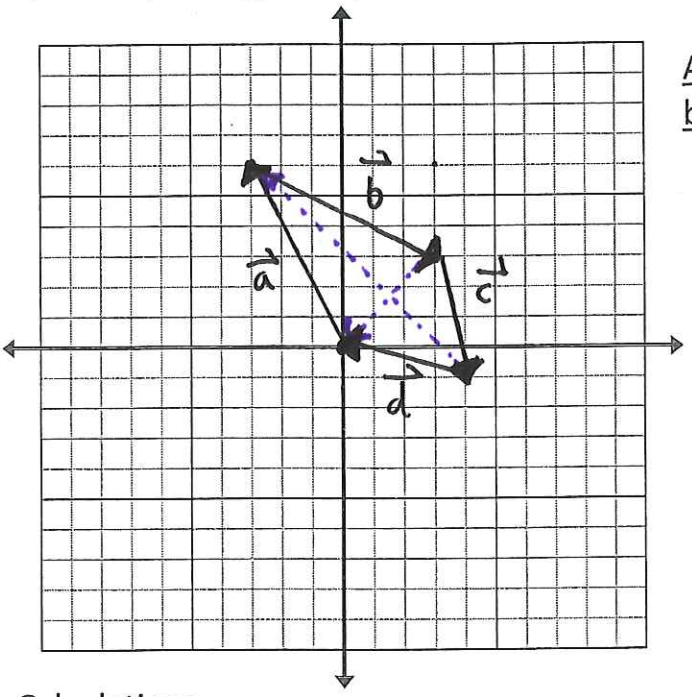
Unit 2: Coordinate Geometry Version E Name Key

SHOW ALL OF YOUR WORK.

a) Graph vectors ***A+B+C+D*** when $\vec{a}=\begin{pmatrix}-3\\6\end{pmatrix},\vec{b}=\begin{pmatrix}6\\-3\end{pmatrix},\vec{c}=\begin{pmatrix}1\\-4\end{pmatrix},\vec{d}=\begin{pmatrix}-4\\1\end{pmatrix}$ on the graph below.

b) Identify any properties of the quadrilateral using magnitudes (distances) and parallel/perpendicular vectors.

c) Classify the type of quadrilateral.



<u>After making calculations, identify properties below:</u>

$|\vec{d}| = |\vec{c}|$

$|\vec{a}| = |\vec{b}|$

Two distinct pairs of equal adjacent sides.

$(\vec{d}+\vec{a}) \perp (\vec{c}+\vec{d})$

The diagonals of the kite are perpendicular!

Quadrilateral
Kite!

<u>Calculations</u>

Magnitudes (lengths):

$|\vec{a}| = \sqrt{(-3)^2+(6)^2} = \sqrt{9+36} = \sqrt{45}$

$|\vec{b}| = \sqrt{(6)^2+(-3)^2} = \sqrt{36+9} = \sqrt{45}$

$|\vec{c}| = \sqrt{1^2+(-4)^2} = \sqrt{1+16} = \sqrt{17}$

$|\vec{d}| = \sqrt{(-4)^2+1^2} = \sqrt{16+1} = \sqrt{17}$

Parallel or Perpendicular Vectors:

$\vec{d}+\vec{a} = \begin{pmatrix}-7\\7\end{pmatrix}$

$\vec{c}+\vec{d} = \begin{pmatrix}-3\\-3\end{pmatrix}$

$(\vec{d}+\vec{a})\cdot(\vec{c}+\vec{d}) = 21-21 = 0$

$-7(-3)+7(-3) =$

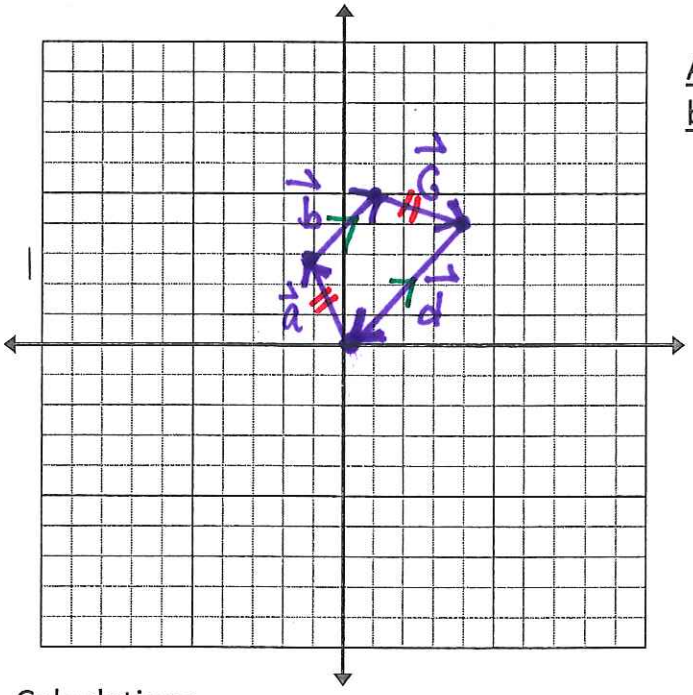
Unit 2: Coordinate Geometry Version F Name Key

SHOW ALL OF YOUR WORK.

a) Graph vectors ***A+B+C+D*** when $\vec{a}=\begin{pmatrix}-1\\3\end{pmatrix},\vec{b}=\begin{pmatrix}2\\2\end{pmatrix},\vec{c}=\begin{pmatrix}3\\-1\end{pmatrix},\vec{d}=\begin{pmatrix}-4\\-4\end{pmatrix}$ on the graph below.

b) Identify any properties of the quadrilateral using magnitudes (distances) and parallel/perpendicular vectors.

c) Classify the type of quadrilateral.



<u>After making calculations, identify properties below:</u>

Vectors $\vec{b}$ & $\vec{d}$ are parallel. (One pair of parallel sides).

Quadrilateral

Isosceles Trapezoid

<u>Calculations</u>

Magnitudes (lengths):

$|\vec{a}| = \sqrt{1+9} = \sqrt{10}$

$|\vec{b}| = \sqrt{4+4} = \sqrt{8} = 2\sqrt{2}$

$|\vec{c}| = \sqrt{9+1} = \sqrt{10}$

Equal Size

$|\vec{d}| = \sqrt{16+16} = \sqrt{32} = 4\sqrt{2}$

Parallel or Perpendicular Vectors:

$\vec{b} \parallel \vec{d}$ because $-2\vec{b} = \vec{d}$

$\vec{a}\cdot\vec{b} \neq 0$ $\quad \vec{b}\cdot\vec{c} \neq 0$

$\vec{a}\cdot\vec{d} \neq 0$ $\quad \vec{c}\cdot\vec{d} \neq 0$

No orthogonal vectors