

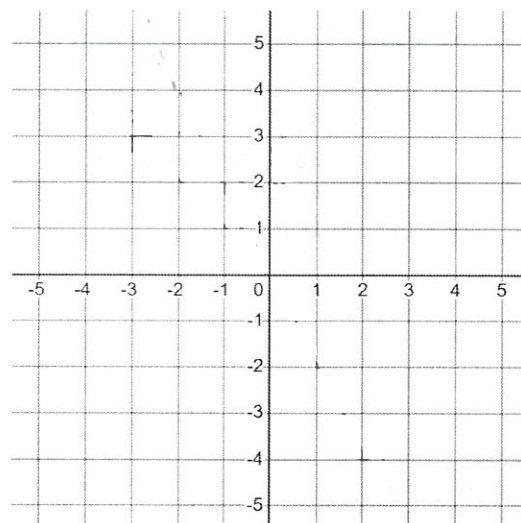
1. Given vectors $\vec{a} = \langle -3, 3 \rangle$ and $\vec{b} = \langle 2, -4 \rangle$, find each. Values should be in exact form. [2pts each]

a) $\vec{b} + 2\vec{a} - 5\vec{j}$

- b) Find a unit vector that is in the same direction as \vec{b}

- c) Find the vector projection, $proj_{\vec{b}} \vec{a}$

- d) On the axis below, sketch and label \vec{a} and \vec{b} in standard position. Then sketch vector projection, $proj_{\vec{b}} \vec{a}$. Label each vector so they can be clearly distinguished.



2. Consider the points $A = (-2, 5, 1)$ and $B = (4, 8, -2)$ and $C = (8, y, 3)$

- a) Find the vector equation of the line containing A and B [3 pts]

- b) Find 2 points on the line that are 3 times as far from A as they are from B. [3 pts]

- c) Solve for the y component of point C so that \overrightarrow{AB} and \overrightarrow{AC} are orthogonal. [3 pts]

3. Given the following set of parametric equations:

$$x(t) = \sqrt{3t - 1} \quad y(t) = \frac{3}{t}$$

a) Eliminate the parameter and write an equation as a function y in terms of x . [3pts]

b) State the domain and range of the graph. [2 pts]

4. For the following set of parametric equations, eliminate the parameter. Then name the type of graph that is formed.

$$\begin{aligned} x(t) &= 2 + 4\sec t & t: [0, 2\pi] \\ y(t) &= 3 + 2\tan t \end{aligned}$$

Equation: _____ [3 pts] Type of graph: _____ [1 pt]

5. A stomp rocket is launched from the ground with a velocity of 60 ft/s at an angle of 30 degrees to the horizontal, and flies towards a 9-foot wall that is at a horizontal distance of 30 ft from the point of launch. Will the stomp rocket hit the wall or go over the wall? You must justify your answer to receive credit. [4]