

Howdy!
we will begin
at 6 pm ;)

1. Sketch the parametric curves described below. Indicate with an arrow the direction in which the curve is traced out as t increases. What is the cartesian equation of the curve?

a.) $x = t - 4, y = 3t + 1$

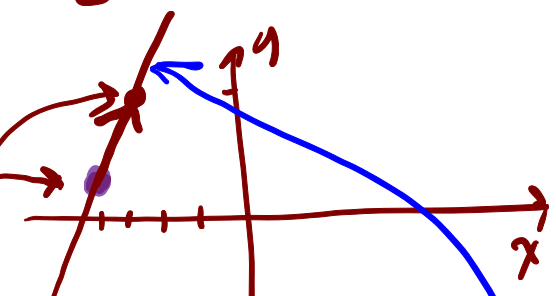
graph will be a line since degree of t is at most 1.

$t = 0 \begin{cases} x = -4 \\ y = 1 \end{cases} \rightarrow (-4, 1)$
 $t = 1 \begin{cases} x = -3 \\ y = 4 \end{cases} \rightarrow (-3, 4)$

cartesian equation:

$x = t - 4 \rightarrow t = x + 4$
 $y = 3t + 1$
 $y = 3(x + 4) + 1$

$y = 3x + 13$



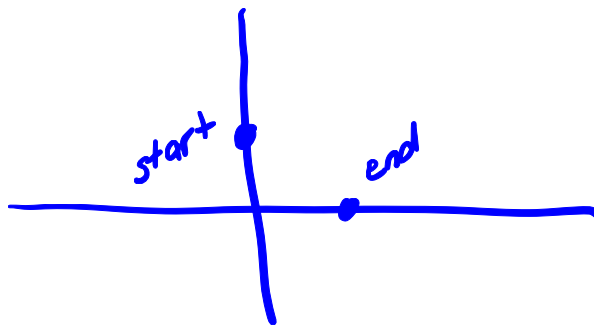
b.) $x = \sqrt{t}, y = 1 - t$

$t = 0 \begin{cases} x = 0 \\ y = 1 \end{cases} \rightarrow (0, 1)$

$t = 1 \begin{cases} x = 1 \\ y = 0 \end{cases} \rightarrow (1, 0)$

cartesian equation:

$x = \sqrt{t}, y$



c.) $x = 2 \sin \theta, y = 3 \cos \theta$

d.) $\mathbf{r}(t) = \langle 2 + \sin t, 3 + \cos t \rangle, 0 \leq t \leq \pi$

Vector equation of a line Illustration

2. Find a vector equation of the line passing through the point $(1, 3)$ and parallel to the vector $\langle -2, 6 \rangle$.

3. Find a vector equation of the line with slope $\frac{2}{3}$ and passing through the point $(-2, 2)$

4. Find parametric equations for the line passing through the points $(8, 3)$ and $(-5, 2)$

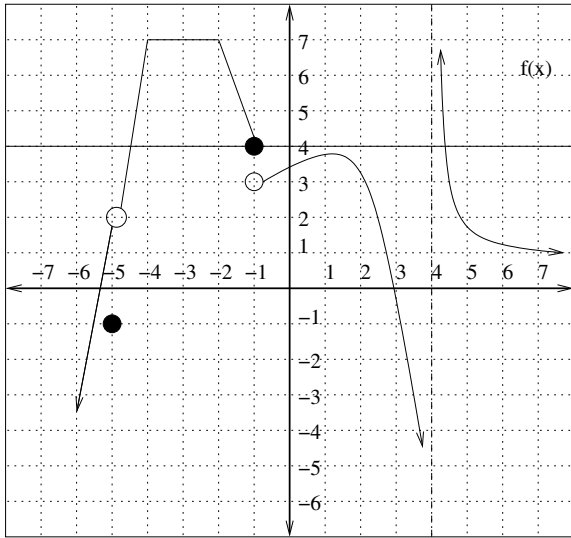
5. Find a vector perpendicular to the line $2x + 5y = 8$.

6. Determine whether the following lines are parallel or perpendicular. If they are not parallel, find the point of intersection.

$$L1: \mathbf{r}(t) = (-4 + 2t)\mathbf{i} + (5 + t)\mathbf{j}$$

$$L2: \mathbf{r}(t) = (2 + 3t)\mathbf{i} + (4 - 6t)\mathbf{j}$$

7. Use the graph of $f(x)$ below to compute the following limits, or explain why the limit does not exist.



a) $\lim_{x \rightarrow -1^-} f(x)$

b) $\lim_{x \rightarrow -1^+} f(x)$

c) $\lim_{x \rightarrow -1} f(x)$

d) $\lim_{x \rightarrow -5} f(x)$

e) $\lim_{x \rightarrow 4^+} f(x)$

f.) $\lim_{x \rightarrow -2} f(x)$

8. Find $\lim_{x \rightarrow -2} \frac{x-1}{x+2}$ or explain why it does not exist.

9. Find $\lim_{x \rightarrow 3} \frac{x-5}{x^2-9}$ or explain why it does not exist.

10. Find $\lim_{x \rightarrow 4} \frac{x-1}{(x-4)^2}$ or explain why it does not exist.