

1. Find an equation for the family of lines with slope $m = 2$.
Find the equation for the member of this family that passes through $(-4, 6)$.

2. Match the description of the graph with the equation.

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|--|---------------------------------|
| ___1. Family of horizontal lines | A. $x = 3 \sin t, y = 2 \cos t$ |
| ___2. All points fall in quadrant I except for $(2,0)$ | B. $y = m(x+3) - 2$ |
| ___3. Equation of vertical asymptote is $x=2$
All points fall in quadrants 1 and 2 | C. $x = \tan^2 t, y = \sec^2 t$ |
| ___4. Family of lines passing through $(-3,-2)$ | D. $y = \sqrt[3]{x}$ |
| ___5. All points fall in quadrants 1 and 3
except for $(0,0)$ | E. $y = \sqrt{x-2}$ |
| ___6. Family of parallel lines that are not horizontal | F. $y = -\frac{1}{(x-2)^2}$ |
| ___7. Equation of vertical asymptote: $x=2$.
All points fall in quadrants 3 and 4. | G. $y = \frac{1}{(x-2)^2}$ |
| ___8. The ellipse $\frac{x^2}{9} + \frac{y^2}{4} = 1$ | H. $y = -2x + b$ |
| ___9. The line $y = x + 1$ | I. $y = b$ |

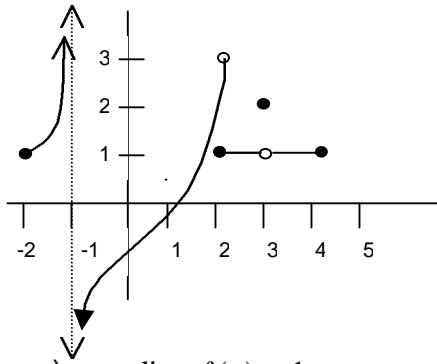
3. Assume that $\sin \mathbf{a} = a$ and $\cos \mathbf{b} = b$. Match:

- | | |
|--|------------------|
| _____1. $\cos(-\mathbf{b})$ | A. a |
| _____2. $\sin(\mathbf{p} + \mathbf{a})$ | B. b |
| _____3. $\cos(\mathbf{p} - \mathbf{b})$ | C. $-a$ |
| _____4. $\cos(2\mathbf{b})$ | D. $-b$ |
| _____5. $\sec \mathbf{b}$ | E. $2b^2 - 1$ |
| _____6. $\cos\left(\frac{\mathbf{p}}{2} - \mathbf{a}\right)$ | F. $\frac{1}{b}$ |

4. Sketch the graph of $x = t - 3, y = 2t - 6, 0 \leq t \leq 4$

Eliminate the parameter and give the equation in terms of x and y .

5. Use the sketch of $f(x)$ to classify the statement as true or false.



- a) $\lim_{x \rightarrow 2^+} f(x) = 1$ _____
- b) $\lim_{x \rightarrow 2} f(x)$ does not exist _____
- c) $f(3) = 1$ _____
- d) $\lim_{x \rightarrow 3} f(x)$ does not exist _____
- e) $\lim_{x \rightarrow 2^-} f(x) = 3$ _____
- f) $\lim_{x \rightarrow -1^-} f(x) = \lim_{x \rightarrow -1^+} f(x)$ _____

6. Sketch a possible graph for a function $f(x)$ with these properties.

- a) $f(0) = 3$ and $f(6) = 1$
- b) $\lim_{x \rightarrow 3^-} f(x) = +\infty$ and $\lim_{x \rightarrow 3^+} f(x) = +\infty$
- c) $\lim_{x \rightarrow +\infty} f(x) = 0$

7. Find the limits.

a) $\lim_{x \rightarrow 3} 5$

b) $\lim_{x \rightarrow 3} (5x)$

c) $\lim_{x \rightarrow -4} \frac{x}{|x|}$

d) $\lim_{x \rightarrow 2} \frac{x^2 - 7x + 10}{x - 2}$

e) $\lim_{x \rightarrow \infty} \frac{2x^2 + 3x - 8}{5x^2 + 7x + 10}$

f) $\lim_{x \rightarrow -\infty} f(x)$ if $f(x) = \begin{cases} 3x^5 + 3, & x < 0 \\ x^2 - 2, & x > 0 \end{cases}$

g) $\lim_{x \rightarrow \infty} \frac{\sqrt{4x^2 - 6x}}{x + 5}$

h) $\lim_{x \rightarrow \infty} (\sqrt{x^2 + 2} - x)$

i) $\lim_{x \rightarrow 0} \frac{\sin 5x}{x}$

j) $\lim_{x \rightarrow 0} \frac{\tan 5x}{\sin 2x}$

8. Find the largest open interval, centered at $x = 2$ on the x -axis, such that for each x in the interval the value of the function $f(x) = 5x - 2$ is within 0.01 of the number $f(2) = 8$

9. Use the **d, e** definition of a limit to prove: $\lim_{x \rightarrow 4} (4x - 3) = 13$

10. Prove: $\lim_{x \rightarrow \infty} \frac{1}{x + 3} = 0$

11. Three conditions must be met to say that $f(x)$ is continuous at $x = a$. State these conditions.

12. Find the values of x at which $f(x)$ is not continuous.

a) $f(x) = \frac{x + 5}{2x^2 + 5x - 3}$

b) $f(x) = \cot x$