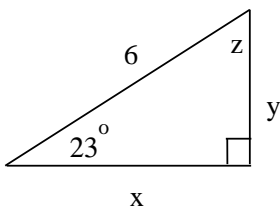
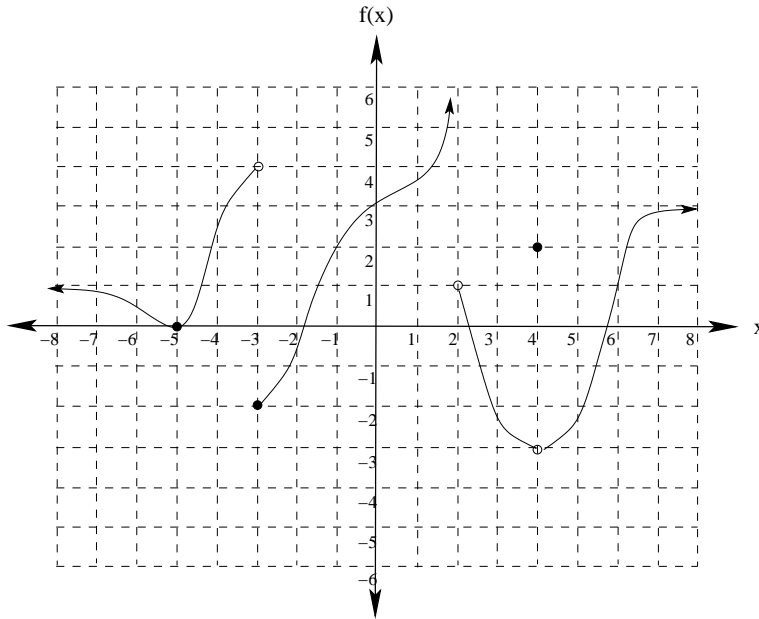


- Given the points  $A : (4, -2)$  and  $B : (-2, 7)$ :
  - Find an equation for the line containing  $A$  and  $B$
  - Find the line that is perpendicular to the line you found in part (a) and containing the point  $(1, -1)$
- Find solutions to the inequality:  $\frac{x^2 - 1}{x^2 + x - 6} \leq 0$ .
- Given the function  $f(x) = \frac{1}{x - 2}$ 
  - What is the domain of  $f$ ? Give your answer in interval notation.
  - Find  $f(5)$  and  $f(2a + 4)$
  - Find  $\frac{f(a + h) - f(a)}{h}$  (be sure to simplify your answer).
- Given that  $f(x) = \frac{1}{2x - 3}$  and  $g(x) = \sqrt{x^2 - 9}$ 
  - Find  $f \circ g(2)$
  - Find the domain of  $\frac{g}{f}$ ? Give your answer in interval notation.
- Find the exact value of each of the following:
  - $\sin\left(\frac{7\pi}{4}\right)$
  - $\cos\left(\frac{4\pi}{3}\right)$
  - $\sin^{-1}\left(\frac{1}{\sqrt{2}}\right)$
  - $\cos^{-1}(-1)$
  - $\sin^{-1}\left(-\frac{\sqrt{3}}{2}\right)$
- Find all solutions to the following equations. Give the exact answers.
  - $2 \sin 3x = \sqrt{3}$
  - $\sin^2(x) - \sin(x) = 0$
- Find the values of  $x$ ,  $y$  and  $z$  in the triangle shown below:



8. A function  $f$  is graphed below. Find the following:



- $f(-5)$ ,  $f(-3)$ , and  $f(4)$
- find the domain and range of  $f$
- find the intervals where  $f$  is decreasing
- find  $\lim_{x \rightarrow 4} f(x)$
- find  $\lim_{x \rightarrow 2^-} f(x)$  and  $\lim_{x \rightarrow 2^+} f(x)$
- find  $\lim_{x \rightarrow -\infty} f(x)$  and  $\lim_{x \rightarrow \infty} f(x)$
- find the points where  $f(x)$  is discontinuous, and classify each point of discontinuity.

9. Find the following limits:

- $\lim_{x \rightarrow 2} \frac{3x + 7}{\sqrt{5x - 1}}$
- $\lim_{x \rightarrow \frac{3}{2}} \frac{2x^2 + x - 6}{4x^2 - 4x - 3}$
- $\lim_{x \rightarrow 2} \frac{x^4 - 16}{x^2 - x - 2}$
- $\lim_{x \rightarrow -2^+} \sqrt{x + 2}$
- $\lim_{x \rightarrow 3^+} \frac{4}{\sqrt{x - 3}}$
- $\lim_{x \rightarrow \infty} \frac{(3x - 5)(2x - 3)}{(2x + 1)(3x - 2)}$
- $\lim_{x \rightarrow \infty} \frac{(3x - 5)(2x - 3)}{(2x + 1)}$

10. Given the function

$$f(x) = \begin{cases} x^2 & \text{if } x < 1 \\ 2 & \text{if } x = 1 \\ 4 - x^2 & \text{if } x > 1 \end{cases}$$

- Graph  $f(x)$ .
  - Find  $\lim_{x \rightarrow 1^-} f(x)$ ,  $\lim_{x \rightarrow 1^+} f(x)$ , and  $\lim_{x \rightarrow 1} f(x)$
  - Is  $f(x)$  continuous at  $x = 1$ ? Justify your answer.
11. Given that  $f(x) = x^3 + 5$ ,  $\lim_{x \rightarrow 2} f(x) = 13$ , and  $\epsilon = .01$ , find the largest  $\delta$  such that if  $0 < |x - 2| < \delta$ , then  $|f(x) - 13| < \epsilon$ .
12. Use the formal definition of a limit to prove that  $\lim_{x \rightarrow 6} 5x - 21 = 9$ .
13. Let  $f(x) = \frac{x^2 - x - 2}{x^2 - 2x}$ .
- Find the values of  $x$  at which  $f$  is discontinuous.
  - Find all vertical and horizontal asymptotes of  $f$ .
14. Find the  $x$  values at which  $f(x) = \frac{\sqrt{9 - x^2}}{x^4 - 16}$  is continuous.
15. Use the Intermediate Value Theorem to show  $x^5 - 3x^4 - 2x^3 - x + 1 = 0$  has a solution between 0 and 1.