1. Find the domain and range of each function.
   A. $f(x) = 1 + x^2$

   B. $g(x) = \sqrt{x^2 - 3x}$

2. $f(x) = x - 1$ and $g(x) = 1/(x + 1)$, find the following.

   A. $f(f(5))$ B. $g(f(8))$

3. Find the limits

   A. $\lim\limits_{u \to 1} \dfrac{u^4 - 1}{u^3 - 1}$

   B. $\lim\limits_{h \to 0^-} \dfrac{\sqrt{6} - \sqrt{5h^2 + 11h + 6}}{h}$

   C. $\lim\limits_{x \to 0} \dfrac{1 + x + \sin x}{3\cos x}$

   D. $\lim\limits_{x \to \infty} \dfrac{\sqrt{x^2 + 1}}{x + 1}$

4. Show that $\lim\limits_{x \to -3} \dfrac{x^2 - 9}{x + 3} = -6$ by the precise definition.

5. For what values of a and b is continuous at every x?
$$f(x) = \begin{cases} -2, & x \le -1 \\ ax - b, & -1 < x < 1 \\ 3, & x \ge 1 \end{cases}$$

6. $\lim \dfrac{1}{x^2 - 4}$

   A. $x \to 2^+$ B. $x \to 2^-$

7. Use the definitions of right-hand and left-hand limits to prove the limit statements

$$\lim\limits_{x \to 0^-} \frac{x}{|x|} = -1$$

8. find the average rate of change of the function over the given interval or intervals.

$$R(\theta) = \sqrt{4\theta + 1}; [0,2]$$