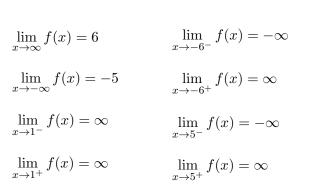
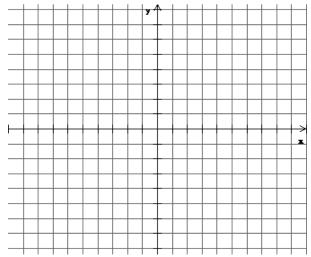
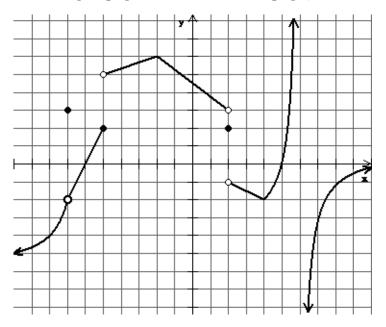
Show all work for credit. Also, give exact answers unless otherwise noted.

1. Sketch the graph of a function f such that the following limits hold.





2. A function p is graphed below. From the graph, find the following. Justify each answer.



(a) Where does *p* have a removable discontinuity, if anywhere?

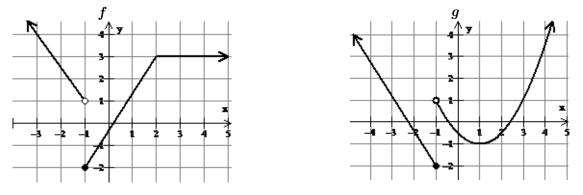
(b) Where does *p* have a jump discontinuity, if anywhere?

(c) Where does p have an infinite discontinuity, if anywhere?

3. Use the graphs for f and g below to determine the continuity at -1 for:

Justify your answers.

(a)
$$f + g$$
 (a) $f - g$



4. Find and classify all discontinuities for each of the following functions. Justify your answers.

(a)
$$h(t) = \frac{3t^2 + 7t - 6}{2t^2 + 5t - 3}$$
 (b) $s(\varphi) = \cot \varphi$

(c)
$$q(r) = \begin{cases} 3r-2 & \text{if } r < 4\\ 2r+1 & \text{if } r \ge 4 \end{cases}$$
 (d) $w(a) = \begin{cases} |a+2| & \text{if } a < -1\\ 1 & \text{if } a = -1\\ 3a^2 - \sqrt{a+5} & \text{if } a > -1 \end{cases}$

- 5. Let the function f be defined by $f(x) = \frac{2x^2 + 5x 3}{x^2 9}$.
 - (a) Determine the horizontal asymptote(s) of f. (b) Determine the vertical Asymptote(s) of f.

6. Find each of the following limits.

(a)
$$\lim_{x \to \infty} \frac{4x^3 + 6x - 1}{-5x^3 + 2x^2 - 3}$$
 (b) $\lim_{x \to 2^+} \frac{2}{3x - 6}$

(c)
$$\lim_{x \to 5} \frac{3x^2 - 75}{x - 5}$$
 (d) $\lim_{x \to -\infty} \frac{2x - x^3}{x^4 + 2x - 11}$

7. Use the Intermediate Value Theorem to show that $x^3 - 15x + 1 = 0$ has three solutions in the interval [-4, 4].