

# Manipulating Limits Worksheet

Evaluate the following.

1.  $\left( \lim_{x \rightarrow -5} \frac{x^2 + 3x - 10}{x + 5} \right)^2$

6. If  $\lim_{x \rightarrow -1} f(x) = 4$ , find  
 $\lim_{x \rightarrow -1} 2f(x) - \sqrt{f(x)}.$

2.  $\lim_{x \rightarrow \infty} \frac{1}{x^2} - \frac{2}{x}$

7. If  $\lim_{x \rightarrow 3} g(x) = -9$ , find  $\lim_{x \rightarrow 3} g(x - 3).$

3.  $\lim_{x \rightarrow \infty} \left[ \ln\left(1 + \frac{1}{x}\right) + \ln\left(1 - \frac{1}{x}\right) \right]$

8. If  $\lim_{x \rightarrow 0} h(x) = 5$  and  $\lim_{x \rightarrow 0} g(x) = 3$ , find  
 $\lim_{x \rightarrow 0} [3h(x) + 5g(x)].$

4.  $\lim_{x \rightarrow -1} \left[ \frac{x+1}{x^2-1} \times \frac{x-1}{x^2+1} \right]$

9. If  $\lim_{x \rightarrow 0} h(x) = 5$  and  $\lim_{x \rightarrow 0} g(x) = 3$ , find  
 $\lim_{x \rightarrow 0} \frac{3h(x)}{g(x)^2}.$

5.  $\lim_{x \rightarrow \infty} \frac{e^{-x^2} + 3}{1 - e^{-x^2}}$

10. If  $\lim_{x \rightarrow \infty} u(x) = a$  and  $\lim_{x \rightarrow \infty} v(x) = b$ , find  
 $\lim_{x \rightarrow \infty} u^2(x) + uv(x) = a.$

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