

### Limits Worksheet 1.3

1. Given  $\lim_{x \rightarrow 9} f(x) = 6$ ,  $\lim_{x \rightarrow 9} g(x) = 3$ ,  $\lim_{x \rightarrow 6} f(x) = 9$ ,  $\lim_{x \rightarrow 6} g(x) = 3$ , evaluate the following limits. If it is not possible to know, state so.

(a)

$$\lim_{x \rightarrow 9} (f(x) + g(x))$$

(d)

$$\lim_{x \rightarrow 6} \left( \frac{f(x)}{3 - g(x)} \right)$$

(b)

$$\lim_{x \rightarrow 9} \left( \frac{3f(x)}{g(x)} \right)$$

(e)

$$\lim_{x \rightarrow 9} g(f(x))$$

(c)

$$\lim_{x \rightarrow 9} \left( \frac{f(x) - 2g(x)}{g(x)} \right)$$

(f)

$$\lim_{x \rightarrow 6} f(g(x))$$

2. Evaluate the given limit.

(a)

$$\lim_{x \rightarrow 3} (x^2 - 3x + 7)$$

(b)

$$\lim_{x \rightarrow \pi} \left( \frac{x - 3}{x - 5} \right)^7$$

(c)

$$\lim_{x \rightarrow 0} \ln(1 + x)$$

(f)

$$\lim_{x \rightarrow 6} \left( \frac{x^2 - 4x - 12}{x^2 - 13x + 42} \right)$$

(d)

$$\lim_{x \rightarrow \pi/4} (\cos(x) \sin(x))$$

(g)

$$\lim_{x \rightarrow 0} \left( \frac{x^2 + 2x}{x^2 - 2x} \right)$$

(e)

$$\lim_{x \rightarrow 0} \ln(x)$$

(h)

$$\lim_{x \rightarrow -2} \left( \frac{x^2 - 5x - 14}{x^2 + 10x + 16} \right)$$