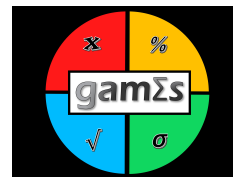


GAMES Practice Problems – Limits



1. Evaluate the following limit, if it exists:

$$\lim_{x \rightarrow 5} \frac{2x^2 + 4x - 5}{x^2 - 5x + 6}$$

2. Evaluate the following limit, if it exists:

$$\lim_{x \rightarrow 5} \frac{x - 7}{x^2(x + 8)}$$

3. Before calculating, guess the value of $\lim_{x \rightarrow \infty} \frac{x^2}{2x}$ by using the function in the limit expression for $x = 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 20, 50$ and 100 .

4. Suppose $\lim_{x \rightarrow a} g(x) = 4$, $\lim_{x \rightarrow a} f(x) = 5$, $\lim_{x \rightarrow a} h(x) = 0$.

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

(b) $\lim_{x \rightarrow a} g(x) - f(x)$

(c) $\lim_{x \rightarrow a} g(x)h(x)$

(d) $\lim_{x \rightarrow a} \frac{g(x)}{f(x)}$

(e) $\lim_{x \rightarrow a} \frac{g(x)}{h(x)}$

(f) $\lim_{x \rightarrow a} \frac{h(x)}{g(x)}$

(g) $\lim_{x \rightarrow a} (f(x))^2$

(h) $\lim_{x \rightarrow a} \frac{1}{f(x) - h(x)}$

5. Consider the function:

$$\begin{aligned} g(x) &= 6x + 2 \text{ for } x < -4 \\ &= -24 \text{ for } x = -4 \\ &= 6x - 2 \text{ for } x > -4 \end{aligned}$$

Evaluate the following limits, if they exist.

(a) $\lim_{x \rightarrow -4^-} g(x)$

(b) $\lim_{x \rightarrow -4^+} g(x)$

(c) $\lim_{x \rightarrow -4} g(x)$

(d) $g(-4)$

6. Evaluate the following limits:

(a) $\lim_{x \rightarrow \infty} \frac{10x^3 - 7x^2 - 4x}{3 - 10x - 3x^3}$

(b) $\lim_{x \rightarrow -\infty} \frac{10x^3 - 7x^2 - 4x}{3 - 10x - 3x^3}$

(c) $\lim_{x \rightarrow -\infty} \frac{7x + 6}{11x^2 - 9x + 10}$

(d) $\lim_{x \rightarrow -\infty} \frac{7x+6}{11x^2-9x+10}$

7. Find all values of the constant k such that the limit shown below exists:

$$\lim_{x \rightarrow \infty} \frac{5^{kx} + 5}{5^{4x} + 7}$$

8. Evaluate the limit:

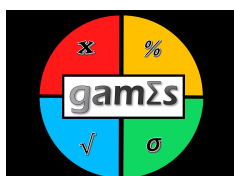
$$\lim_{x \rightarrow \infty} \frac{(5-x)(11+7x)}{(3-11x)(7+6x)}$$

9. Calculate the following limits by direct substitution.

(a) $\lim_{y \rightarrow -2} y^3(5-3y^2)$

(b) $\lim_{t \rightarrow -6} (\sqrt{t^2+3t-2})^3$

(c) $\lim_{b \rightarrow 7} \frac{24}{b+1} - (b-4)^2$



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