

Name: _____ Date: _____ Period: _____

End of Unit 1 Review— Limits and Continuity**Lessons 1.10 through 1.16.**

Reviews do NOT cover all material from the lessons but will hopefully remind you of key points. To be prepared, you should review all packets from Unit 1 (including the Mid-Unit Review).

1. If $f(x) = \frac{x+3}{x^2-2x-15}$, identify the type of each discontinuity and where it is located.

State whether the function is continuous at the given x values. Justify your answers!

$$2. f(x) = \begin{cases} \cos(3x), & x < 0 \\ \tan x, & 0 \leq x < \frac{\pi}{4} \\ \sin(2x), & x \geq \frac{\pi}{4} \end{cases}$$

Continuous at $x = 0$? Continuous at $x = \frac{\pi}{4}$?

Find the domain of each function.

3. $h(t) = \frac{\sqrt{t+3}}{t-5}$

4. $f(x) = \ln\left(\frac{2}{x-1}\right)$

5. If the function f is continuous for all real numbers and if $f(x) = \frac{x^2+6x+8}{x+2}$ when $x \neq -2$, then $f(-2) =$

6. Let f be the function defined by $f(x) = \begin{cases} \frac{x^2+8x+12}{x+6}, & x \neq -6 \\ b, & x = -6 \end{cases}$. For what value of b is f continuous at $x = -6$?

Evaluate the limit.

7. $\lim_{x \rightarrow \infty} \sin\left(\frac{x+3\pi x^2}{2x^2}\right)$

8. $\lim_{x \rightarrow -5^-} \frac{-3}{25-x^2}$

9. $\lim_{x \rightarrow \infty} \frac{\sin x}{x}$

10. $\lim_{x \rightarrow \infty} \frac{4x^5-2x^2+3}{3x^2+2x^5-x^4}$

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

12. $\lim_{x \rightarrow \infty} x^5 3^{-x}$

13. Identify all horizontal asymptotes of $f(x) = \frac{\sqrt{16-x^3+5x}}{5x^3-8x}$.