Unit 1 - Review

Score: _____ / 40   Name:_____

NO CALCULATOR!

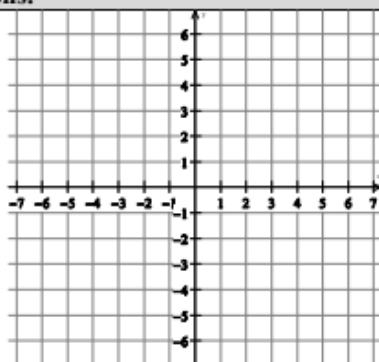| **Sketch a graph of a function g that satisfies all of the following conditions.** |
| --- |

1.

a. $g(-5) = -2$

b. $\lim\limits_{x \to -5^+} g(x) = 4$

c. $\lim\limits_{x \to -5^-} g(x) < g(-5)$

d. g is decreasing on $x < -5$

e. $\lim\limits_{x \to 2} g(x) = g(-5)$

Evaluate the limit.

$$\lim_{x \to 0} \frac{3x^6 + x^3}{5x^5 + 3x^3}$$

$$\lim_{x \to 0} \frac{3 - 3\cos x}{x}$$

$$\lim_{x \to \infty} \frac{3x^5 + 2x^2 + 1}{2x^5 + 5x^4 + x^3}$$

$$\lim_{x \to -2^+} \frac{x+1}{x^2 + 4x + 4}$$

$$\lim_{x \to 1} \frac{x-1}{\frac{1}{2-x} - 1}$$

$$\lim_{x \to 8^+} \frac{x-8}{|x-8|}$$

$$\lim_{x \to \infty} \left(\frac{\cos x}{x} + 2\right)$$

According to the table, what is value of $\lim\limits_{x \to 13} f(x)$?

x	12.9	12.999	13.001	13.1
$f(x)$	−8.1	−8.001	−7.999	−7.9

Identify any horizontal asymptote(s) of the following functions

$$f(x) = \frac{(2x+1)(4-3x)}{(2x+7)^2}$$

$$f(x) = \frac{\sqrt{25x^6 - 2x^2 + 5x}}{2x^3 + 3x^2}$$

For each function identify the type of each discontinuity and where it is located.

$$f(x) = \frac{x+2}{x^2+10x+21}$$

Find the domain of each function.

$$f(x) = \ln\left(\frac{6}{x-3}\right)$$

Let g and h be the functions defined by $g(x) = -\frac{1}{2}x^2 + x - \frac{3}{2}$ and $h(x) = \sin\left(\frac{\pi}{2}(x+2)\right)$. If f is a function that satisfies $g(x) \le f(x) \le h(x)$ for all x, what is $\lim_{x\to 1} f(x)$?

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

$$f(x) = \begin{cases} \tan\frac{x}{2}, & x < 0 \\ \sin(2x), & 0 \le x \le \pi \\ \cos\left(\frac{x}{4}\right), & x > \pi \end{cases}$$

Continuous at $x = 0$?   Continuous at $x = \pi$?

Let f be the function defined by $f(x) = \begin{cases} \frac{x^2+8x+7}{x+1}, & x \ne -1 \\ b, & x = -1 \end{cases}$. For what value of b is f continuous at $x = -1$?

$\lim_{x\to\infty} \frac{\ln|x|+\pi}{x} =$

(A) $-\infty$ (B) 0 (C) e (D) ∞ (E) The limit does not exist.