Semester 1 - Unit 1 Review

AP Calc. AB/BC

NO CALCULATOR!

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

1.

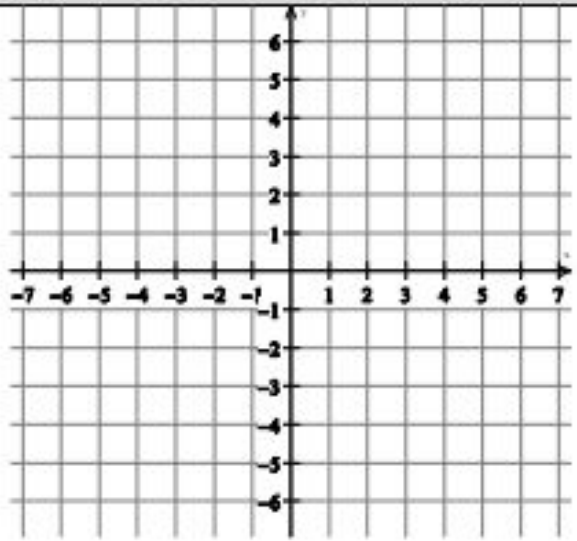
a. $g(-5) = -2$

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

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

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

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



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 $\lim_{x \to 13} f(x)$?

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 $g(x) \leq f(x) \leq h(x)$ 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!

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

Continuous at $x = 0$?

Continuous at $x = \pi$?

Let f be the function defined by $f(x) = \begin{cases} \frac{x^2+8x+7}{x+1}, & x \neq -1 \\ b, & x = -1 \end{cases}$. 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.

Answer Key:

Semester 1 - Unit 1 Review - Answer Key