NAME _____ DATE _____ PD _____

AP Calculus AB Limits Review

Evaluate each limit algebraically.

1) $\lim_{x\to -2}\dfrac{x^3-4x}{x-2}$

2) $\lim_{x\to -4}\dfrac{x^2-16}{x^2+5x+4}$

3) $\lim_{x\to -\infty}\dfrac{4x-5x^3}{x^2+1}$

4) $\lim_{x\to 0}\dfrac{2x^3+5x^2}{x^3-3x^2}$

5) $\lim_{x\to \infty}\dfrac{\sqrt{6x^2+2x-1}}{5x+3}$

6) $\lim_{x\to \infty}\dfrac{x^2+2x}{e^{x^2}}$

7) $\lim_{x\to 1}\dfrac{1-x^2}{x-1}$

8) $\lim_{x\to 16}\dfrac{\sqrt{x}-4}{x-16}$

9) $\lim_{x\to \infty}\dfrac{8x-2}{5-4x}$

10) $\lim_{x\to 0}\dfrac{\sqrt{x+6}-\sqrt{6}}{x}$

11) $\lim_{x\to \infty}\dfrac{(2-x)(4x+4)}{(2x+1)(2+3x)}$

12) $\lim_{x\to 0}\dfrac{\dfrac{1}{x-2}+\dfrac{1}{2}}{x}$

13) $\lim_{\theta\to 0}\dfrac{\sin a\theta}{b\theta}$

14) $\lim_{x\to 0}\dfrac{\cos x-\cos^2 x}{x}$

15) $\lim_{h\to 4}\dfrac{(2+h)^2-9h}{h-4}$

16) $\lim_{x\to \infty}\dfrac{6x^2-9}{x^3-12x+3}$

17) $\lim_{x\to 2^-}\dfrac{x+5}{x-2}$

18) $\lim_{x\to 2^+}\dfrac{x+5}{x-2}$

19) $\lim_{x\to 2^-}[x]$

20) $\lim_{x\to 2^+}[x]$

21) $\lim_{x\to -2^-}[x]$

22) $\lim_{x\to -2^+}[x]$

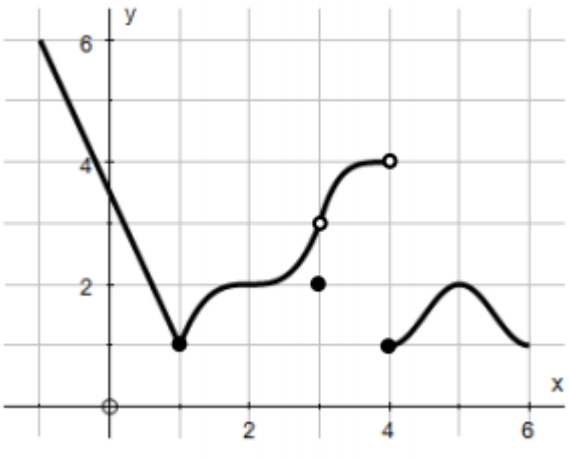
23) When $g(x)=\begin{cases}\dfrac{4x^2}{2x+1} & x\le 0\\ \dfrac{1}{x} & x>0\end{cases}$, find each limit: $\lim_{x\to\infty} g(x)$, $\lim_{x\to-\infty} g(x)$, $\lim_{x\to 0^-} g(x)$, $\lim_{x\to 0^+} g(x)$

24) Find all horizontal and vertical asymptotes: $f(x)=\dfrac{1-x}{2x^2-5x-3}$

25)If $\lim_{x\to 2} f(x) = 6$ and $\lim_{x\to 2} g(x) = -2$, evaluate the following limits:

a) $\lim_{x\to 2} f(x) + g(x)$ b) $\lim_{x\to 2} f(x) - g(x)$ c) $\lim_{x\to 2} f(x)\cdot g(x)$ d) $\lim_{x\to 2} g(x) - 2f(x) + 3$

26) Evaluate each of the following limits. If they do not exist, explain why.



a) $\lim_{x\to 1} f(x)$ b) $\lim_{x\to 3^-} f(x)$

c) $\lim_{x\to 3^+} f(x)$ d) $\lim_{x\to 3} f(x)$

e) $\lim_{x\to 4^+} f(x)$ f) $\lim_{x\to 4^-} f(x)$

g) $\lim_{x\to 4} f(x)$ h) $f(4)$

i) Using the definition of continuity, explain why f is discontinuous at $x = 4$

27) When $f(x) = \begin{cases} \sqrt{-x} & x < 0 \\ 3 - x & 0 \le x < 3 \\ (x-3)^2 & x > 3 \end{cases}$, find

a) $\lim_{x\to 0^-} f(x)$ b) $\lim_{x\to 0^+} f(x)$

c) $\lim_{x\to 0} f(x)$ d) $f(0)$

e) $\lim_{x\to 3^+} f(x)$ f) $\lim_{x\to 3^-} f(x)$

g) $\lim_{x\to 3} f(x)$ h) $f(3)$

28) Use the definition of continuity to determine if g is continuous at $x = 1$ when $g(x) = \begin{cases} 2x - 1 & x \le 1 \\ -3x + 1 & x > 1 \end{cases}$

29) Find the value of a that would make each function continuous.

a) $g(x) = \begin{cases} x^2 + ax & x \le 5 \\ 5\sin\left(\dfrac{\pi x}{2}\right) & x > 5 \end{cases}$

b) $g(x) = \begin{cases} \dfrac{x^2 - 2x - 3}{x - 3} & x < 3 \\ ax - 2 & x \ge 3 \end{cases}$