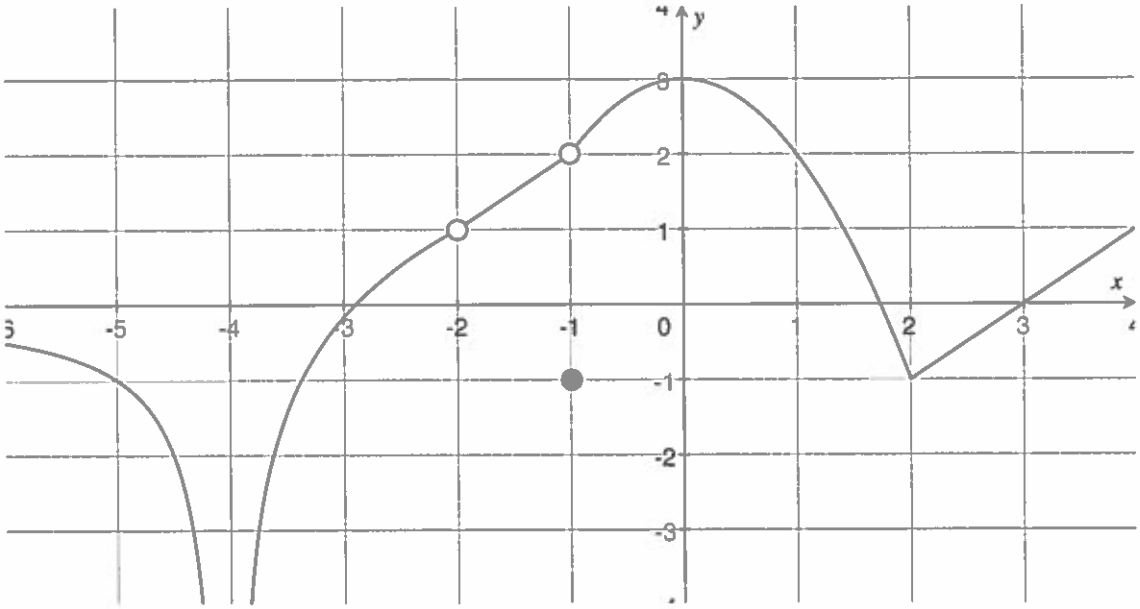
Who hopes they're prepared? Key Period:____

AP Calculus AB: Chapter 2 Review



1) $\lim_{x\to -4^-} f(x) = -\infty$

2) $\lim_{x\to -4} f(x) = -\infty$

3) $\lim_{x\to -2^+} f(x) = 1$

4) $\lim_{x\to -1} f(x) = 2$

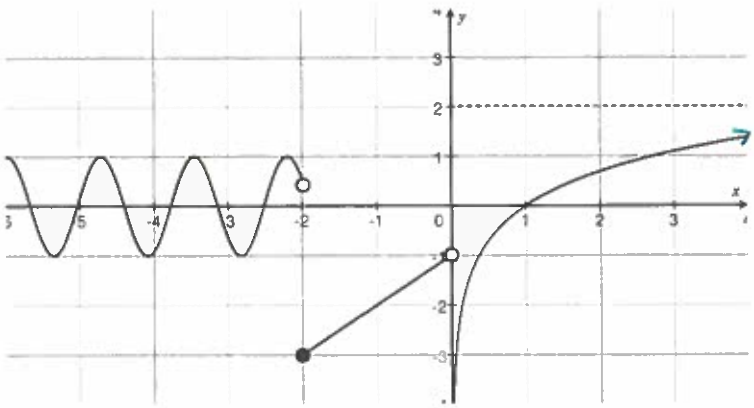
5) $\lim_{x\to 0} f(x) = 3$

6) $\lim_{x\to 1^-} f(x) = 2$

7) $\lim_{x\to 1} f(x) = 2$

8) $\lim_{x\to 2} f(x) = -1$

9) $\lim_{n\to 3^+} f(x) = 0$



10) $\lim_{x\to \infty} f(x) = 2$

11) $\lim_{x\to -\infty} f(x) =$ DNE (It keeps between -1 and 1)

12) $\lim_{x\to -2} f(x) =$ DNE

13) $\lim_{x\to 0} f(x) =$ DNE

14) $\lim_{x\to 1} f(x) = 0$

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15) Tell whether the piecewise function, $f(x) = \begin{cases} \frac{2x^2+7x+5}{x^2-1}, & x \geq -1 \\ 2^x - 2, & x < -1 \end{cases}$ is continuous. If not then show the rule as of to why it is not continuous.

1) $\lim_{x\to -1} f(x)$ L: $\frac{(x+1)(2x+5)}{(x+1)(x-1)} = \frac{2(-1)+5}{-1-1} = \frac{-2+5}{-2} = \boxed{\frac{3}{-2}}$

R: $2^{-1}-2 = \frac{1}{2} - \frac{4}{2} = \boxed{\frac{-3}{2}}$ $\boxed{-\frac{3}{2}}$

(2) $f(-1) = -\frac{3}{2}$

(3) $\lim_{x\to -1} f(x) = f(-1) = -\frac{3}{2}$

f(x) is continuous

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16) Tell whether the piecewise function, $f(x) = \begin{cases} x, & x = 2 \\ x^3 - x, & x \neq 2 \end{cases}$ is continuous. If not then show the rule as of to why it is not continuous.

① $\lim_{x\to 2} f(x) = (2)^3 - 2 = 8 - 2 = \boxed{6}$

② $f(2) = \boxed{2}$

③ $\lim_{x\to 2} f(x) \neq f(2)$ so $f(x)$ is not continuous.

17)(This is the same question as above but with inequalities instead of equal signs.) Tell whether the piecewise function, $f(x) = \begin{cases} x^3 - x, & x > 2 \\ x, & x \leq 2 \end{cases}$ is continuous. If not then show the rule as of to why it is not continuous.

① $\lim_{x\to 2} f(x)$ L: 2, R: $(2)^3 - 2 = 6$ → DNE

$\lim_{x\to a} f(x)$ DNE so $f(x)$ is not continuous.

18) Find the value of k that makes f(x) continuous, $f(x) = \begin{cases} x^3 - x, & x > 2 \\ kx, & x \leq 2 \end{cases}$

$(2)^3 - 2 = k(2)$

$6 = 2k$

$\boxed{k = 3}$

19) Find the k-value to make the function, $g(x) = \begin{cases} k^2x^2 - 7xk, & x > -1 \\ 10x, & x \leq -1 \end{cases}$ continuous.

$k^2(-1)^2 - 7(-1)k = 10(-1)$

$k^2 + 7k = -10$

$k^2 + 7k + 10 = 0$ → $(k+5)(k+2) = 0$

$\boxed{k = -5 \text{ or } k = -2}$

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20) $\lim_{x\to 2} \frac{x^2 - 4}{x - 2}$ $(x+2)(x-2)$

$2 + 2 = \boxed{4}$

21) $\lim_{x\to \frac{\pi}{4}} \csc(x) = \boxed{\frac{2}{\sqrt{2}}}$ or $\frac{2\sqrt{2}}{2} = \boxed{\sqrt{2}}$

22) $\lim_{x\to \frac{\pi}{3}} \cot(x) = \frac{\sqrt{1}}{\sqrt{3}} = \boxed{\frac{1}{\sqrt{3}} \text{ or } \frac{\sqrt{3}}{3}}$

23) $\lim_{x\to \frac{5\pi}{6}} \frac{x}{\cos(x)} = \left(\frac{\frac{5\pi}{6}}{\frac{-\sqrt{3}}{2}}\right) = \frac{-10\pi}{6\sqrt{3}} = \boxed{\frac{5\pi}{3\sqrt{3}} \text{ or } \frac{5\pi\sqrt{3}}{9}}$

S | A

T | C

24) $\lim_{x\to 2} \frac{3x^2 + 14x - 5}{x - 2}$ $(x+5)(3x-1)$

① can't plug in

② can't factor and cancel

1.7 L: $\frac{+}{-} = -\infty$

2.1 R: $\frac{+}{+} = \infty$ → DNE

25) $\lim_{x\to a} \frac{4x^2 - 5ax + a^2}{x^2 - a^2}$

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26) $\lim_{x\to\infty} -2x^3 + 4x + 3 =$ $-\infty$

27) $\lim_{x\to\infty} \frac{5x - 4x^{2} + 3}{2x^{2} - 2} = \frac{-4}{2} =$ -2

28) $\lim_{x\to\infty} \frac{x^2 + 3x^{5} - x}{x^{7} - 10} =$ 0

29) $\lim_{x\to-\infty} \frac{2^x + 3}{7x^3 - 5} = \frac{2^{-\infty}}{7x^3} = \frac{1}{2^{\infty}\cdot 7x^3} =$ 0

30) $\lim_{x\to\infty} \frac{-3x^3 + 8x^2}{3x} = \frac{-3(\infty)^3}{3(\infty)} =$ $-\infty$

31) $\lim_{x\to-\infty} \frac{-3x^3 + 8x^2}{3x} = \frac{-3(-\infty)^3}{3(-\infty)} = \frac{+}{-} =$ $-\infty$

32) $\lim_{x\to\infty} \frac{\sqrt{x^2 + 3}}{x} =$ 1

33) $\lim_{x\to-\infty} \frac{\sqrt{x^2 + 3}}{x} =$ -1

32) Find the asymptotes and holes in the function $y = \frac{3x^2+14x-5}{x-2}$ $\frac{(3x-1)(x+5)}{(x-2)}$

hole : None

H.A.: None

V.A.: $x=2$

33) Find the asymptotes and holes in the function $y = \frac{(x-2)(2x-7)}{2x^2-5x-7}$

$(2x-7)(x+1)$

hole: $x = \frac{7}{2}$

H.A: $y = 1$

V.A.: $x = -1$

$2x - 7 = 0$

$2x = 7$

$x = \frac{7}{2}$