Learning Target: I can determine continuity *mathematically*.

Find the intervals on which each function is continuous.

25) $f(x)=\sin\left(\dfrac{1}{x-\pi}\right)$

26) $f(x)=\begin{cases} x+3 & x\le -4 \\ -x-9 & x>-4 \end{cases}$

27) $f(x)=-2\cot(2x)$ over $[-\pi,\pi]$

28) $f(x)=\begin{cases} -2x+6 & x<6 \\ -2 & x\ge 6 \end{cases}$

29) $f(x)=\dfrac{x+1}{x^2-4x}$

30) $f(x)=\dfrac{25x}{x^2+25}$

31) $f(x)=\begin{cases} -\dfrac{x}{2}-1 & x\le 1 \\ -x^2+4x-3 & x>1 \end{cases}$

32) $f(x)=\begin{cases} \dfrac{x}{2}-3 & x>-4 \\ -x^2-4x-5 & x\le -4 \end{cases}$

Learning Target: I can classify types of discontinuities providing a *mathematical* explanation for each.

Determine if each function is continuous. If the function is not continuous, find the x-axis location of and classify each discontinuity.

33) $f(x)=\begin{cases} x^2-4x+3 & x\ge 3 \\ -2x+3 & x<3 \end{cases}$

34) $f(x)=-\dfrac{x^2-9x+18}{x-1}$

35) $f(x)=\dfrac{-x-1}{x^2+x+1}$

36) $f(x)=\cos\left(\dfrac{1}{x}\right)$ over $[-\pi,\pi]$

37) $f(x)=\sin\left(\dfrac{1}{x+\pi}\right)$

38) $f(x)=-\tan(2x)$ over $[-\pi,\pi]$

39) $f(x)=\dfrac{x^2-2x-8}{x+2}$

40) $f(x)=\begin{cases} -x^2+16x-63 & x\ge 7 \\ -2x+9 & x<7 \end{cases}$

Calculus Name:

Chapter 2 – Finals Review Date: Period:

Directions: Choose at least 4 problems from each learning target. If you need to do more, do more.

Learning Target: I can find limits using purely algebraically methods. Do not use l'Hôpital's Rule.

1) $\lim\limits_{x\to 2}\dfrac{x^2-1}{x^3+2}$ **2)** $\lim\limits_{x\to -2}\dfrac{x+2}{x^2-4}$ **3)** $\lim\limits_{x\to -2}\dfrac{x^2-4}{x^3+8}$ **4)** $\lim\limits_{x\to -1}\dfrac{\dfrac{1}{x+2}-1}{x+1}$

5) $\lim\limits_{x\to 0}\dfrac{\sqrt{x+9}-3}{x}$ **6)** $\lim\limits_{x\to 0}\dfrac{\dfrac{1}{x+1}-1}{x}$ **7)** $\lim\limits_{x\to 1}\dfrac{\sqrt{3}-\sqrt{x+2}}{1-x}$ **8)** $\lim\limits_{x\to -2}\dfrac{x^2-1}{2x}$

Learning Target: I can use the properties of limits to evaluate limits.

For 9-12, use $\lim\limits_{x\to c} f(x)=4$ and $\lim\limits_{x\to c} g(x)=5$ to evaluate the limits.

9) $\lim\limits_{x\to c}\left[f(x)\right]^3$ **10)** $\lim\limits_{x\to c}\left[3f(x)-g(x)\right]$ **11)** $\lim\limits_{x\to c}\left[f(x)g(x)\right]$ **12)** $\lim\limits_{x\to c}\dfrac{f(x)}{g(x)}$

For 13-16, use $\lim\limits_{x\to c} f(x)=27$ and $\lim\limits_{x\to c} g(x)=12$ to evaluate the limits.

13) $\lim\limits_{x\to c}\sqrt[3]{f(x)}$ **14)** $\lim\limits_{x\to c}\dfrac{f(x)}{18}$ **15)** $\lim\limits_{x\to c}\left[f(x)g(x)\right]$ **16)** $\lim\limits_{x\to c}\left[f(x)-2g(x)\right]$

Learning Target: I can find one-sided and two-sided limits.

17) $\lim\limits_{x\to -1^+}\left(-|x+1|-1\right)$ **18)** $\lim\limits_{x\to -2^-}\left(x+|2x+4|\right)$ **19)** $\lim\limits_{x\to 2^+} f(x), f(x)=\begin{cases} x^2+6x+8, & x\le -1 \\ -2x+1, & x>-1 \end{cases}$ **20)** $\lim\limits_{x\to \frac{\pi}{2}^-} 2\sec x$

21) $\lim\limits_{x\to 2^+}\dfrac{x-2}{x^2-3x+2}$ **22)** $\lim\limits_{x\to 1^+}\dfrac{x-1}{x^2-4x+3}$ **23)** $\lim\limits_{x\to 2^+} f(x), f(x)=\begin{cases} x+1, & x\le 2 \\ \dfrac{x}{2}+2, & x>2 \end{cases}$ **24)** $\lim\limits_{x\to \frac{\pi}{3}^+} -\cot(2x)$