Name:_____

Limits Test Review

Find the limit of the function:

1. $\lim_{x\to 3}\dfrac{x-3}{x^2-9}$

2. $\lim_{x\to 0}\dfrac{\sin 3x}{\sin 5x}$

3. $\lim_{h\to 0}\dfrac{-5(x+h)+5x}{h}$

4. $\lim_{x\to 3}\begin{cases}\frac{1}{2}x+1 & x\le 4\\ 2x-5 & x>4\end{cases}$

5. $\lim_{x\to 4}\dfrac{\sqrt{x+5}-3}{x-4}$

6. $\lim_{x\to 3^-}\dfrac{x^2}{x^2-9}$

7. $\lim_{x\to 0}\dfrac{(1-\cos^2 x)}{2x^2}$

8. $\lim_{x\to 5^+}\dfrac{x}{x^2-25}$

9. $\lim_{h\to 0}\dfrac{(x+h)^2-x^2}{h}$

10. $\lim_{x\to 2^+}\dfrac{x-3}{2-x}$

11. $\lim_{x\to 0}\dfrac{\sin x\cos x}{x^2-5x}$

12. $\lim_{x\to 3}\dfrac{\sqrt{x+1}}{x-4}$

13. $\lim_{x\to 0}\dfrac{\frac{1}{x+2}-\frac{1}{2}}{x}$

14. $\lim_{x\to\infty}\dfrac{4x-3}{2-x}$

15. $\lim_{x\to 5}\begin{cases}x-4 & x\le 5\\ -x+3 & x>5\end{cases}$

16. $\lim_{x\to\infty}\dfrac{7x^2-2}{(2x-1)(3-x)}$

17. $\lim_{x\to 2^+}\begin{cases}x^2-2 & x\le 2\\ 3x-5 & x>2\end{cases}$

18. $\lim_{x\to-\infty}\dfrac{3x^2-7x}{2x^3}$

19. $\lim_{x\to 0}\dfrac{\sin x(1-\cos x)}{2x^2}$

20. $\lim_{x\to 1^-}\begin{cases}x^3 & x\le 1\\ -x+3 & x>1\end{cases}$

21. Use the Intermediate Value Theorem to show that $f(x) = x^3 + 2x - 1$ has a zero on the interval [0,1]

Find where the function is discontinuous and describe the type of discontinuity

22. $$f(x) = \begin{cases} \dfrac{x^2-4}{x+2} & x \neq -2 \\ 3 & x = -2 \end{cases}$$

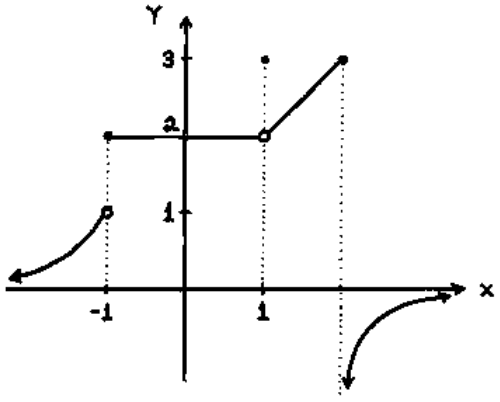
23. $$f(x) = \begin{cases} x^2 & x < 1 \\ 2x-1 & 1 \le x \le 3 \\ -x+7 & x > 3 \end{cases}$$

24. $$f(x) = \frac{x^2 - 3x - 10}{x^2 - 25}$$

25. Find the value of c that will make f(x) continuous at x=1

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

Use the graph below of g(x) to answer the questions



26. $\lim_{x \to -1^+} g(x)$ **27.** $\lim_{x \to 2^+} g(x)$ **28.** $\lim_{x \to -1^-} g(x)$

29. $\lim_{x \to 2^-} g(x)$ **30.** $\lim_{x \to 1} g(x)$ **31.** $\lim_{x \to 0} g(x)$

32. $\lim_{x \to -1} g(x)$ **33.** $g(1)$ **34.** $\lim_{x \to -\infty} g(x)$

35. Find where g(x) is discontinuous and list the type of discontinuity