**Name_____Chapter 1 Review**

**Evaluate the following limits.**

1. $\lim\limits_{x \to 4} \dfrac{x-4}{x^2 - x - 12}$

6. $\lim\limits_{x \to \infty} \dfrac{3x-2}{9x+7}$

2. $\lim\limits_{x \to 3} \dfrac{x^3 - 27}{x^2 - 9}$

7. $\lim\limits_{x \to \infty} \dfrac{6x-3}{6x^2 - 3x}$

3. $\lim\limits_{h \to 0} \dfrac{(x+h)^2 - x^2}{h}$

8. $\lim\limits_{x \to \infty} \dfrac{2x^3}{x^2 + 1}$

4. $\lim\limits_{x \to 2} \dfrac{4-x^2}{3 - \sqrt{x^2 + 5}}$

9. $\lim\limits_{t \to 0} \dfrac{(x+t)^3 - x^3}{t}$

5. $\lim\limits_{x \to 1} \dfrac{x^2 + x - 2}{(x-1)^2}$

10. $\lim\limits_{\Delta x \to 0} \dfrac{2(x+\Delta x)^2 - 3(x+\Delta x) - (2x^2 - 3x)}{\Delta x}$

11. $\lim\limits_{x\to\infty}\dfrac{x}{\sqrt{x^2+5}}$

12. $\lim\limits_{x\to-\infty}\dfrac{2x}{\sqrt{3x^2-4}}$

13. $\lim\limits_{x\to1}\dfrac{\sqrt{2x+1}-\sqrt{3}}{x-1}$

14. $\lim\limits_{\theta\to0}\dfrac{\sin 3\theta}{\sin 2\theta}$

15. $\lim\limits_{x\to\frac{\pi}{2}}\dfrac{\sin(x-\frac{\pi}{2})}{x-\frac{\pi}{2}}$

16. $\lim\limits_{x\to0}\dfrac{1-\cos^3 x}{x}$

17. $\lim\limits_{x\to3} f(x)$ where f(x) $= \begin{cases} x-4 \text{ if } -3<x\le1 \\ 2x^2-5 \text{ if } 1<x<3 \\ x+7 \text{ if } 3\le x\le7 \end{cases}$

18. $\lim\limits_{x\to1} f(x)$ Use Number 17's function.

19. $\lim\limits_{x\to-2} f(x)$ Use Number 17's function.

20. $\lim\limits_{x\to0}\dfrac{x}{\sec x}$

**On problems 21 – 31, determine the vertical and horizontal asymptotes for each function. If an asymptote does not exist, state that fact. You can use the factorizations from the previous pages.**

21. $f(x) = \dfrac{x-4}{x^2 - x - 12}$

27. $f(x) = \dfrac{6x-3}{6x^2 - 3x}$

22. $f(x) = \dfrac{x^3 - 27}{x^2 - 9}$

28. $f(x) = \dfrac{2x^3}{x^2 + 1}$

23. $f(x) = \dfrac{(x+h)^2 - x^2}{h}$

29. $f(x) = \dfrac{x}{\sqrt{x^2 + 5}}$

24. $f(x) = \dfrac{4 - x^2}{3 - \sqrt{x^2 + 5}}$

30. $f(x) = \dfrac{2x}{\sqrt{3x^2 - 4}}$

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

31. $f(x) = \dfrac{\sqrt{2x+1} - \sqrt{3}}{x - 1}$

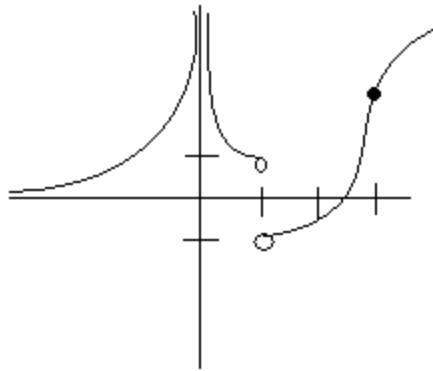26. $f(x) = \dfrac{3x - 2}{9x + 7}$

**Evaluate Numerically**

32. $\lim\limits_{x\to 1}\dfrac{|x-1|}{x-1}$

33. $\lim\limits_{x\to 2^+}\dfrac{|x-2|}{x-2}$

**Evaluate Graphically**

34. $\lim\limits_{x\to 0} f(x)$

35. $\lim\limits_{x\to 3} f(x)$

36. $\lim\limits_{x\to 2} f(x)$



37. $f(3)$

38. $\lim\limits_{x\to 3^+} f(x)$

39. $\lim\limits_{x\to 3^-} f(x)$

40. $\lim\limits_{x\to 3} f(x)$
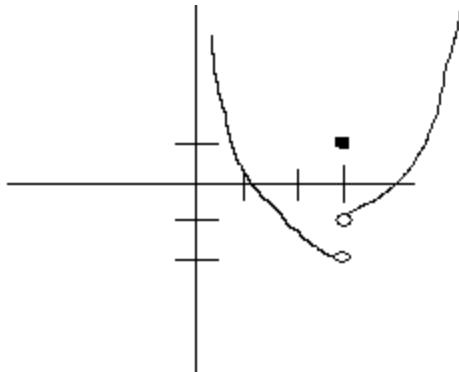


**Determine any points of discontinuity.  Then determine whether the discontinuity is a hole, jump, or an asymptote.**

41. $f(x) = \dfrac{x-4}{x^2-x-2}$

42. $f(x) = \begin{cases} \dfrac{1}{x-3} & \text{if } x \le 5 \\ \dfrac{1}{2} & \text{if } x > 5 \end{cases}$