Calculus Name: _____

Chapter 2 Review Block: _____

There's obviously not enough room for you to work out problems on this paper. This will not be collected, but I highly suggest you understand how to complete each and every problem here! Solutions (along with the worksheet) will be posted on your Assignment page.

For questions 1 – 10, evaluate each limit without using your calculator.

1. $\lim_{x\to 5/2}\lfloor x\rfloor$

2. $\lim_{x\to\infty}\dfrac{x^2+5x-3}{3x+2}$

3. $\lim_{x\to\infty}\dfrac{x^2+5x-3}{3x^2+2}$

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

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

6. $\lim_{x\to\infty}\dfrac{\sin x}{2x}$

7. $\lim_{x\to 0}\dfrac{\tan(5x)}{\sin(3x)}$

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

9. $\lim_{x\to\infty}\dfrac{5x-7x^2}{4x^2+1}$

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

11. Use a table of values to evaluate the following limit: $\lim_{x\to\infty}\left(1+\dfrac{1}{x}\right)^x$

12. Make a table of values (4 of them would work) to evaluate $\lim_{x\to 2}\dfrac{x+3}{x-2}$.

For questions 13 and 14, find ALL asymptotes (vertical, horizontal, and oblique) and justify your response.

13. $y=\ln x$

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

15. Let $h(x)=\dfrac{(x-1)(x+3)}{(x+3)(x-2)}$. Identify all values of c where the $\lim_{x\to c}h(x)$ EXISTS.

16. Let $g(x)=\dfrac{x^2+5x+6}{x^2+3x+2}$.

a) Find the domain of $g(x)$.

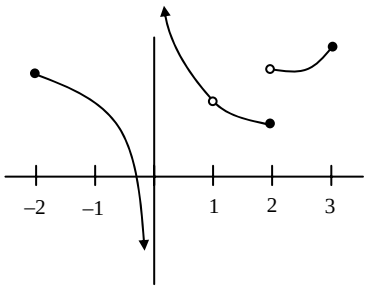
b) Find the $\lim_{x\to c}g(x)$ for all values of c where $g(x)$ is not defined.

c) Find any horizontal asymptotes and justify your response.

d) Find any vertical asymptotes and justify your response.

e) Write an extension to the function so that $g(x)$ is continuous for all $x < -1$.

17. Using the function below, over what intervals does $\lim_{x\to c}f(x)$ exist?



18. Let $y = x^3 - 4x$.

a) Find the instantaneous slope for any value of *x*.
b) Use your answer in part *a* to find the slope at *x* = –1.
c) Find the equation of the tangent line when *x* = –1.
d) Find the equation of the normal line when *x* = –1.

19. Let $g(x) = \sqrt{x}$. Find the instantaneous slope at *x* = 4.

For questions 20 - 22, find the value of the parameter(s) that would make the function continuous. Justify your response using the definition of continuity.

20. $j(x) = \begin{cases} ax^2 & ; x < 1 \\ 4x - 2 & ; x \geq 1 \end{cases}$

21. $k(x) = \begin{cases} \dfrac{\sin 3x}{x} & x \neq 0 \\ a & x = 0 \end{cases}$

22. $f(x) = \begin{cases} a + 3x & ; x \leq -1 \\ bx^2 + 2 & ; x > -1 \end{cases}$

23. Let $y = \dfrac{x^2 + 5x - 3}{x - 2}$.

a) Find the End Behavior Model
b) Describe the End Behavior.
c) Find all asymptotes.

24. If a line has a vertical tangent line at $x = x_0$, then $\lim\limits_{h \to 0} \dfrac{f(x_0 + h) - f(x_0)}{h} = +\infty$ or $-\infty$. Show that $y = x^{2/5}$ has a vertical tangent line at *x* = 0.

25. Let $k(x) = \dfrac{\sqrt{x} - 3}{x - 9}$. Write an extension to the function so that it is continuous at *x* = 9.

**Review your homework … some of you actually need to DO ALL OF IT FIRST! … then make sure you still understand!

**Review your notes!