TO: H PreCalculus Students

FROM: Mrs. Heinzel
Ms. DeLia
Mr. Wells

DATE: June 2009

RE: Calculus Summer Assignment

Complete the questions on the attached sheets. Be sure to show all work and/or explain your answers. You may need a scientific calculator for some of the calculations, but a graphing calculator is not necessary to complete the assignment. Bring all work the first day of class in September.

Have a great summer doing math!!

CALCULUS SUMMER REVIEW PROBLEMS NAME:

In Exercises 7–14, sketch the graph of the equation.

7. $y = \frac{1}{2}(-x + 3)$

12. $y = 6x - x^2$

CALCULUS SUMMER REVIEW PROBLEMS **NAME:**

13. $y = \sqrt{5 - x}$

19. *Think About It* Write an equation whose graph has intercepts at $x = -2$ and $x = 2$ and is symmetric with respect to the origin.

CALCULUS SUMMER REVIEW PROBLEMS NAME:

In Exercises and 24, use the concept of slope to find t such that the three points are collinear.

24. $(-3, 3), (t, -1), (8, 6)$

find an equation of the line that passes through the point with the indicated slope. Sketch the line.

27. $(-3, 0), \quad m = -\frac{2}{3}$

30. Find equations of the lines passing through $(1, 3)$ and having the following characteristics.

(a) Slope of $-\frac{2}{3}$

(b) Perpendicular to the line $x + y = 0$

(c) Passing through the point $(2, 4)$

(d) Parallel to the x-axis

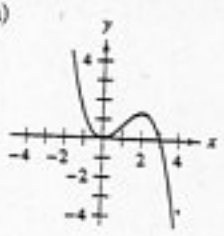
40. Given $f(x) = 1 - x^2$ and $g(x) = 2x + 1$, evaluate each expression.

(a) $f(x) - g(x)$ (b) $f(x)g(x)$ (c) $g(f(x))$

CALCULUS SUMMER REVIEW PROBLEMS NAME:

47. *Think About It* What is the minimum degree of the polynomial function whose graph approximates the given graph? What sign must the leading coefficient have?

(a)



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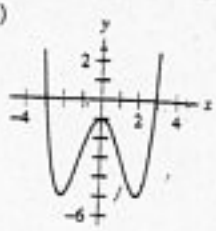

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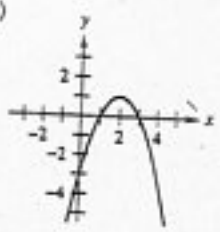
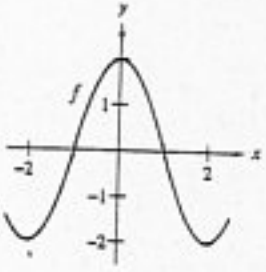


(d)

4. Consider the graph of the function f shown below. Use this graph to sketch the graphs of the following functions. To print an enlarged copy of the graph, go to the website *www.mathgraphs.com*.

(a) $f(x+1)$ (b) $f(x)+1$ (c) $2f(x)$ (d) $f(-x)$

(e) $-f(x)$ (f) $|f(x)|$ (g) $f(|x|)$



CALCULUS SUMMER REVIEW PROBLEMS NAME:

In Exercises 4, complete the table and use the result to estimate the limit.

x	-0.1	-0.01	-0.001	0.001	0.01	0.1
$f(x)$						

4. $\lim_{x \to 0} \dfrac{4(\sqrt{x+2} - \sqrt{2})}{x}$

In Exercises 11–24, find the limit (if it exists).

11. $\lim_{t \to 1} \sqrt{t+2}$

12. $\lim_{y \to 4} 3|y - 1|$

13. $\lim_{t \to -1} \dfrac{t+2}{t^2 - 4}$

14. $\lim_{t \to 3} \dfrac{t^2 - 9}{t - 3}$

15. $\lim_{x \to 4} \dfrac{\sqrt{x} - 2}{x - 4}$

16. $\lim_{x \to 0} \dfrac{\sqrt{4+x} - 2}{x}$

17. $\lim_{x \to 0} \dfrac{[1/(x+1)] - 1}{x}$

18. $\lim_{s \to 0} \dfrac{(1/\sqrt{1+s}) - 1}{s}$

19. $\lim_{x \to -5} \dfrac{x^3 + 125}{x + 5}$

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

21. $\lim_{x \to 0} \dfrac{1 - \cos x}{\sin x}$

CALCULUS SUMMER REVIEW PROBLEMS NAME:

In Exercises 37–46, determine the intervals on which the function is continuous.

37. $f(x) = [x + 3]$

38. $f(x) = \dfrac{3x^2 - x - 2}{x - 1}$

39. $f(x) = \begin{cases} \dfrac{3x^2 - x - 2}{x - 1}, & x \neq 1 \\ 0, & x = 1 \end{cases}$

40. $f(x) = \begin{cases} 5 - x, & x \leq 2 \\ 2x - 3, & x > 2 \end{cases}$

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

43. $f(x) = \dfrac{3}{x + 1}$

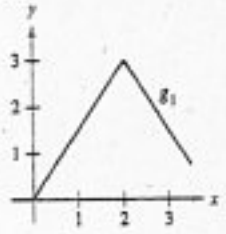
45. $f(x) = \csc \dfrac{\pi x}{2}$

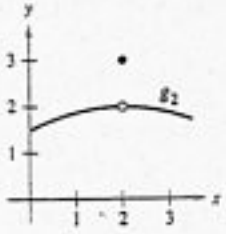
47. Determine the value of c such that the function is continuous on the entire real line.

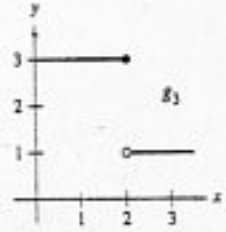
$$f(x) = \begin{cases} x + 3, & x \leq 2 \\ cx + 6, & x > 2 \end{cases}$$

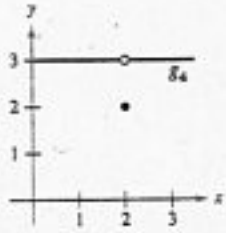
CALCULUS SUMMER REVIEW PROBLEMS NAME:

9. Consider the graphs of the four functions g_1, g_2, g_3, and g_4.









For each given condition of the function f, which of the graphs could be the graph of f?

(a) $\lim_{x \to 2} f(x) = 3$

(b) f is continuous at 2.

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

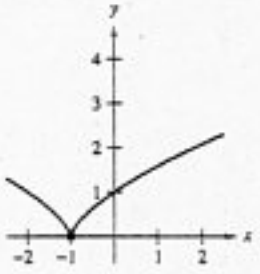
CALCULUS SUMMER REVIEW PROBLEMS NAME:

In Exercises 1 , find the derivative of the function by using the definition of the derivative.

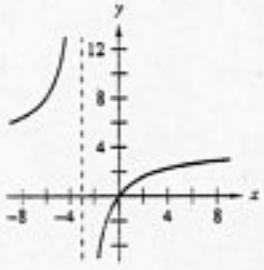
1. $f(x) = x^2 - 2x + 3$

In Exercises 5 and 6, describe the x-values at which f is differentiable.

5. $f(x) = (x + 1)^{2/3}$



6. $f(x) = \dfrac{4x}{x + 3}$



CALCULUS SUMMER REVIEW PROBLEMS **NAME:**

7. Sketch the graph of $f(x) = 4 - |x - 2|$.

(a) Is f continuous at $x = 2$?

(b) Is f differentiable at $x = 2$? Explain.

In Exercises 9 find the slope of the tangent line to the graph of the function at the given point.

9. $g(x) = \frac{2}{3}x^2 - \frac{x}{6}, \quad \left(-1, \frac{5}{6}\right)$

CALCULUS SUMMER REVIEW PROBLEMS NAME:

In Exercises 15–30, find the derivative of the function.

15. $y = 25$
16. $y = -12$
17. $f(x) = x^8$
18. $g(x) = x^{12}$

19. $h(t) = 3t^4$
21. $f(x) = x^3 - 3x^2$
23. $h(x) = 6\sqrt{x} + 3\sqrt[3]{x}$
25. $g(t) = \dfrac{2}{3t^2}$
27. $f(\theta) = 2\theta - 3\sin\theta$
29. $f(\theta) = 3\cos\theta - \dfrac{\sin\theta}{4}$

33. ***Vibrating String*** When a guitar string is plucked, it vibrates with a frequency of $F = 200\sqrt{T}$, where F is measured in vibrations per second and the tension T is measured in pounds. Find the rates of change of F when (a) $T = 4$ and (b) $T = 9$.