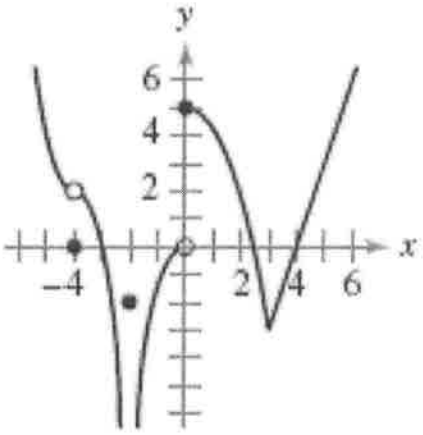
Calculus **Name** _____

Cumulative Review – Chapters 1-4

Chapter 1

1. Find the limit, if it exists. $\lim_{x\to 5}\frac{x^2-25}{x-5}$	2. Determine any x-values for which the function is discontinuous. $f(x)=\frac{3x^2-x-2}{x-1}$	3. Find the limit, if it exists. $\lim_{x\to 2^-}\frac{1}{\sqrt[3]{x^2-4}}$
4. Use the graph of f below to find each limit or value. (a) $\lim_{x\to 0} f(x) =$ (b) f(0) = (c) $\lim_{x\to -4} f(x) =$ (d) f(-4) = (e) $\lim_{x\to -2} f(x) =$		
5. Find the limit. $\lim_{x\to 3}\sqrt{x^2-4} =$	6. Find the limit. $\lim_{x\to 2^-}\frac{1}{x-2} =$	7. Explain the difference between removable and non-removable discontinuities. Give an example of each.

Chapter 2

1. Find the derivative of the function using the limit defintion, $\lim_{h\to 0}\frac{f(x+h)-f(x)}{h}$ $f(x)=x^2+5x-13$	2. Find the derivative. $f(x)=6\sqrt{x}-\frac{3}{2x^3}+\cos x$	3. Find the derivative. $f(x)=\left(2x^2-7\right)^5$
4. Find the derivative. $f(x)=3x^2\sec x$	5. Find the derivative. $f(x)=\frac{\tan x}{x^2}$	6. Find the derivative. $f(x)=2x^2+\sin^2 2x$
7. Find $\frac{dy}{dx}$. $x^2+3xy+y^3=10$	8. Find the equation of a tangent line to the graph of the function at the given point. $f(x)=\frac{2}{3}x^2-\frac{x}{6}\quad\left(-1,\frac{5}{6}\right)$	9. To estimate the height of a building, a weight is dropped from the top of the building into the pool at ground level. How tall is the building if the splash is seen 9.2 seconds after the ball was dropped?
10. The edges of a cube are expanding at a rate of 5 cm per seconds. How fast is the surface area changing with each edge has a length of 4.5 cm?	11. Find the equation of a tangent line to the graph of the function at the given point. $f(x)=\frac{x+1}{x-1}\quad\left(\frac{1}{2},-3\right)$	12. Find the derivative. $f(x)=\sqrt[3]{1-x^3}$
13. An automobile's velocity starting from rest is $v(t)=\frac{90t}{4t+10}$ where v is measured in feet per second. Find the vehicle's	14. Find the derivative. $y=1-\cos 2x+2\cos^2 x$	15. Find the equation of a tangent line to the graph of the function at the given point. $x^2+y^2=20\quad(2,4)$

accesleration at 5 seconds.		

Chapter 3

Find the critical numbers to determine any relative maxima or minima. Describe increasing and decreasing intervals. Also, find any points of inflection and discuss the concavity of the function. 1. $f(x) = x^3 - 12x$ 2. $f(x) = 4x + 8\cos(x)\ [0, 2\pi]$	3. Find the absolute maximum and absolute minimum of the function on the interval. $f(x) = x^2 + 2x$ on [-2, 4]	Find the limit. 4. $\lim_{x\to\infty} \frac{-2x^3-6x+1}{3x^2-2}$ 5. $\lim_{x\to\infty} \frac{x^2+x^3}{x^2-3}$ 6. $\lim_{x\to\infty} \frac{-4x^2+x+1}{x^3-2}$
7. Determine the value, ***c***, that satisfies the **Mean Value Theorem for** $f(x) = 2x^2 - 3x + 1$ on the interval [0, 4].	8. Given the following, what can you say about the graph of f(x) at x = 3? $f(3) = 7$ $f'(3) = 10$ $f''(3) = -2$	9. An open box from a square piece of cardboard, 24 inches on each side, is to be made with the maximum by cutting squares from the corners and turning up the sides. Find the maximum volume possible.
10. Find the critical numbers of the function. $f(x) = 3x^2 + 2x + 1$		

Chapter 4

Find the indefinite integral. 1. $\int (5 - x)\ dx$ 2. $\int x^2\sqrt{1-x^3}\ dx$ 3. $\int \left(\sqrt[4]{x^3} + 1\right)\ dx$	Find the indefinite integral. 4. $\int (1+3x)x^2\ dx$ 5. $\int (2x-3)^3 dx$ 6. $\int (2\cos^4 x)(\sin x)\ dx$	Find the indefinite integral. 7. $\int 5x(2-x^2)^8\ dx$ 8. $\int (x^2 + \sec^2 x)\ dx$ 9. $\int \frac{x^2+2x^4-3}{x^4}\ dx$
Evaluate. 10. $\int_{-2}^{4}(3x - 5)\ dx$ 11. $\int_1^3 \left(\frac{1}{t^2} - \frac{1}{t^4}\right)\ dt$ 12. $\int_{\frac{\pi}{4}}^{\pi} \sec^2\theta\ d\theta$ 13. $\int_{\frac{\pi}{4}}^{\pi} (\cos\theta + 2\sin\theta)\, d\theta$	Find the average value of the function on the given interval. 14. $f(x) = x^2 - 2x\ [0, 3]$ 15. $f(x) = \sin x\ [0, \pi]$	Use the trapezoidal rule to approximate the given integral with n=3. 16. $\int_{-0.5}^{1} \sqrt{1+x^3}\ dx$