AP Worksheet #4
End of Chapter 2
All work must be shown and done on another sheet of paper!
This is just your answer sheet!

Grading:

100%	= 19 correct	78%	= 14 correct
95%	= 18 correct	75%	= 13 correct
90%	= 17.5 correct	70%	= 12 correct
88%	= 17 correct	68%	= 11 correct
85%	= 16 correct	65%	= 10.5 correct
80%	= 15 correct	60%	= 10 correct

Work must support your answers.
No exceptions.

Due Date: Friday, October 24th

Score:_____ Name:_____

Do <u>not</u> use calculator (even for basic math) unless ** is by the problem.
Problems marked with @ are problems that will not be able to be done until the end of chapter 2.

1. If $f(x) = x^{\frac{3}{2}}$, then $f'(4) =$ 1._____
2. @If $x^3 + 3xy + 2y^3 = 17$, then in terms of x and y, $\frac{dy}{dx} =$ 2._____
3. If the function f is continuous for all real numbers and if $f(x) = \frac{x^2 - 4}{x + 2}$ when $x \neq -2$, the $f(-2) =$ 3._____
4. An equation of the line (in standard form) tangent to the graph of $y = \frac{2x+3}{3x-2}$ at the point $(1,5)$ is 4._____
5. If $y = \tan x - \cot x$, then $\frac{dy}{dx} =$ 5._____
6. If h is the function given by $h(x) = f(g(x))$, where $f(x) = 3x^2 - 1$ and $g(x) = |x|$, then $h(x) =$ 6._____
7. If $f(x) = (x-1)^2 \sin x$, then $f'(0) =$ 7._____
8. The fundamental period of $2\cos(3x)$ is 8._____
9. The slope of the line normal (perpendicular) to the graph of $y = 2\sec x$ at $x = \frac{\pi}{4}$ is 9._____
10. @**Boats A and B leave the same place at the same time. Boat A heads due North at 12 km/hr. Boat B heads due east at 18km/hr. After 2.5 hours, how fast is the distance between the boats increasing? 10._____
11. If $f(x) = (x^2 - 2x - 1)^{\frac{2}{3}}$, then $f'(0) =$ 11._____

12. A particle moves along the y-axis so that at time *t*, where $0 \le t \le \pi$, its position is given by $s(t) = -2\cos t - \frac{t^2}{2} + 10$. What is the velocity of the particle when its acceleration is zero?

12._____

13. $\lim_{\theta \to 0} \frac{1-\cos\theta}{2\sin^2\theta}$ is

13._____

14. @**The top of a 25-foot ladder is sliding down a vertical wall at a constant rate of 3 feet per minute. When the top of the ladder is 7 feet from the ground, what is the rate of change of the distance between the bottom of the ladder and the wall?

14._____

15. @Consider the equation $x^2 - 2xy + 4y^2 = 52$. Find the equation of the tangent line(s) to the curve at the point $x = 2$.

15._____

16. If *f* is a differentiable function, then $f'(a)$ is given by which of the following? Justify.

16._____

I. $\lim_{h \to 0} \frac{f(a+h) - f(a)}{h}$

II. $\lim_{x \to a} \frac{f(x) - f(a)}{x - a}$

III. $\lim_{x \to h} \frac{f(x+h) - f(x)}{h}$

17. @The radius of a circle is increasing at a nonzero rate, and at a certain instant, the rate of increase in the area of the circle is numerically equal to the rate of increase in the circumference. At this instant, the radius of the circle is

17._____

18. If $f(x) = \sqrt{1+\sqrt{x}}$, find $f'(x)$.

18._____

19. If $f(x) = \sin^2 x$, find $f'''(x)$.

19._____

20. If $y = \left(\frac{x^3 - 2}{2x^5 - 1}\right)^4$, find $\frac{dy}{dx}$ at $x = 1$.

20._____

I did not use my calculator (even for basic math) on these problems unless the problem was marked with a **.
Signature: _____