Tangent Line

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To find the equation of a tangent line to a function at a point:

1. You may have to find the *y*-value of the point on the graph by substituting in the given *x*-value into the original equation.
2. Find the derivative of *f*.
3. Evaluate $f'(x)$ to get the slope of the graph....must be a number!!!
4. Substitute the given point and the slope of the derivative at that *x*-value into the point-slope formula.

**1. Let *f* be the function defined by $f(x) = 4x^3 - 5x + 3$. Find the equation of the line tangent to the graph of *f* at $x = -1$.

2. Using the table below, find the equation of the line tangent to $h(x)$ at $x = 8$, provided $h(x)$ is a differentiable function.

x	$g(x)$	$h(x)$	$g'(x)$	$h'(x)$
8	-3	9	5	-4

**3. If the line tangent to the graph of the function *f* at the point (1, 7) passes through the point (-2, -2), then $f'(1) = ?$

**(calc.) 4. Find the equation of the line tangent to the graph of $f(x) = x^4 + 2x^2$ at the point where $f'(x) = 1$.

Class Notes for Tangent Lines

1. Find the equation of the line tangent to $g(x) = x^{2/3}$ at $x = 8$.

2. Suppose $f(x)$ and $h(x)$ are both differentiable functions. Using the table below, find the equation of the line tangent to $h(x)$ at $x = -2$ provided $h(x) = 3f(x)$.

x	$f(x)$	$f'(x)$
-2	3	-5

Below is your first free response question....always worth 9 points, must show all work, never leave any parts blank, etc.!!!!
No calculator for this question.

3. Let $f(x) = \frac{1}{x}$.

   a) Find the equation of the line tangent to $f(x)$ at $x = -3$.

   b) Find the point(s) on $f(x)$ where $f'(x) = \frac{-1}{4}$.

   c) Is $f(x)$ continuous at $x = 0$? Justify your answer.