

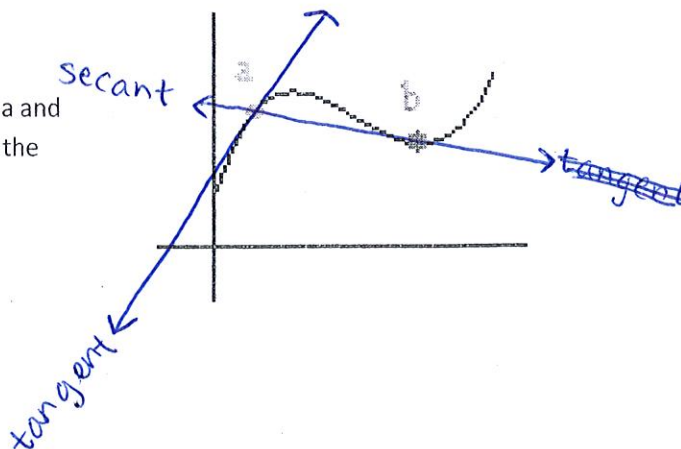
Worksheet #1 MathScoop

- 1) The line connecting two points $(a, f(a))$ and $(b, f(b))$ on a curve is known as the secant line.
- 2) As "b" approaches "a", the slope of the secant line approaches the slope of the tangent line.
- 3) The derivative of a function also known as the instantaneous ROC / slope and the slope of tangent line
- 4) The slope of the secant line tells you the average ROC rate of change and the slope of the tangent line tells you the instantaneous rate of change.

5)

	<p>The tangent line is the <u>Solid</u> line</p> <p>The secant line is the <u>Secant</u> line</p>
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- 6) Sketch the secant line between the point a and point b. On the same graph below sketch the tangent line at point a.



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- 7) Find the average rate of change between the points (-1,6) and (5,3)

$$\frac{3-6}{5-(-1)} = \frac{-3}{6} = -\frac{1}{2}$$

8)

- a) Find the equation of the secant line between point a and point b in the graph below.

Slope:

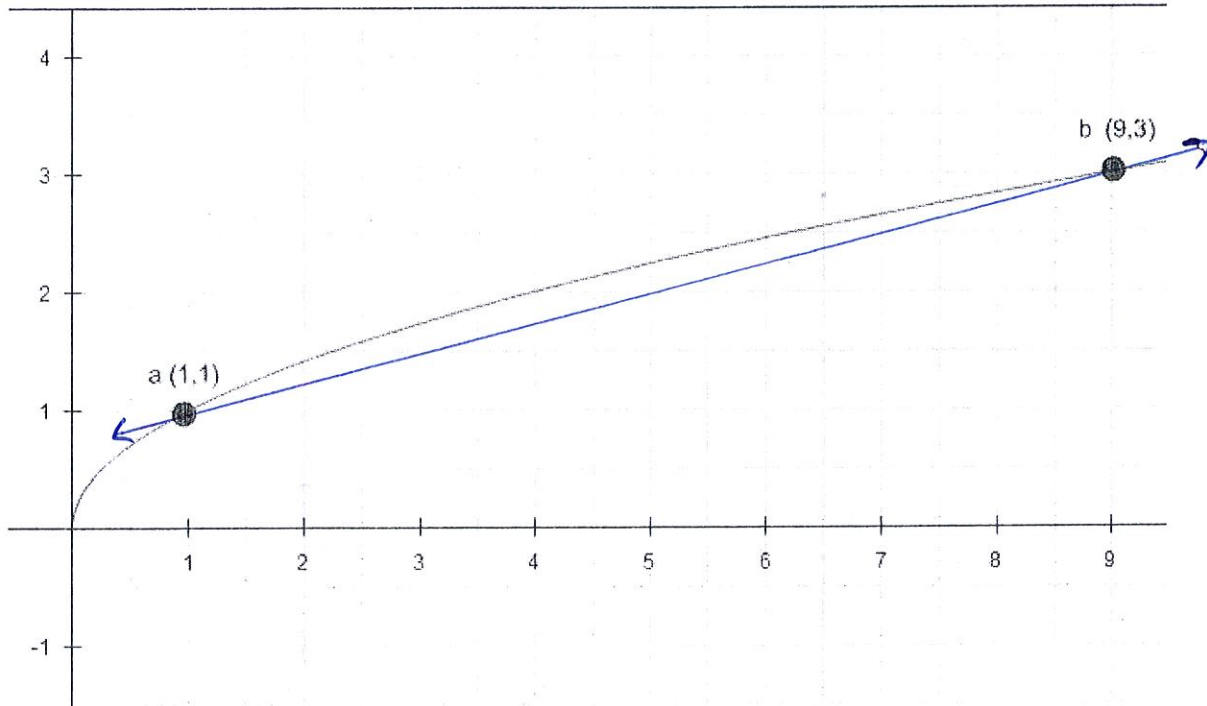
$$\frac{3-1}{9-1} = \frac{2}{8} = \frac{1}{4}$$

Equation:

$$y-1 = \frac{1}{4}(x-1)$$

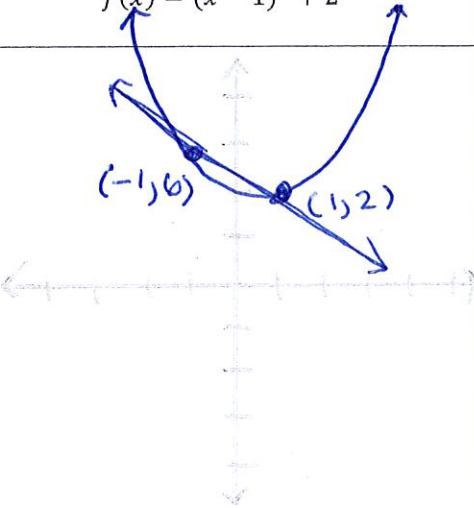
* best in
point-slope
form

Sketch the secant line on the graph



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9) Sketch the graph of $f(x) = (x - 1)^2 + 2$.

<p>$f(x) = (x - 1)^2 + 2$</p> 	<p>Plot the point $x = -1$ and label it "a" Plot the point $x = 1$ and label it "b"</p> <p>a) Find the equation of the secant line between points "a" and points "b"</p> <p>Slope: $\frac{f(1) - f(-1)}{1 - (-1)} = \frac{2 - 6}{1 + 1} = \frac{-4}{2} = -2$</p> <p>Equation: $y = -2x + 4$</p> <p>$y - 2 = -2(x - 1)$ * best in point-slope form</p> <p>b) Sketch the secant line on the graph</p>
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10) Given function $y = x^3$, and the point $(-1, -1)$. Starting with the given point which x -value will produce a secant line with the greatest rate of change.

Hint: sketch a large graph below of $y = x^3$. Draw the 4 given secant lines and compare.

a) $x = 1$ $\frac{f(1) - f(-1)}{1 - (-1)} = \frac{1 - (-1)}{2} = 1$

b) $x = 0$ $\frac{f(-1) - f(0)}{-1 - 0} = \frac{-1 - 0}{-1} = 1$

c) $x = -2$ $\frac{f(-1) - f(-2)}{-1 - (-2)} = \frac{-1 - (-8)}{-1 + 2} = \frac{7}{1} = 7$

d) $x = 2$ $\frac{f(-1) - f(2)}{-1 - 2} = \frac{-1 - 8}{-3} = 3$

