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1. (3 points) Find the slope of the tangent line to the graph of $y = x^2$ at the point $(-0.4, 0.16)$ **and** write the corresponding equation of the tangent line. (Remember that the slope of the graph of $y = x^2$ at the point (a, a^2) is equal to $2a$).

Solution:

Remember that the slope of the tangent line to the graph of $y = x^2$ at the point $(-0.4, 0.16)$ is the same as the slope of the graph at that point.

So to find the slope of the tangent line, we can find the slope of the graph.

The hint tells us that the slope of the graph of $y = x^2$ at the point (a, a^2) is equal to $2a$). In our case, we can take $a = -0.4$. So the slope of the graph is $2(-0.4) = -0.8$.

So, the slope of the tangent line is also -0.8.

To find the equation of the (straight!) tangent line, it is enough to have its slope and a point on it. We have just found the slope, which is -0.8.

Remember that the tangent line *touches* the graph at $(-0.4, 0.16)$. This means that the point $(-0.4, 0.16)$ lies on both the graph and the tangent line.

So, the point $(-0.4, 0.16)$ lies on the tangent line.

Now we can use the formula

$$y - y_1 = m(x - x_1)$$

with $(x_1, y_1) = (-0, 4, 0.16)$ and $m = -0.8$ to find the equation of the tangent line:

$$y - y_1 = m(x - x_1)$$

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$$y - 0.16 = (-0.8)(x - (-0.4))$$

2. (2 points) Find the derivative of the function $f(x) = x^{\frac{2}{3}}$.

Solution:

This function is in the form $f(x) = x^r$, where r is a constant.

In this case, $r = \frac{2}{3}$.

So, the power rule tells us that

$$f'(x) = rx^{r-1}$$

or,

$$f'(x) = \frac{2}{3}x^{\frac{2}{3}-1} = \frac{2}{3}x^{-\frac{1}{3}}.$$