4. (5 points) Show how to use the concept of the derivative to help you find the equation of the line tangent to the graph of $y = 10x^3$ at the point (2, 80).

$\frac{dy}{dx} = 30x^2$ ✓. If $x=2$, $\frac{dy}{dx} = 120$. ✓

So, the equation of the tangent we seek is

$y = 120x - 160$. ✓ ✓ ✓

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5. (10 points) Specify the derivative of each of the folowing:

a. $y = 8x^3 - 6x^2 + 10x - 11$

$\frac{dy}{dx} = 24x^2 - 12x + 10$ ✓ ✓

b. $f(x) = 30e^x$

$f'(x) = 30e^x$ ✓ ✓

c. $g(x) = \frac{1}{x^2} = x^{-2}$

$g'(x) = -2x^{-3}$ ✓ ✓

d. $h(x) = (2x+3)^2$

$h'(x) = 2(2x+3)^1(2)$

$h'(x) = 4(2x+3)$

$h'(x) = 8x + 12$ ✓ ✓

e. $y = 1000e^{0.05x}$

$\frac{dy}{dx} = 50e^{0.05x}$ ✓ ✓

6. (5 points) Suppose a cost function is given by $C(x) = 0.1x^3 - x^2 + 100x + 200$ where x is the number of units produced and C(x) is the cost in dollars to produce units.

a. Find C(10) and interpret its meaning.

$C(10) = 100 - 100 + 1000 + 200 = 1200$ ✓

It costs \$1200 to produce the first 10 units. ✓

b. Find C '(10) and interpret its meaning.

$C'(x) = 0.3x^2 - 2x + 100$ ✓

$C'(10) = 30 - 20 + 100 = 110$ ✓

It costs \$110 to produce the 11th unit. ✓