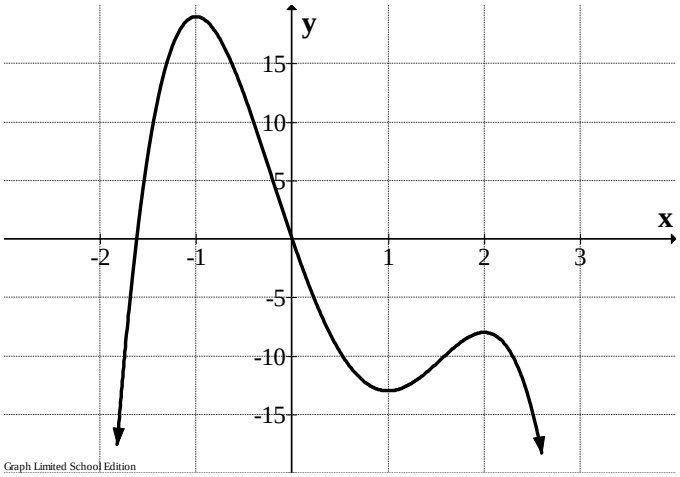
Week 4 Activity = Section 3.2 and 3.3 Review

Math 251 Derivatives involving products and quotients

1. A graph of the function g is shown below. Give a graph of g '. Explain how you got your graph.



2. Explain why $f'(x) = 0$ for $f(x) = c$, where c is a constant. Use a graph to support your answer.

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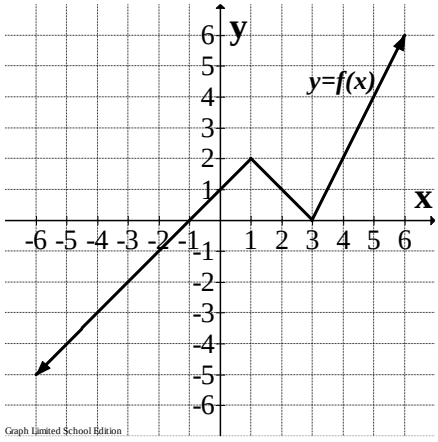
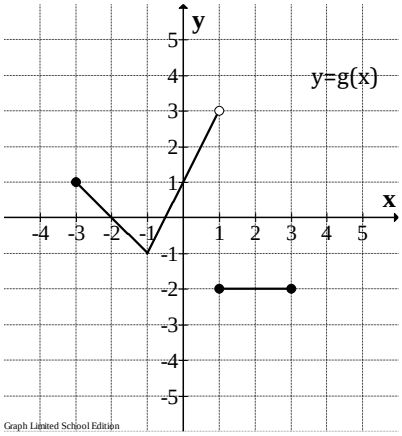
3. The graphs of $f(x)$ and $g(x)$ are given below. Use the graphs in order to answer the following questions.





a) Let $h(x) = f(x) \cdot g(x)$. Find $h'(0)$ and $h'(-2)$

b) Let $k(x) = \dfrac{f(x)}{g(x)}$. Find $k'(0)$, $k'(-2)$, and $k'(-1)$.

c) Let $w(x) = f(x) - g(x)$. Find $w'(0)$ and $w'(2)$.

d) $p(x) = 7 \cdot f(x) + 64$. Find $p'(-5)$ and $p'(2)$

4. At what <u>point</u> along the curve $y = e^x$ is the tangent line parallel to the line $x - y = 4$? What is the equation of the tangent line to the curve at this point? Graph both the curve $y = e^x$ and this tangent line. Justify your response.

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5. For the function $f(x)=x^2e^x$, give all values $\boldsymbol{c}$ such that at the point $(\boldsymbol{c}, f(\boldsymbol{c}))$ there is a horizontal tangent line. Be sure to explain your steps in finding a solution.

6. Find the equation for tangent line to the curve $y = x^2 + 2$ that passes through the point $(6,2)$.

7. Compute g '(1), where $g(x)=\frac{x + f(x)}{x - f(x)}$, f(1)=4, and f '(1)=2

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8. Assume that f(x) is a differentiable function and that the values of f(x) and its derivative at the points x=0, 1, and 2 are given by:

f(0)=3, f(1)=5, f(2)=-2, and f '(0)=-1, f '(1)=0, f '(2)=3

Let $g(x)=x^2 - 3x = 2$. For each function below calculate the derivative at the given point.

a. $\frac{f(x)}{g(x)}$, x=0 b. f(x)g(x), x=1 c. $\frac{f(x) \times e^x}{g(x)}$, x=2