

Graded Homework Set 3 -- Calculus I -- Math 191 (Reference pages in red)

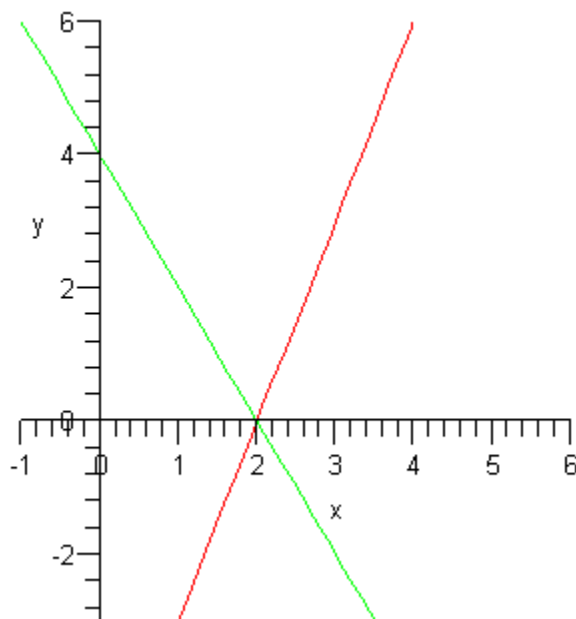
1. Find $h'(2)$ given that $h(2) = -3$, $g(2) = 4$, $f'(2) = -2$, and $g'(2) = 7$ if:

a. $h(x) = f(x) \cdot g(x)$

b. $h(x) = \frac{f(x)}{g(x)}$

(Use the theorems from section 3.3)

2. Consider the two lines sketched below with the green line being $f(x)$ and the red line being $g(x)$: (See problems 67 and 68 page 146)



a. Find $h'(3)$ if $h(x) = f(x) \cdot g(x)$.

b. Find $h'(2)$ if $h(x) = f(x) \cdot g(x)$.

c. Find $h'(1)$ if $h(x) = \frac{1}{f(x)}$.

3. Calculate the following trig derivatives (dy/dx) if: (See section 3.4)

a. $y = f(x) = \sin(x) + 4\cos(x)$

b. $y = f(x) = \frac{1 + \sin(x)}{1 - \cos(x)}$ Do not simplify.

c. $y = f(x) = \sec(x) - \tan(x)$

d. $y = f(x) = \frac{\cot(x)}{x^2}$ Do not simplify.

4. If $y = f(x) = \tan(x)$, sketch, on the same graph, $f(x)$, and $f'(x)$.
(A graphing calculator will assist you with this)
5. If $y = f(x) = \frac{\sin(x)}{x}$, (See page 153)
- Find $f'(x)$.
 - Find $f''(x)$.
6. Use the quotient rule and trig identities to prove that the derivative of the $\sec(x) = \sec(x)\tan(x)$. Note that $\sec(x) = \frac{1}{\cos(x)}$.
7. Find the equation of the tangent line to the curve $y = \cos(x)$ at the point $(\pi, -1)$.
8. Use implicit differentiation to find dy/dx if: (See and study section 3.6)
- $x^2 + y^3 = 2$
 - $x^2 + xy - y^2 = 4$