Name (last, first): ____________________________ Section: ______

Show all work to receive credit. Print clearly. Place answers in boxes when provided.

1. (20 points) Let $p(x) = x^5 - 2x + 1$ and let $q(x) = (x^3 + 2)^2$. Compute:
   
   (a) $q(-1)$  
   
   (b) $q(a + b)$  
   
   (c) $p \circ q(-1)$  
   
   (d) $q \circ p(x)$  

2. (10 points) Find the equation of the line through (5, 4) and (7, 0).
3. (10 points) Find the points of intersection of the curves $y = x^3 + 2x$ and $y = 3x^2$.

4. (10 points) In the box below, write the definition of $f'(x)$.

$$\int f'(x) =$$
5. (20 points) From the definition compute $f'(x)$ if $f(x) = x^2 - 3x + 2$.

6. (20 points) Find the equation of the tangent line to $y = x^2 - 3x + 2$ at the point where $x = -1$. 


7. (35 points) The graph $y = f(x)$ is pictured below.

(a) What is the domain of $f$?

(b) What is the range of $f$?

(c) What is $f(5)$?

(d) How many solutions are there to $f(x) = 1$?

(e) On the graph, draw the tangent line to $y = f(x)$ through the point where $x = 3$.

(f) Estimate $f'(3)$.

(g) Find a solution to $f'(x) = 0$. 

8. (50 points) Find the derivatives of the following functions.

(a) \( f(x) = x^3 + 2x^2 + 3x + 4 \)

(b) \( f(x) = \frac{7}{8\sqrt{x}} \)

(c) \( f(x) = (\sqrt{x^3 + 2x^2})^3 \)
(d) \( f(x) = (x - 2)(x + 2) \)

(e) \( f(x) = ((6x + 5)^4 + 3)^2 \)