

**Name:** \_\_\_\_\_

**VIP ID:** \_\_\_\_\_

- Write your name and VIP ID in the space provided above.
  - The test has four (4) pages, including this one.
  - Enter your answer in the box(es) provided.
  - You must show sufficient work to justify all answers unless otherwise stated in the problem. Correct answers with inconsistent work may not be given credit.
  - Credit for each problem is given in parentheses at the right of the problem number.
  - No books or notes may be used on this test.
  - An approved calculator may be used on this test.
- 

Page	Max. points	Your points
2	30	
3	40	
4	30	
<b>Total</b>	100	

**Problem 1.** (5 pts each) Find the derivative of the following functions:

(a)  $f(x) = 65$

$f'(x) =$

(b)  $y = t^2 + \sqrt{t}$

$y'(t) =$

(c)  $f(x) = e^x + 2^x + 3 \cdot 3^x$

$f'(x) =$

(d)  $f(x) = \ln 5 - \ln x$

$f'(x) =$

---

**Problem 2** (10 pts). Find all points at which the tangent line to the graph of the following function is horizontal:

$$y = f(x) = 2x^3 - 3x^2 - 36x$$

**Problem 3.** (5 pts each) Find the derivative of the following functions:

(a)  $f(x) = (5x^3)^2$

$f'(x) =$

(b)  $f(x) = \sqrt{\frac{1}{x^{36}}}$

$f'(x) =$

(c)  $y = 6t^5 - 10\sqrt{t} + \frac{9}{t}$

$y'(t) =$

(d)  $f(x) = (2^x + x^5)(3 - \ln x)$

$f'(x) =$

(e)  $f(x) = \frac{3x^8 + 23}{x}$

$f'(x) =$

(f)  $f(x) = \ln(e^{-x} - 4)$

$f'(x) =$

(g)  $f(x) = (9 - \ln x)^{0.9}$

$f'(x) =$

(h)  $f(x) = 5e^{6x} + e^{-x^7}$

$f'(x) =$

**Problem 4** (10 pts). Find an equation for the tangent line to the graph of  $f(x) = 3x^2 - 5x + 6$  at  $x = 1$ .

 $y =$ 

**Problem 5** (10 pts). Find an equation for the tangent line to the graph of  $f(x) = (2x^2 - 1)(3x + 4)$  at  $x = 0$ .

 $y =$ 

**Problem 6** (10 pts). Find an equation for the tangent line to the graph of  $f(x) = (3x^2 - 5)^4$  at  $x = 2$ .

 $y =$