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	49	
4	21	
Total	100	

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

(a) $f(x) = 56$

$f'(x) =$

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

$y'(t) =$

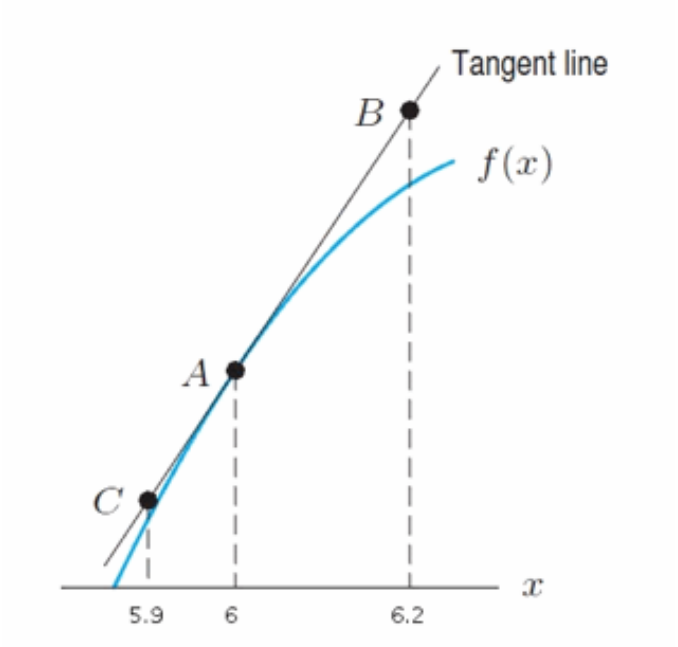
(c) $f(x) = e^x + 2^x + 3 \cdot 3^x$

$f'(x) =$

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

$f'(x) =$

Problem 2 (10 pts)**.** The function in the figure below has $f(6) = 31$ and $f'(6) = 2.1$. Find the coordinates of the points A, B and C.



$A = (\quad , \quad)$, $B = (\quad , \quad)$, $C = (\quad , \quad)$

Problem 3. (7 pts each) Find the derivative of the following functions:

(a) $f(x) = \sqrt{\dfrac{1}{x^{39}}}$

$f'(x) =$

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

$y'(t) =$

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

$f'(x) =$

(d) $f(x) = \dfrac{x^8 + 2}{x}$

$f'(x) =$

(e) $f(x) = \ln\left(8 - e^{-x}\right)$

$f'(x) =$

(f) $f(x) = \left(6 + \ln x\right)^{0.6}$

$f'(x) =$

(g) $f(x) = 2e^{7x} + e^{-x^6}$

$f'(x) =$

Problem 4 (7 pts)**.** Find an equation for the tangent line to the graph of $f(x) = 3x^2 - 5x + 6$ at $x = 1$.

$y =$ [ ]

Problem 5 (7 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 (7pts)**.** The cost C (in dollars) to produce g gallons of a chemical can be expressed as $C = f(g)$. Using units, explain the meaning of the following statements in terms of the chemical.

(a) $f(400) = 500$.

The statement $f(400) = 500$ means [ ]

(b) $f'(400) = 6$

The statement $f'(400) = 6$ means [ ]