

## Chapter 6 Practice Test 2

Name \_\_\_\_\_

Calculate the derivative of each function below.

\_\_\_\_\_ 1.  $f(x) = x^3 + 7x^2 - 3x + 3$

\_\_\_\_\_ 2.  $f(x) = 5x^{-2} + x^{-1}$

\_\_\_\_\_ 3.  $f(x) = \frac{5}{x^6} + \frac{3}{x^4} - \frac{1}{4}x^2$

\_\_\_\_\_ 4. What is the slope of the line tangent to the graph of  $f(x) = x^2 - 10x + 3$  at the point (3, -18)?

\_\_\_\_\_ 5. What is the slope of the line tangent to the graph of  $f(x) = 2x^4 - x^2 + 6$  at the point (1, 7)?

\_\_\_\_\_ 6. What is the equation of the line tangent to the graph of  $f(x) = x^3 + x - 6$  at the point (1, -4)?  
Write the equation in slope intercept form.

\_\_\_\_\_ 7. What is the equation of the line tangent to the graph of  $f(x) = 2x^4 + 4x^3$  at the point (2, 64)?  
Write the equation in slope intercept form.

\_\_\_\_\_ 8. Find the critical points on  $f(x) = x^3 - 2x^2$   
Just list them as ordered pairs.  
Don't worry about what type of critical point they might be.

9. Find the critical points of  $f(x) = x^3 + 3x^2 + 4$ .  
Determine whether each point represents a maximum, minimum, or point of inflection.

10. Find the x-intercept and y-intercept of  $f(x) = x^2 + 3x - 4$ .

x-intercept = \_\_\_\_\_ y-intercept = \_\_\_\_\_

\_\_\_\_\_ 11. What are the roots of  $x^2 + 10x + 9 = 0$ ?

\_\_\_\_\_ 12. What are the roots of  $x^4 - 5x^2 + 4 = 0$ ? (It can be broken down!)

**Write the polynomial of least degree for each set of roots given.**

\_\_\_\_\_ 13. 3, -5i, 5i

\_\_\_\_\_ 14. 1, 4i, -4i

**Find the discriminant of each equation and tell how many solutions exist.**

17.  $4x^2 - 4x + 1 = 0$  Discriminant value = \_\_\_\_\_ Number of solutions = \_\_\_\_\_

18.  $x^2 - x + 6 = 0$  Discriminant value = \_\_\_\_\_ Number of solutions = \_\_\_\_\_

19.  $2x^2 + 9x + 1 = 0$  Discriminant value = \_\_\_\_\_ Number of solutions = \_\_\_\_\_

**Given the vertex and another point on the graph, give a 3<sup>rd</sup> point that must be on the graph.**

\_\_\_\_\_ 20. Vertex = (2, 4) Point = (7, 10)

\_\_\_\_\_ 21. Vertex = (5, 2) Point = (-3, -4)