Calculus Worksheet #4 Unit 2 page 1 _____

Find the equation of (a) the line that is tangent to and (b) the line that is normal to each of the following functions at the point on the graph with the given x-coordinate. If any line is oblique give its slope-intercept equation. Show your work and your solutions neatly organized.

1. $f(x) = x^2 - 3x - 2 \quad ; \quad x = -1$

(a) _____

(b) _____

2. $f(x) = x^3 - 3x^2 - 9x - 3 \quad ; \quad x = -1$

(a) _____

(b) _____

3. $f(x) = \sqrt{x} \quad ; \quad x = 4$

(a) _____

(b) _____

4. $f(x) = \sqrt[3]{x} \quad ; \quad x = 8$

(a) _____

(b) _____

Calculus Worksheet #4 Unit 2 page 2

Write the equation of any line which contains the given point and is tangent to the graph of the given function. Give the point of tangency with each equation.

5. (2 , 2) ; $f(x) = x^2 + 3x + 1$

6. (1 , 0) ; $f(x) = x^2 + 3$

7. (4, -7) ; $f(x) = x^2 - 6x + 5$

8. (-1 , -6) ; $f(x) = 4 + x - x^2$

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Find the acute angle between the graphs of the given functions at each point where they intersect. Show your work and your solutions neatly organized.

9. $y = 2x + 1$
$y = -x + 4$

10. $y = \frac{1}{3}x + 4$
$y = \frac{3}{2}x + 11$

11. $y = x^2 - 2x$
$y = -x + 6$

12. $y = 2x^2 + 3x - 5$
$y = x^2 + 2x - 3$