Classwork 37

1. Given $f(x) = x^4 - 8x^3 + 4x^2 + 9$

a) Find the slope at $x = 3$.

b) When does the curve have a slope of 0?

2. Find the derivative of each function using the rule.

a) $y = 1/x$ b) $y = 1/x^4$ c) $y = 5/x^3$ d) $y = \dfrac{1}{2x^6}$

3. Write each of the following functions with an exponent instead of a root.

a) $y = \sqrt{x}$ b) $y = \sqrt[3]{x}$ c) $y = \sqrt[5]{x}$ d) $y = 4\sqrt[4]{x}$

4. Find the derivative of $f(x) = \sqrt{x}$ using the definition.

5. Find the derivative of each function.

a) $y = \dfrac{1}{x^5}$

b) $y = \dfrac{4}{x^3}$

c) $y = \sqrt[4]{x}$

d) $y = 2\sqrt[5]{x}$

e) $y = \dfrac{2}{x^2}$

f) $y = 10x^{1/5}$

g) $y = 4\sqrt{x}$

h) $y = 6\sqrt[3]{x} + \dfrac{5}{x^4}$

6. Prove that "the rule" works for all negative exponents.

7. Find the tangent line to the curve $y = x^{2/3}$ at $x = 8$.

8. A line goes through the point $(0, -9)$. It is tangent to the curve $y = x^2$. Where does it hit the curve?

<u>Practice Problems</u>

1. Find the derivative of each function.

a) $y = 5x - 2$

b) $y = 7x^4 - 3x^2 + 5x + 1$

c) $y = 6\sqrt[4]{x}$

d) $y = \dfrac{6}{x^4}$

2. Find the slope of each function at $x = 3$

3. Find the points when function (a), (c), and (d) have a slope of 64.