**Name:** _____ **TC**

## Classwork 36

1. Write **the limit** for the derivative of each function, but do not find the answer. **(Just set it up)**

a) $f(x) = 3x^4$ b) $f(x) = 7x^2 - 3$ c) $f(x) = \sqrt{x} + x$

2. a) Find the slope of the function $y = 1/2x^3 - 7x$ at $x = 2$

b) Find the equation of the tangent line at $x = 2$, and then check using the calculator.

3. a) Rewrite each expression with a positive exponent (without changing the value).

i. $x^{-2}$ ii. $x^{-1}$ iii. $5x^{-4}$

b) Rewrite each expression using a negative exponent.

i. $1/x^3$ ii. $4/x$ iii. $5/x^7$

c) Write a formula for $1/x^n$ using a negative exponent.

4. Find the derivative of $f(x) = \frac{1}{x}$ using the definition.

5. Find the derivative of $f(x) = \frac{1}{x^2}$ using the definition.

6. Fill in the box with the missing exponent. For (f), each box has to have the same number.

a. $3^7 \cdot 3^{\square} = 3^9$ b. $5^6 \cdot 5^{\square} = 5^{10}$ c. $4^3 \cdot 4^{\square} = 4^9$

d. $6^{1/2} \cdot 6^{\square} = 6^1$ e. $2^{1/3} \cdot 2^{1/3} \cdot 2^{\square} = 2^1$ f. $x^{\square} \cdot x^{\square} \cdot x^{\square} \cdot x^{\square} = x^1$

7. Based on your answers to (d), (e), and (f), what does a fractional exponent have to mean?

Write a formula for $X^{1/n}$ .

8. Find the derivative of $\sqrt{x}$ using the definition.

Practice Problems

1. Write an equation for the tangent to the graph of $y = 5x^2 - 2x$ at $x = 3$

2. Find the derivative of each function.

a) $y = 5\sqrt[3]{x}$

b) $y = \frac{2}{x^4}$

c) $y = \frac{4}{3x^3} + \sqrt[3]{8x}$