Name: _____ Unit 7 – Exploring Derivatives- Group Activity

IV. Use the TI-89 to find the derivative of the following:

$f(x)=3x-5$ 3 $f(x)=x+2$ 1 $f(x)=3-2x$ -2

$f(x)=-3x-4$ -3 $f(x)=\frac{1}{2}x$ $\frac{1}{2}$ $f(x)=4-\frac{2}{3}x$ $-\frac{2}{3}$

1. All of the above functions are linear. And their derivative is the slope of the line.

V. Discovering the shortcut.
There is a shortcut to finding the derivative of a polynomial. Find the derivative of the following and see if you can discover the shortcut.

$f(x)=x^2$ $2x$ $f(x)=x^{10}$ $10x^9$ $f(x)=\sqrt{x}$ $x^{1/2}$ $\frac{1}{2}x^{-1/2}=\frac{1}{2x^{1/2}}$

$f(x)=x^4$ $4x^3$ $f(x)=\frac{1}{x^2}$ x^{-2} $-2x^{-3}=\frac{-2}{x^3}$ $f(x)=\sqrt[4]{x^5}$ $x^{5/4}$ $\frac{5}{4}x^{1/4}$

1. Describe the shortcut

power × coefficient

new power = old power − 1

VI. The constant multiple rule. – The derivative of a constant times a function is the constant times the derivative. Find the derivative of the following.

$f(x)=3x^2$ $3\cdot(2x)$ $6x$ $f(x)=-4x^{-3}$ $-4\cdot(-3x^{-4})$ $12x^{-4}$ $f(x)=-x^9$ $-1\cdot(9x^8)$ $-9x^8$

VII. The sum and difference rules: - The derivative of the sum of two functions is the sum of the derivatives of the two functions. Find the derivatives of the following:

$f(x)=x^2-3x$ $2x-3$ $f(x)=4x^3+5x^2+x-1$ $12x^2+10x+1$ $f(x)=8x-\sqrt[3]{x}$ $x^{1/3}$ $8-\frac{1}{3}x^{-2/3}$

VIII. Derivative of weird functions. Find the derivative of the following:

$f(x)=\sin x$ $\cos x$ $f(x)=\cos x$ $-\sin x$ $f(x)=e^x$ e^x $f(x)=\ln x$ $\frac{1}{x}$