**Mr. Visca’s: Calculus (Chpt 3.3)**

**Chpt 3 – Day 3: Rules of Differentiation**

**3.3 Rules for Differentiation**

1) Derivative of a constant \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Example: f(x) = 7

2) Power Rule Example: y = 4x3

3) Constant Multiple Rule Example: f(x) = 4x3 y = $\frac{x^{5}}{4}$

c is a constant and u is a differentiable function of x

4) Sum and Difference Rule Example: y = 5x3 + 3x2 - 11x - 9

u and v is a differentiable functions of x

5) Product Rule Example: y = (x2 + 1)(x3 + 3)

6) Quotient Rule Example: $y=\frac{x^{2}-1}{x^{2}+1}$

Numerical Derivative

Let *y* = uv

Find *y*' (2) if u(2) = 3 u'(2) = -4 v(2) = 1 v'(2) = 2

Using the rules

1) Does the curve y= *x*4 - 2*x*2 + 2 have any horizontal tangent lines?

Horizontal tangents occur where slope \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is zero



2) Find the equation of the tangent line to the curve at the point (1, 2).

Second and Higher Order Derivatives

Second Derivative: take the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ derivative

Third Derivative: take the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ derivative

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#s: 2-16 even,23a, 23b, 26, 47

What do 1st and 2nd derivatives represent in 47?