AP Calc WS#9 Composite Function - Chain Rule Name: \_\_\_\_\_\_

 Composite function is obtained by “plugging” one function into another.

 For example with two functions g(x) = x3 + 1 and f(x) = .

 The composite function f(g(x)) = while g(f(x)) =

Chain Rule: If f and g are differentiable (derivative-able) then the composite function f(g(x)) is differentiable and (f(g(x)))' =[ f '(g(x))] [g' (x)] say [outside ' (inside) ] [ inside ' ]

 By setting u = g(x), we may also write the Chain Rule as

Example: Find the derivative of y = .

As we've seen above f(x) = (outside) and g(x) = x3 + 1 (inside)

By the Chain Rule

 Find the derivative of y = (x3 + 7)2 Hint f(x) = x2 (outside) g(x) = x3 +7 (inside)

Find the derivative of y = (x2 – 1)3

Remember these basic formula and

Find the derivative of y = sin (x5) Hint f(x) = sinx (outside) g(x) = x5 (inside)

Find the derivative of y = (cosx)4

y = (1 + cos2x)2 y = cos2 (x3 + x2)

An object moves along the x-axis so that its position at any time t ≥ 0 is given by s(t) = cos (t2 + 1).

Find the velocity of the object as a function of t.

Higher order derivative:

 

Find the first four derivatives of

 y = x3 - 5x2 + 2. y = x4 + x3 - 2x2 + x - 5

Find the derivative of the following, use cheat sheet for the formula and online tools to check

 Compute NDER (x3, 2) using h = 0.001 then show me the calculator result

Do (x2, 10) (|x|, 0) what wrong?

Find the rate of change of the area A of a circle with respect to its radius r.

Evaluate the rate of change of A at r = 5 and at r = 10.

If r is measured in inches and A is measured in square inches, what units would be appropriate

for dA/dr?