

SM121 Test III

2 November 2010

Name _____

Prof. J. D'Archangelo

Find $\frac{dy}{dx}$ for functions 1. - 5. (Do not use your calculator and do not simplify.)

1. $y = (x - 4)^7 \cos(3x)$

2. $y = \frac{e^{2x}}{\tan(x)}$

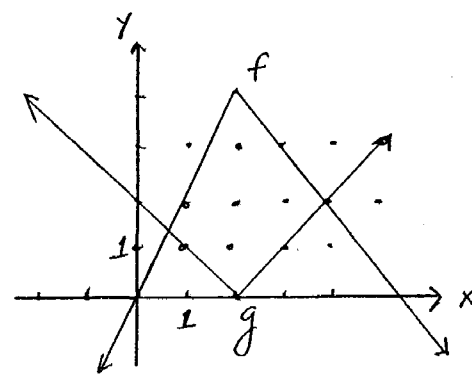
3. $y = \arctan(x^3)$

4. $y = (\sin(5x))^x$

5. $y = x \ln(x) \sec(x)$

Over

6. If f and g are functions whose graphs are shown on the right, let $p(x) = f(x)g(x)$ and $c(x) = f(g(x))$.



a) Find $p'(3)$.

b) Find $c'(3)$.

7. Prove the Quotient Rule by first writing $f(x)/g(x) = f(x)[g(x)]^{-1}$ and then using the Product Rule and the Chain Rule.

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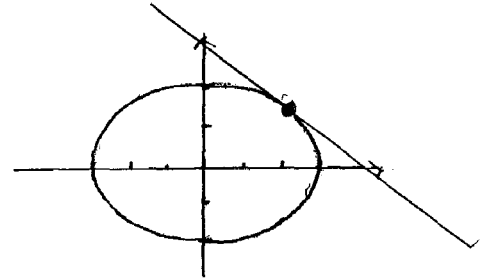
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8. Find the line tangent to the ellipse defined implicitly by $4x^2 + 9y^2 = 36$ at the point $(2, \frac{2\sqrt{5}}{3})$.



9. a) Find the linearization (tangent line) for $f(x) = e^x$ at $x = 0$.
b) Graph the function and its tangent line on the same axes.
c) Use your linearization to approximate $e^{-0.4}$.
d) Is your approximation in c) too large or too small? Why?

Over

10. A ladder 15 ft long rests against a vertical wall. If the top of the ladder slides down the wall at a rate of 2 ft/s, how fast is the bottom of the ladder sliding away from the wall when the bottom is 9 ft from the wall? (Draw and label a diagram.)

