

MATH-121 (DUPRÉ) FALL 2009 QUIZ 1 ANSWERS

1. NAME. 10 POINTS

PRINT YOUR NAME IN LARGE CAPITAL LETTERS ON THE UPPER RIGHT HAND CORNER OF YOUR QUIZ PAPER.

2. PROBLEM. 20 POINTS

If $f(2) = 5$, if $f(7) = 2$, if $g(2) = 7$, and $g(5) = -2$, what are $g(f(2))$ and $f(g(2))$?

$$g(f(2)) = g(5) = -2$$

and

$$f(g(2)) = f(7) = 2.$$

3. PROBLEM. 30 POINTS

If the curve $y = f(x)$ has a tangent line at the point $(8, 4)$ and that tangent line also passes through the point $(10, 8)$, then what is $f'(8)$?

The slope of the tangent line is simply the slope, m , of the line through the two points (remember, slope is simply rise over run):

$$m = \frac{8 - 4}{10 - 8} = \frac{4}{2} = 2.$$

4. PROBLEM. 40 POINTS

If $f(x) = x^3 - 5x$, give the polynomial $p(x)$ with the property that $p(h) = f(2 + h) - f(2)$. You may use the formula $(a + b)^3 = a^3 + 3a^2b + 3ab^2 + b^3$.

$f(2 + h) = 2^3 + (3)(2^2h) + (3)(2h^2) + h^3 - 5(2 + h) = 2^3 - (5)2 + 12h + 6h^2 + h^3 - 5h$
and $f(2) = 2^3 - (5)2$, so

$$f(2 + h) - f(2) = h^3 + 6h^2 + 7h,$$

so if

$$p(x) = x^3 + 6x^2 + 7x,$$

then

$$p(h) = f(2 + h) - f(2).$$