

Write the derivatives of these functions legibly on the lines provided. No computers or calculators. Do not simplify your answers.

1.  $\frac{d}{dx}(x^{12} - 6x^{-2} + 12x - 1) =$

$12x^{11} - 6(-2x^{-3}) + 12$

2.  $\frac{d}{dt}(f(p(t))) =$

$f'(p(t)) \cdot p'(t)$

3.  $\frac{d}{dt}\left(\frac{2t-5}{t^5+2}\right) =$

$\frac{2(t^5+2) - (2t-5)(5t^4)}{(t^5+2)^2}$

4.  $\frac{d}{dt}(1-3t^2)^6 =$

$6(1-3t^2)^5(-6t)$

5.  $\frac{d}{dx}e^{1+5x} =$

$(e^{1+5x})(5)$

Math 113 -- Gateway Practice  
Derivatives

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Name

6.  $\frac{d}{dx}(\arctan(x))^3 =$

$3(\arctan x)^2 \left(\frac{1}{1+x^2}\right)$

7.  $\frac{d}{dx}(\ln(4x^3)) =$

$\left(\frac{1}{4x^3}\right)(12x^2)$

8.  $\frac{d}{du}(\sin u \cdot 3^u) =$

$\cos u \cdot 3^u + (\sin u)(\ln 3 \cdot 3^u)$

9.  $\frac{d}{dt}\left(\frac{\tan(3t)}{t^3}\right) =$

$\frac{(\sec^2(3t) \cdot 3)(t^3) - (\tan(3t)) \cdot (3t^2)}{(t^3)^2}$

10.  $\frac{d}{dx}(\sqrt{x^5} - x^{-1/3}) =$   
 $\uparrow$   
 $x^{5/2}$

$\frac{5}{2}x^{3/2} - \left(-\frac{1}{3}\right)x^{-4/3}$