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Math 2010, Winter 2007, Quiz 6  
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Differentiate:

1.  $(x+2)^5(x-1)^3$

2.  $\sin(x^2 + \sqrt{x})$

3.  $\ln(1 + e^{2x})$

4.  $\frac{x^3}{(x+1)^2}$

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1.  $5(x+2)^4(x-1)^3 + (x+2)^5(3(x-1)^2) = (x-1)^2(x+2)^4 [5x-5 + 3x+6]$

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2.  $\cos(x^2 + \sqrt{x}) \cdot (2x + \frac{1}{2\sqrt{x}}) = (2x + \frac{1}{2\sqrt{x}}) \cos(x^2 + \sqrt{x})$

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3.  $\frac{1}{1+e^{2x}} \cdot e^{2x} \cdot 2 = \frac{2e^{2x}}{1+e^{2x}}$

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4.  $\frac{3x^2(x+1)^2 - x^3(2(x+1))}{(x+1)^4} = \frac{3x^2(x+1) - 2x^3}{(x+1)^3}$   
 $= \frac{3x^3 + 3x^2 - 2x^3}{( )^3} = \frac{x^3 + 3x^2}{(x+1)^3} = \frac{x^2(x+3)}{(x+1)^3}$

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