

Quiz 3 Solutions, Math 220, Professor David Levermore
Friday, 17 September 2010

- (1) [3] Compute the derivative of the function $f(x) = (x^2 + 3)^7$.

Solution. By the *general power rule* you see that

$$f'(x) = 7(x^2 + 3)^6 2x = 14(x^2 + 3)^6 x.$$

Remark. You did not need to simplify the answer to get full credit, but it is a good habit to get into. This is because finding a derivative will often be followed by other steps in some longer problem and a simplified form will usually make those subsequent steps easier. This remark applies to the solutions of all the problems on this quiz.

- (2) [3] Compute the derivative of the function $g(z) = z^{\frac{3}{4}} - z^{-3}$.

Solution. By the *sum rule* and *power rule* you see that

$$g'(z) = \frac{3}{4}z^{-\frac{1}{4}} - (-3)z^{-4} = \frac{3}{4}z^{-\frac{1}{4}} + 3z^{-4}.$$

- (3) [4] Compute the first and second derivatives of the function $h(t) = t^3 - 5t^2 + 2t - 4$.

Solution. By the *sum rule*, *scalar multiple rule*, and *power rule* you see that

$$h'(t) = 3t^2 - 5 \cdot 2t + 2 = 3t^2 - 10t + 2,$$

$$h''(t) = 3 \cdot 2t - 10 = 6t - 10.$$