MTH 251
LAB §3.1

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1. Differentiate the following polynomial expressions. Look for a pattern and become comfortable with these derivatives as you will see them a lot!

   a. 1
   b. x
   c. x^2
   d. x^3
   e. x^4
   f. x^{-1}
   g. x^{-2}
   h. x^{-3}
   i. x^{-4}
   j. x^{-5}
   k. $\dfrac{1}{x}$
   l. $\dfrac{1}{x^2}$
   m. $\dfrac{1}{x^3}$
   n. $\dfrac{1}{x^4}$
   o. $\dfrac{1}{x^5}$
   p. $x^{\frac{1}{2}}$
   q. $x^{\frac{3}{2}}$
   r. $x^{\frac{4}{3}}$
   s. $x^{\frac{5}{3}}$
   t. $x^{\frac{6}{5}}$
   u. $\sqrt{x}$
   v. $\sqrt[3]{x^2}$
   w. $\sqrt[4]{x^3}$
   x. $\sqrt[5]{x^4}$
   y. $\sqrt[6]{x^5}$

2. Find $\frac{d}{dx}(x^3 + x^2 + x + 1)$

3. Find $\dfrac{dy}{dx}$ if $y = 1 - 2x - \dfrac{3}{2}x^2$

4. Find $f'(x)$ if $f(x) = \sqrt{x}$

5. Find $\frac{d}{dx}(251)$

6. Find $\dfrac{dy}{dx}$ if $y = 3x^{\frac{3}{2}}$

7. Find $g'(y)$ if $g(y) = 16(2y^3 - \sqrt{y} + y^{-1})$

8. Find $h'(z)$ if $h(z) = 1.5e^z - 6.2\sqrt[4]{z}$

9. Find $\frac{d}{dt}\left(7e^t - \dfrac{t^2 - 12t + 26.25}{t^2}\right)$