

**THE UNIVERSITY OF AKRON**  
**Theoretical and Applied Mathematics**



**Calculus I: Differentiation Practice**  
**Basic Differentiation Formulas 2**

**D. P. Story**

© 2003 [dpstory@uakron.edu](mailto:dpstory@uakron.edu)

November 16, 2003

Version 1.0

## Prerequisite:

### Tutorial on the AcroT<sub>E</sub>X System of Online Assessment

You must enter your answer in the response boxes using a certain “natural” syntax. This is a brief tutorial on how to enter your answers in the response boxes below.

**Instructions:** In order to make this a useful academic exercise, you should solve each of the problems on a separate sheet of paper, simplify as needed. Then transfer your answer into the response box. Work neatly and be well-organized. Work as if your paper is to be handed in.

The programming cannot check for a simplified answer, but a simplified answer might be easier to enter into the response box. For example, it is easier to enter ‘ $x$ ’ than the non-simplified expression ‘ $x(2x + 4) - 2x(x + 1) - x$ ’.



**Addition Formula.** Differentiate each of the following.

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

$$2. \frac{d}{dx}\left(x\sqrt{x} - \frac{1}{\sqrt{x}}\right) =$$

$$3. \frac{d}{dx} \frac{4x^4 - 2x^2}{2x^2} =$$

$$4. \frac{d}{dx}(3x^3 - 2\cos(x)) =$$

$$5. \frac{d}{dt} \frac{t^2 - 3t^3}{\sqrt{t}} =$$

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

$$7. \frac{d}{dx}\left(\frac{1 + \sin(x)}{\cos(x)}\right) =$$



Repeat this practice set until you get through with *no errors*. Then go on to the next practice set.

**Product Rule/Quotient Rule.** Differentiate each of the following.

1.  $\frac{d}{dx} x^2 \sin(x) =$

2.  $\frac{d}{dx} \sec(x) \tan(x) =$

3.  $\frac{d}{dx} \frac{\cos(x)}{x} =$

4.  $\frac{d}{dx} \frac{x - 1}{x + 1} =$

5.  $\frac{d}{dt} \sqrt{t} \sec(t) =$

6.  $\frac{d}{dx} \sin(x) \cos(x) =$

7.  $\frac{d}{dx} \frac{x \sin(x)}{\cos(x)} =$




$$8. \frac{d}{ds} \frac{4s^2}{1 - 6s^2} =$$

$$9. \frac{d}{dx} \left[ \frac{x \sin(x)}{x + 1} \right] =$$

Repeat this practice set until you get through with *no errors*. When you have finished **both** practice sets without error, try taking a online quiz to test your understanding, go to the [Followup Assessment](#).

### Directions:

 Followup Assessment

 AcroT<sub>E</sub>X Online Assessment Page