

## Symbolic differentiation

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- Objectives:**
1. Practice paper-and-pencil differentiation skills
  2. Develop good habits of *checking* all results  
*spend more time checking than calculating!!!!*
  3. Practice MAPLE syntax and develop basic understanding of computer algebra

- Tasks:**
1. For each function given below, use **paper-and-pencil** techniques to find a **simplified** formula for its derivative.
  2. Only **AFTER** completing part 1. use MAPLE to re-affirm your calculations.
  3. Compare both results, and, working on both sides, continue until both approaches match. Suitable MAPLE commands include `simplify`, `combine`, `factor`, `expand`, ... Ask for help when stuck.

**Deliverables:** None at this time. Above primary objectives will be assessed at the next test.

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a.  $y = x^3 + 3x^2 - 1$

b.  $y = \frac{1}{\sqrt{x}} - \sqrt[3]{x}$

c.  $y = e^x - x^e$

d.  $y = \frac{x^2+3x}{x^3-5x+1}$

e.  $y = \frac{3x^2-4x+5}{\frac{x}{6x^4-12}}$

f.  $y = \frac{2+\sin 3x}{2+\cos 3x}$

g.  $y = \sin x^2$

h.  $y = \sin^2 x$

i.  $y = (\sin x)^2$

j.  $y = 3 \sin^{-1} 5x$

k.  $y = \frac{7}{\sin x}$

l.  $y = 2x + 11 \arctan 3x$

m.  $y = x \ln(x) + 4$

n.  $y = x(\ln x + 4)$

o.  $y = (x-1) \ln(x)$

p.  $y = \ln 6x$

q.  $y = \frac{x^2-\sqrt{x}}{x} - 3$

r.  $y = \sin \frac{x^{1/3}-x^{1/4}}{3x-7}$

When finished, first look around and help other classmates; learn from them!!!

Then go back to the text-book and work the most challenging derivatives that you can find.

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