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Math 102
Calculus Practice

Sp 2010

1. Find y'

a) $y = (7x^3 - 9x^2 + 8x) \left(\frac{12}{x^3} + 17x^{1/3} + 10 \right)$

b) $y = (10\sqrt{x} + 14x^5) \left(-6x^4 + \frac{18}{x} \right)$

c) $y = \frac{6x^2 + 5x + 1}{7 - 10x^3}$

d) $y = \frac{\frac{16}{x} + 9x^{1/5}}{4x^2 - 10x + 40}$

2. If you throw a golf ball from the top of a 96 foot building with an initial velocity of 16 feet per second:

a) when will it pass you on the way down?

b) How fast will it be going at that point?

c) when will it hit the ground?

d) what is its impact velocity?

e) when will it reach its maximum height?

f) what is the maximum height?

(2)

3. Repeat #2 with initial height = 32
and initial velocity = 16.

4. Sketch y and identify min/max
if

a) $y = 1 - \frac{x^2}{2} + \frac{x^4}{28}$

b) $y = x^3 - 6x^2 + 1$

c) $y' = (x+4)^3(x+2)x^5(x-2)^4(x-5)^7$
- use 1st derivative test + sketch

d) $y' = x^3(x-1)$
- use 2nd derivative test to
classify min/max + sketch

5. Show that $(e^x)' = e^x$ by
assuming that $e^x = 1 + x + \frac{x^2}{2!} + \frac{x^3}{3!} + \dots$