Relating to the max...

Homework 6: Due Friday, October 14

The next few assignments will cover story problems. This one covers more difficult max-min problems (4.7 and 4.8), and starts related rates problems (3.10 and 3.11). It also includes some review (more problems). In general, to solve a max-min story problem you will need to find a formula for the thing that you want to optimize (max or min?), find constraints relating all of the variables to just one independent variable, combine, then check the end points, points where \( y' \) is undefined and zero. Then answer the question.

To solve a related rates problem, write out all of the derivatives that you know and want to find in \( \frac{da}{dt} \) notation. Find an equation relating all of the variables, differentiate, plug in the numbers and solve.

sec 4.7 page 336: 34, 35, 42, 43, 46, 51, 52, 59, 60
sec 4.8 page 346: 20, 21, 23
sec 3.10 page 260: 2, 7, 8, 10, 12, 14, 16
sec 3.11 page 267: 5, 6, 9, 41, 42

More problems:

1. Find the equation of the tangent line to \( y = x \sin x \) at \( x = \pi/6 \).
2. Find \( y' \) given \( y^3 + 2y^4 - x^3 + x = 1 \)
3. Find \( y' \) given \( \tan(xy^2) + \tanh(x^2y) = 0 \)
4. Find \( y' \) given \( y = (\sin x)^x \)

Newton rates...

Homework 7: Due Wednesday, October 19

This homework continues with related rates and includes some Newton’s method problems (4.9) (find the equation of the tangent line and then solve) and some review (page 177 plus more.)

sec 4.7 page 336: 56
sec 4.9 page 351: 1, 7, 9, 33
sec 3.10 page 260: 17, 19, 22, 23, 24, 27, 29, 31, 32, 37
page 177: 1, 3, 12, 22, 44, 46

More problems:

1. Find the equation of the tangent line to \( p = \sqrt[5]{q} \) at \( q = 25 \).

2. Find \( y' \) given \( y = \frac{\cos^3(7x+1)}{\sinh(x \tan x)} \).

3. Find \( y' \) given \( y = (\cosh^3 x^4) \tanh(7x) \ln x \).

4. Find \( y' \) given \( y = x^x \sin x \).