(8) 1. Calculate the derivative of y with respect to x if $\sin(x+y) = x + \cos(y)$.

Section 3.8, exercise 23

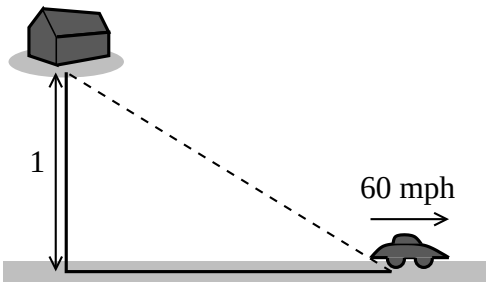
(10) 2. a) Calculate the derivative if $y = \arctan\left(\dfrac{1+t}{1-t}\right)$.

Section 3.9, exercise 31

b) Find an equation of the tangent line at the point indicated: $f(x) = \ln(x^2)$, $x = 4$.

Section 3.10, exercise 30

(12) 3. A road perpendicular to a highway leads to a farmhouse located 1 mile away. An automobile travels past the farmhouse at a speed of 60 mph. How fast is the distance between the automobile and the farmhouse increasing when the automobile is 3 miles past the intersection of the farmhouse and the road?



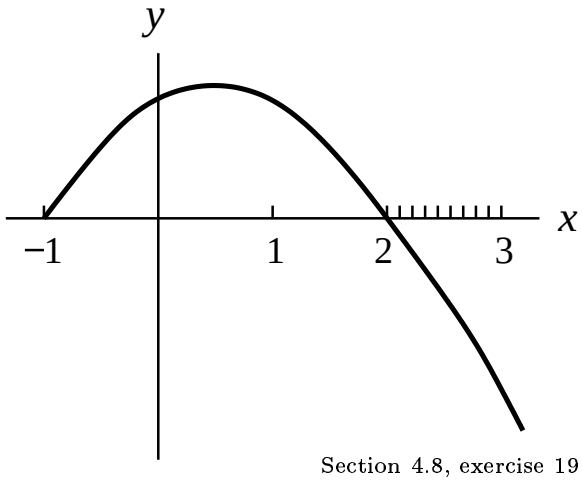
Section 3.11, exercise 9

(6) 4. The cube root of 27 is 3. How much larger is the cube root of 27.2? Estimate using the Linear Approximation.

Section 4.1, exercise 25

(8) 5. Let x_1, x_2 be the estimates obtained by applying Newton's Method with $x_0 = 1$ to the function graphed in the accompanying figure. Estimate the numerical values of x_1 and x_2 and draw the tangent lines used to obtain them.

$x_1 \approx$ _____ and $x_2 \approx$ _____



Section 4.8, exercise 19

(10) 6. Find the maximum and minimum values of the function on the given interval.

$$y = x - \frac{4x}{x+1}, \quad [0,3]$$

Section 4.2, exercise 39

(9) 7. Find the critical points and the intervals on which the function is increasing or decreasing, and apply the First Derivative Test to each critical point.

$$y = \cos\theta + \sin\theta, \quad [0, 2\pi]$$

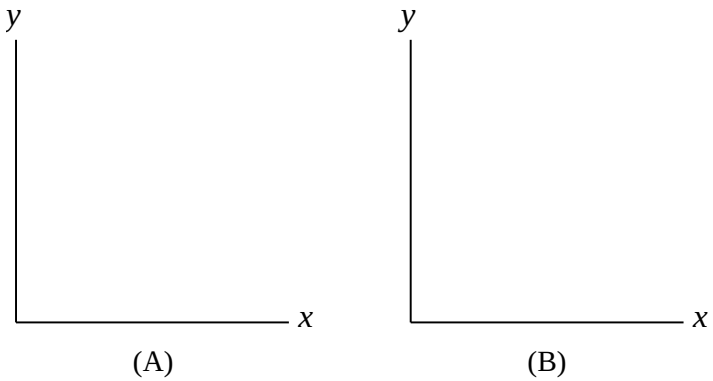
Section 4.3, exercise 42

(11) 8. Determine the intervals on which the function is concave up or down and find the points of inflection.

$$y = (x^2 - 3)e^x$$

Section 4.4, exercise 17

(4) 9. Sketch an arc where f' and f'' have the sign combination $++$ on axes (A). Do the same for $-+$ on axes (B).



Section 4.4, preliminary question 1

(12) 10. A landscape architect wishes to enclose a rectangular garden on one side by a brick wall costing \$30/ft and on the other sides by a metal fence costing \$10/ft. If the area of the garden is 1,000 ft^2, find the dimensions of the garden that minimizes the cost.

Section 4.6, exercise 11

(10) 11. Evaluate the limit. Be sure, as the cover page states, to **Show your work** since **An answer alone may not receive full credit.** Explain why any special method you use is applicable.

$$\lim_{x \to 4} \frac{1}{\sqrt{x} - 2} - \frac{4}{x - 4}$$

Section 4.7, exercise 28

Second Exam for Math 153

November 19, 2009

NAME _____

SECTION _____

Do all problems, in any order.
Show your work. An answer alone may not receive full credit.
No texts, notes, or calculators may be used on this exam.

Problem Number	Possible Points	Points Earned:
1	8	
2	10	
3	12	
4	6	
5	8	
6	10	
7	9	
8	11	
9	4	
10	12	
11	10	
Total Points Earned:		