Name: _____

CLASSWORK 88

Use implicit differentiation to find each derivative.

1. Y is a function of x. Find the derivative of $y^2 + yx + 3x^5 = y$ in terms of x.

2. C is a function of b. Find the derivative of $bc^2 + c^4 = 10$ in terms of b.

3. Y and x are functions of t. Find the derivative of $xy + y^2 - x = 5$ in terms of t.

4. A pizza restaurant wants to see if it can increase the amount of money it is making from selling slices. Right now, a slice costs $1.75 and they sell an average of 100 slices per day. They decide to start increasing the price at a rate of $.05 per day. They notice that when they do that, sales start dropping at a rate of 5 slices per day.
a) Use calculus to find the exact, instantaneous rate of change of income under these circumstances.

b) Show that this answer makes sense by calculating the change in income between today and tomorrow.

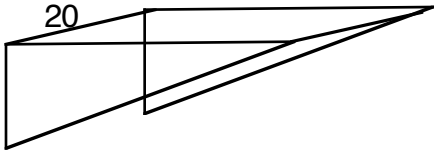
5. A spherical snowball is melting in the 60º New York winter. It is losing volume at a rate of 1 cubic centimeter per minute.

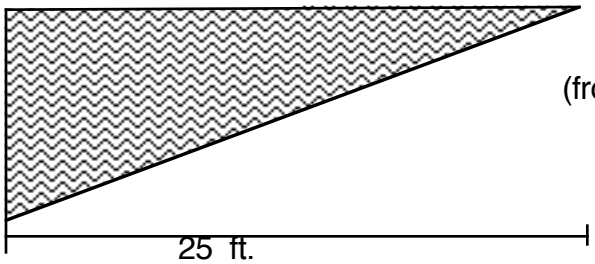
a) Write an equation relating the radius of the snowball to its volume.

b) How fast is the radius decreasing when it is 5 cm long?

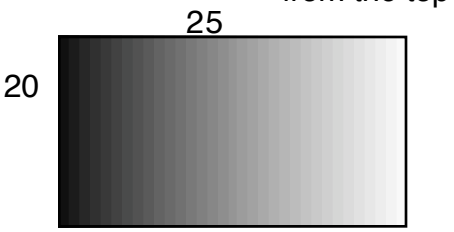
6. The Lettie G. and the Harbor school rowing squad leave South Street Seaport at the same time. The Lettie is sailing east at 10 miles per hour. The rowing squad is sailing south at 5 miles per hour. How fast is the distance between them increasing after 2 hours?

7. The bottom of the Bushwick Campus pool is slanted from the shallow end to the deep end. A cross-section is shown below.
It is also 20 feet wide.





(from the side)



a) FInd the current volume of the pool in cubic feet.

b) The pool develops a leak. When the water level is at 10 feet, the pool is losing 3 cubic feet of water volume per minute. How fast is the water level dropping at this time?