MAC 2311 Hybrid Calculus I (B)

**3.7-3.8**

1. Given *yx*3 + sin (*xy*) = 1, find $\frac{dy}{dx}$

2. Given sin (*y*) = *xy+x*2 –*y* 2, find $\frac{dy}{dx}$

3. Find the equation of the tangent line to the graph of $ycos \left(2x\right)=xsin\left(2y\right)$ at the point (π/4,π/2).

4. True / False: If the radius of a circle is increasing at a constant rate, then so is the area. Explain. Show algebraically.

5. A balloon is inflated and its volume increases at a rate of 2 cm3/min. At what rate is the radius of the balloon changing when the radius is 5 cm?

6. Gravel is being dumped from a conveyor belt and accumulates in a conical pile with radius that is always 3 times its height. If gravel falls from the belt at a rate of 100ft3/min, how fast is the height of the gravel pile changing when the pile is 10 ft. high? The volume of a cone is$ V=\frac{1}{3}πr^{2}h$. Your answer should be exact (No decimals). Show units.



7. A 13-ft ladder is leaning against a vertical wall. If the foot of the ladder is pulled away at a rate of ½ ft/s, how fast is the top of the ladder sliding when the lower end of the ladder is 5 ft. from the wall?



8. A boat is pulled into a dock by a rope attached to the bow of the boat and passing through a pulley on the dock that is 3 m higher than the bow of the boat. If the rope is pulled in at a rate of 2 m/s how fast is the boat approaching the dock when 5 m of rope are left to pull in? Your answer should be exact (No decimals).

