BC: Q103. PRACTICE EXAM

Section 3.7:

1*. Consider the curve C: $y^2 = x^2 - x - 8$.

A. Find dy/dx

B. Find the points on the curve C when $y = 2$.

C. Find the equations of the respective tangent lines to the curve C at the points found in part B.

D. Show that there are no horizontal tangents to the curve C.

E. Find d^2y/dx^2 (Do not simplified)

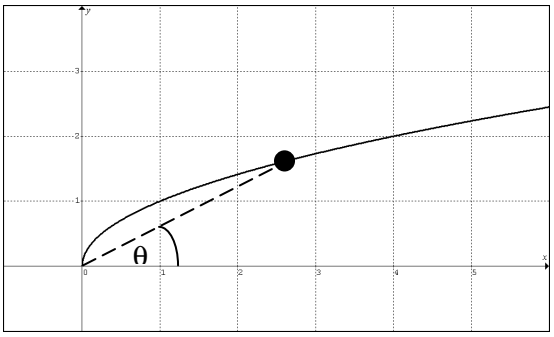
F. Find d^2y/dx^2 at the point $(-3,-2)$ (Do simplify)

2. Find dy/dx if $x^3 - xy^3 = 18xy$.

3*. Find dy/dx if $2\cos(xy^2) + y = x^2y$

Section 4.6:

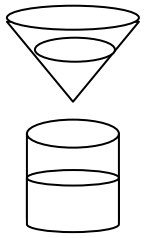
4*. A particle moves from left to right along the curve $y = \sqrt{x}$ in such a way that the x-coordinate increases at the rate of 8 m/s. How fast is the angle of inclination θ of the line joining the particle to the origin changing when $x = 4$?



5*. Coffee is draining from a conical filter (6 inch base and 6 inch height) into a cylindrical coffeepot (6 inch base) at the rate 10 in^3/min.

A. How fast is the level (height) in the cone falling at the moment when $h = 5$.

B. How fast is the level (height) in the pot rising at the same moment?



6. A particle $P(x,y)$ is moving in the coordinate plane in such a way that $dx/dt = -1$ m/sec and $dy/dt = 5$ m/sec. How fast is the particle's distance from the origin changing as it passes through the point (5, 12)?

Section 4.5:

7. Let f be a function with $f(4) = 1.8$ and $f'(x) = \sqrt{5 + x}$.
Use a linearization of f at $x = 4$ and use it to approximate $f(4.2)$.

8. Estimate the change in $f(x) = x^3 + 2x$ as x decreases from 3 to 2.8

9. Estimate $\sqrt{8.9}$ using a linearization.