**MATH 1073 Calculus I**

**Assignment 5**

1. Use implicit differentiation to find an equation of the tangent line to the curve at the given point.

*x2 +* 2*xy +* 4*y2* = 12, (2, 1) (ellipse)

Ans:



So an equation of the tangent line is



2. If *f* (*x*) + *x*2 [ *f* (*x*)]3 = 10 and f (1) = 2, find *f ’* (1).

Ans:



3. Find *dy*/*dx* by implicit differentiation

sin (*xy*) = cos (*x*+*y*)

Ans:



4. If *xy* + *ey* = *e*, find the value of *y’’* at the point where *x* = 0.

Ans:



5. Find the derivative of the function. Simplify where possible.

Ans:

6. Use logarithmic differentiation to find the derivative of the function.

Ans:

(a) Take natural logarithms of both sides of the equation:

Differentiating implicitly with respect to *x* gives

Solving for *dy/dx*, we get

(b) Since both the base and exponent are variable, we use logarithmic differentiation:

7. Use a linear approximation (or differentials) to estimate.

Ans:



8. The circumference of a sphere was measured to be 84 cm with a possible error of 0.5 cm.

(a) Use differentials to estimate the maximum error in the calculated surface area. What is the relative error?

(b) Use differentials to estimate the maximum error in the calculated volume. What is the relative error?

Ans:



9. Use differentials to estimate the amount of paint needed to apply a coat of paint 0.05 cm thick to a hemispherical dome with diameter 50 m.

Ans:

