

5 Oct. 2009

1. Find the first partial derivatives of the following functions.

(a)  $f(x, y) = \cos(xy) + xy^2$

5%

(b)  $f(x, y) = (x + y)^2$

5%

(c)  $f(x, y) = (x^2 + 3y)^3$

5%

(d)  $f(x, y) = \cos(x)e^{2y}$

5%

2. Find the second partial derivatives of the following functions.

(a)  $f(x, y) = \cos(xy) + xy^2$

10%

(b)  $f(x, y) = (x + y)^2$

10%

3. A cylindrical hole of diameter 10 inches and height 30 inches is to be cut in a block of wood by a process in which the maximum error in diameter is 0.05 inch and in height is 0.1 inch. What is the largest possible error in the volume of the cavity?

20%

4. For each of the following complete the square on the denominator and then evaluate the integral.

(a)  $\int \frac{dt}{t^2+2t+2}$

10%

(b)  $\int \frac{dt}{2t^2+6t+2}$

10%

5. Integrate the following by making use of the 't' substitution.

(a)  $\int \frac{dx}{3 \sin x + \cos x}$

20%