

This print-out should have 9 questions. Multiple-choice questions may continue on the next column or page – find all choices before answering.

001 10.0 points

Find the value of f_x and f_y at $(1, -1)$ when

$$f(x, y) = \frac{2}{xy} + 4x^2 + y^2.$$

1. $f_x|_{(1,-1)} = -6, \quad f_y|_{(1,-1)} = 0$
2. $f_x|_{(1,-1)} = 6, \quad f_y|_{(1,-1)} = -3$
3. $f_x|_{(1,-1)} = 10, \quad f_y|_{(1,-1)} = 0$
4. $f_x|_{(1,-1)} = 10, \quad f_y|_{(1,-1)} = -4$
5. $f_x|_{(1,-1)} = -6, \quad f_y|_{(1,-1)} = -4$

002 10.0 points

Determine $f_{xx} + f_{yy}$ when

$$f(x, y) = (x - 5)(y + 1)(x + y + 3).$$

1. $f_{xx} + f_{yy} = 2(x + y + 6)$
2. $f_{xx} + f_{yy} = 2(x + y - 4)$
3. $f_{xx} + f_{yy} = x + y - 4$
4. $f_{xx} + f_{yy} = x + y + 6$
5. $f_{xx} + f_{yy} = 2(x + y - 6)$

003 10.0 points

Determine $f_{xx}f_{yy} - (f_{xy})^2$ when

$$f(x, y) = \frac{2}{3}x^3 + 2y^2 + 6x + 2y + 2xy.$$

1. $f_{xx}f_{yy} - (f_{xy})^2 = 16x + 4$
2. $f_{xx}f_{yy} - (f_{xy})^2 = 8x + 4$
3. $f_{xx}f_{yy} - (f_{xy})^2 = 16x - 4$
4. $f_{xx}f_{yy} - (f_{xy})^2 = 16x - 2$
5. $f_{xx}f_{yy} - (f_{xy})^2 = 8x - 4$

004 10.0 points

Determine $f_x - f_y$ when

$$f(x, y) = 3x^2 + xy - 2y^2 - x + 3y.$$

1. $f_x - f_y = 7x - 3y - 4$
2. $f_x - f_y = 7x - 3y + 2$
3. $f_x - f_y = 5x + 5y + 2$
4. $f_x - f_y = 5x - 3y - 4$
5. $f_x - f_y = 7x + 5y + 2$
6. $f_x - f_y = 5x + 5y - 4$

005 10.0 points

Determine f_x when

$$f(x, y) = (2x + y)e^{x/y}.$$

1. $f_x = \left(\frac{x}{y} - 1\right)e^{x/y}$
2. $f_x = \left(\frac{2x}{y} + 3\right)e^{x/y}$
3. $f_x = \left(\frac{2x}{y} + 1\right)e^{x/y}$
4. $f_x = \left(\frac{x}{y} + 1\right)e^{x/y}$
5. $f_x = \left(\frac{x}{y} - 3\right)e^{x/y}$

6. $f_x = \left(\frac{2x}{y} - 3\right) e^{x/y}$

006 10.0 points

Find u_t when

$$u = xe^{-2t} \sin \theta.$$

1. $u_t = -2e^{-2t} \sin \theta$

2. $u_t = e^{-2t} \sin \theta$

3. $u_t = -2xe^{-2t} \sin \theta$

4. $u_t = 2xe^{-2t} \sin \theta$

5. $u_t = xe^{-2t} \cos \theta$

007 10.0 points

Determine the second partial f_{xy} of f when

$$f(x, y) = \frac{3x^2}{y} + \frac{y^2}{16x}.$$

1. $f_{xy} = \frac{6x}{y^2} + \frac{y}{8x^2}$

2. $f_{xy} = 6x - y$

3. $f_{xy} = -\frac{6x}{y^2} - \frac{y}{8x^2}$

4. $f_{xy} = \frac{6x}{y^2} - \frac{y}{8x^2}$

5. $f_{xy} = 6x + y$

008 10.0 points

Determine

$$\frac{\partial z}{\partial y}$$

when $z = 3e^{-x/y}$.

1. $\frac{\partial z}{\partial y} = \frac{3}{y^2} e^{-x/y}$

2. $\frac{\partial z}{\partial y} = \frac{3x}{y^2} e^{-x/y}$

3. $\frac{\partial z}{\partial y} = -\frac{3}{y^2} e^{-x/y}$

4. $\frac{\partial z}{\partial y} = -\frac{3x}{y} e^{-x/y}$

5. $\frac{\partial z}{\partial y} = -\frac{3x}{y^2} e^{-x/y}$

6. $\frac{\partial z}{\partial y} = \frac{3x}{y} e^{-x/y}$

009 10.0 points

Determine f_{xy} when

$$f(x, y) = 2y \tan^{-1}\left(\frac{y}{x}\right).$$

1. $f_{xy} = \frac{xy^2}{x^2 + y^2}$

2. $f_{xy} = \frac{xy}{x^2 + y^2}$

3. $f_{xy} = \frac{4x^2y}{(x^2 + y^2)^2}$

4. $f_{xy} = -\frac{4x^2y}{(x^2 + y^2)^2}$

5. $f_{xy} = -\frac{4xy}{x^2 + y^2}$

6. $f_{xy} = -\frac{x^2y}{(x^2 + y^2)^2}$