Section 13.5

1) $w = 4x^2 + y^2; \quad x = 5t; \quad y = 7t$

a) $\dfrac{dw}{dt} = \dfrac{\partial w}{\partial x} \cdot \dfrac{dx}{dt} + \dfrac{\partial w}{\partial y} \cdot \dfrac{dy}{dt} =$ _____

b) When $t = 5$, $\dfrac{dw}{dt} =$ _____

2) $w = x \cos y; \quad x = 5t; \quad y = e^t$

a) $\dfrac{dw}{dt} = \dfrac{\partial w}{\partial x} \cdot \dfrac{dx}{dt} + \dfrac{\partial w}{\partial y} \cdot \dfrac{dy}{dt} =$ _____

b) When $t = \pi$, $\dfrac{dw}{dt} =$ _____

3) $w = \sin(x - 4t); \quad x = 5t; \quad y = 4$

Find $\dfrac{dw}{dt} = \dfrac{\partial w}{\partial x} \cdot \dfrac{dx}{dt} + \dfrac{\partial w}{\partial y} \cdot \dfrac{dy}{dt} =$? _____

4) $w = x^2 + y^2 + z^2; \quad x = 5t; \quad y = 4t; \quad z = 3t$

Find $\dfrac{dw}{dt} = \dfrac{\partial w}{\partial x} \cdot \dfrac{dx}{dt} + \dfrac{\partial w}{\partial y} \cdot \dfrac{dy}{dt} + \dfrac{\partial w}{\partial z} \cdot \dfrac{dz}{dt} =$? _____

5) $w = x^2 + y^2; \quad x = 3s + t; \quad y = s - t;$

a) $\dfrac{\partial w}{\partial s} = \dfrac{\partial w}{\partial x} \cdot \dfrac{dx}{ds} + \dfrac{\partial w}{\partial y} \cdot \dfrac{dy}{ds} =$?

b) $\dfrac{\partial w}{\partial t} = \dfrac{\partial w}{\partial x} \cdot \dfrac{dx}{dt} + \dfrac{\partial w}{\partial y} \cdot \dfrac{dy}{dt} =$?

6) $w = \cos(4x + 3y); \quad x = s + t; \quad y = s - t;$

a) $\dfrac{\partial w}{\partial s} = \dfrac{\partial w}{\partial x} \cdot \dfrac{dx}{ds} + \dfrac{\partial w}{\partial y} \cdot \dfrac{dy}{ds} =$?

b) $\dfrac{\partial w}{\partial t} = \dfrac{\partial w}{\partial x} \cdot \dfrac{dx}{dt} + \dfrac{\partial w}{\partial y} \cdot \dfrac{dy}{dt} =$?

7) $x^2 + 5xy - y^3 - x + y = 0$

a) $F(x, y) =$?

b) $F_x(x, y) =$?

c) $F_y(x, y) =$?

d) $y' = \dfrac{dy}{dx} = -\dfrac{F_x(x, y)}{F_y(x, y)} =$?

8) $\cos(xy) + \tan(xy) - 12 = 0$

a) $F(x, y) =$?

b) $F_x(x, y) =$?

c) $F_y(x, y) =$?

d) $y' = \dfrac{dy}{dx} = -\dfrac{F_x(x, y)}{F_y(x, y)} =$?

9) $3xy + 5yz + z^3 - 3 = 0$

a) $F(x, y, z) =$? b) $F_x(x, y, z) =$?

c) $F_y(x, y, z) =$? d) $F_z(x, y, z) =$?

e) $\frac{\partial z}{\partial x} = -\frac{F_x(x, y, z)}{F_z(x, y, z)} =$? f) $\frac{\partial z}{\partial y} = -\frac{F_y(x, y, z)}{F_z(x, y, z)} =$?

10) $e^y \cos(y + x) - 4z = 0$

a) $F(x, y, z) =$? b) $F_x(x, y, z) =$?

c) $F_y(x, y, z) =$? d) $F_z(x, y, z) =$?

e) $\frac{\partial z}{\partial x} = -\frac{F_x(x, y, z)}{F_z(x, y, z)} =$? f) $\frac{\partial z}{\partial y} = -\frac{F_y(x, y, z)}{F_z(x, y, z)} =$?