1. A partial derivative of a function with two or more variables with respect to one variable. Treat all other variables as constant.

   Find the partial derivative of the following function:

   $$f(x, y, z) = \frac{x^4}{z^2} + 2xln(y) + y\sqrt{z}$$

   a.) With respect to x

   b.) With respect to y

   c.) With respect to z

2. The chain rule is used when dealing with a composite function $f(g(x))$ and the derivative is calculated as $f'(g(x)) * g'(x)$.

   Find the derivative of the following functions:

   a.)

   $$f(x) = \ln(x^2)$$

   b.)

   $$f(x) = e^{2x}$$

3. Find the partial derivative of the following function:

   $$f(x, y) = (3x + 4y^2)^2 + \ln(xy^2)$$

   a.) With respect to x

   b.) With respect to y

4. What is the marginal utility of x for the following utility function?

   $$U(x, y) = 5x^2y^3$$

5. What is the marginal utility of y for the following utility function?

   $$U(x, y) = x^{.25}y^{.75}$$

6. Find the cross-partial derivative $f_{xy}(x, y)$ of the following function:

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