

Derivatives and Integrals:

For each utility function below, calculate the marginal rate of substitution.

1. $u(x, y) = x^{0.7}y^{0.3}$

2. $u(x, y) = 2x + 3y$

3. $u(x, y) = (x - 2)^3(y - 1)$

Differentiate the following functions.

4. $u(c) = \frac{1}{1-\theta} (c^{1-\theta} - 1)$

5. $\pi(q) = (250 - q)q - 50q$

6. $TC(q) = 10 + 40q - 16q^2 + 20q^3$

For the following problem, calculate the Consumer Surplus for the given inverse supply and demand functions:

7. Demand: $p = \frac{25}{q+1}$

Supply: $p = q + 1$