Assignment 10

May 2020 - 11:00, 18:00 GMT

1. A link to a report on the impact of technology on society and economics is submitted by Dr. Smith. It is mandatory for all students to read and submit a summary of the report by the end of the week.

2. Which of the following is true for the series $\sum_{n=1}^{\infty} \frac{1}{n^2}$?

   a) It converges to $\pi^2/6$.
   b) It diverges to infinity.
   c) It converges to $0$.
   d) It converges to $1$.

3. Find the sum of the first 10 terms of the geometric sequence $a_n = 3 \cdot 2^{n-1}$.

4. A firm uses the production function $Q = 2L + 3K$ to maximize profits. If the price of labor $(L)$ is $10$ and the price of capital $(K)$ is $20$, what is the optimal combination of $L$ and $K$?

5. The function $f(x) = x^2 - 4x + 4$ has a minimum at $x = 2$. What is the value of $f(2)$?

6. The demand function for a product is given by $Q_d = 100 - 5P$, where $Q_d$ is the quantity demanded and $P$ is the price. If the price is $15$, what is the quantity demanded?

7. The supply function for a product is given by $Q_s = 5P$, where $Q_s$ is the quantity supplied and $P$ is the price. If the price is $10$, what is the quantity supplied?

8. The cost function for a production process is given by $C(Q) = 100 + 5Q$, where $C$ is the total cost and $Q$ is the quantity produced. Find the marginal cost at a quantity of $20$.

9. The revenue function for a product is given by $R(Q) = 20Q - Q^2$, where $R$ is the total revenue and $Q$ is the quantity sold. Find the marginal revenue at a quantity of $10$.

10. The profit function for a production process is given by $P(Q) = 5Q - 2Q^2$, where $P$ is the total profit and $Q$ is the quantity produced. Find the profit at a quantity of $3$. 

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Unit 12 - Week 10

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