Questions on Calculus

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1. What are the drivatives of

   - $y = 2 + 6x$

     $\frac{d(y)}{d(x)} =$

   - $y = 5 - 4x + 2x^3$

     $\frac{d(y)}{d(x)} =$

   - $y = 25 + 6x^2 - 3x^3 + 25x^4$

     $\frac{d(y)}{d(x)} =$

   - $y - 3 = 2x$

     $\frac{d(y)}{d(x)} =$

   - $TPP = 24 + 5L + 2L^2 - L^3$

     $\frac{d(TPP)}{d(L)} =$

     Find the second derivative of the following

   - $TU = 25 + X_1 - X_1^2$

     $\frac{d^2(U)}{d(X_1)^2} =$

   - $TU = 25 + 25X_1 - 2X_1^2$

     $\frac{d^2(U)}{d(X_1)^2} =$

- $TPP = 15 + 15Q + Q^2 - Q^3$

  $\frac{d^2(TPP)}{d(L)^2} =$

- What does your answer to the previous question tell you about the shape of the Total Physical Product Curve?

- Given the $TU = 25X - 0.5X^2$

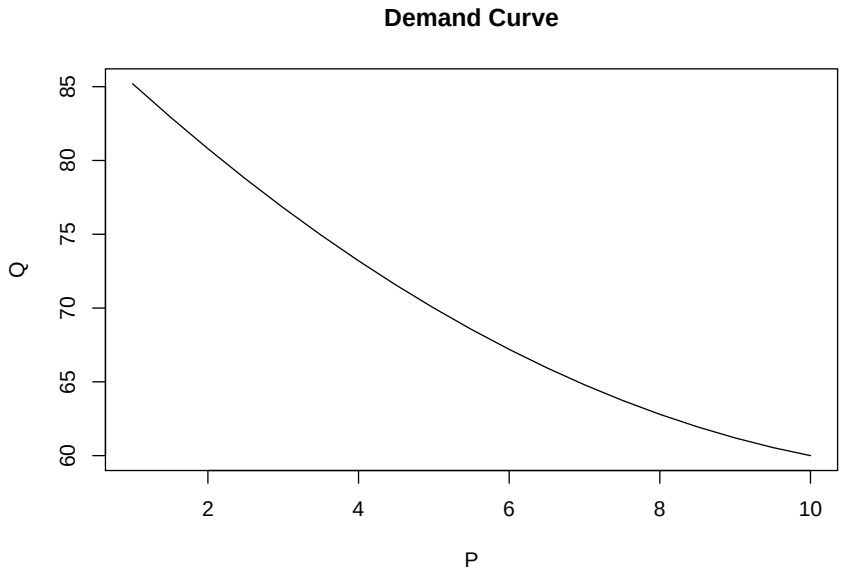
  - What is the drivative of TU?

    $\frac{d(TU)}{dX} =$

  - What can we say about the utility of X?

  Given a demand curve

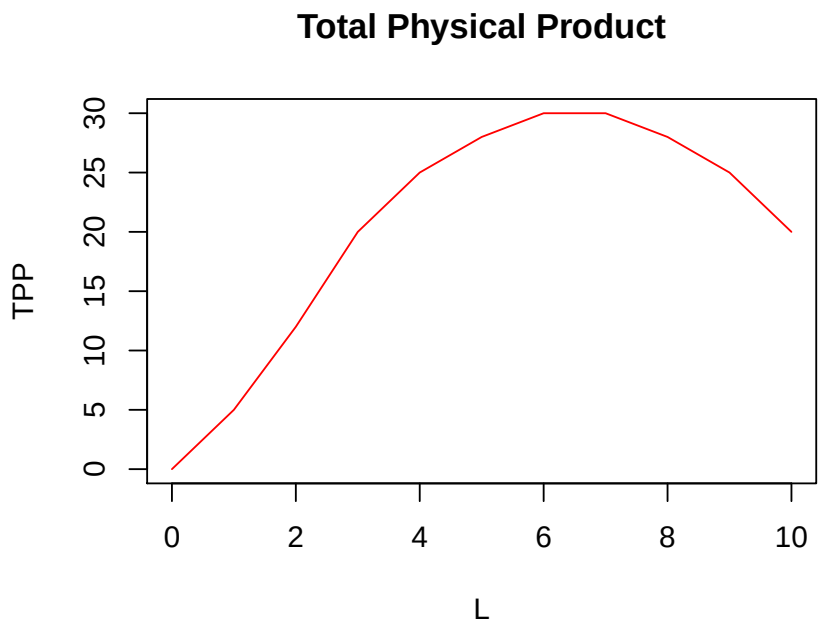
$$Q_d = 90 - 5P + 0.2P^2$$



  What is the elasticity of demand at the point $P = 5, Q = 70$?

- Here is the total physical product curve. Draw the *average physical*

product? for between two points on the graph.



- How would you calculate the *marginal physical product*?

2. What is the gradient of the TPP at its peak?

3. What is the value of the MPP when TPP is at its peak?

4. Given the $TPP = 100 + 32Q + 23Q^2 - Q^3$,

   - What is the TPP' or MPP?
   - How would you find the maximum TPP? What is the maximum TPP? This can be done with factorisation.

5. Given the $TPP = 500 + 180Q + 15Q^2 - 2Q^3$,

   - What is the TPP' or MPP?

     $MPP = 180 + 30Q - 6Q^2$

- What is the maximum TPP? The equaition.