Q1. Profit
Given the demand equation for the product is
\[ p = q^2 - 100q + 3200 \]
and the manufacturer's average-cost function is
\[ \bar{c} = \frac{2}{3} q^2 - 40q + \frac{10000}{q} \]

a) Find the approximated additional revenue if the capacity is increased from 20 to 21 units. What is the actual change?
b) Find the approximated additional cost if the capacity is increased from 100 to 101 units. What is the actual change?
c) Is it profitable to produce the 101st unit? (i.e. increase from 100 to 101)
d) What is \( q \) for maximum profit?
e) What is the expected maximum profit?
f) What is the selling price \( p \) at maximum profit?

Q2. Revenue
Given \( q = 6 - 0.2p \). Find the approximated additional revenue. (2 to 3)

Q3. Given \( p = q^2 - 100q + 3200 \). Find the elasticity \( \eta \) at \( q = 10, q = 20, q = 30 \) and comment.

Q4. Given \( p = 1200 - q^2 \). Find the elasticity \( \eta \) at \( q = 10, q = 20, q = 25 \) and comment.

Q5. Given \( q = 900 - p^2 \). Find the elasticity \( \eta \) at \( p = 5\) and comment.

Q6. Given the demand function \( q = 900 - 30p \). Determine the price at which the demand is unit elasticity.

Q7. Profit
Given the demand equation for the product is
\[ q = \frac{400 - p}{50} \]
and
\[ \frac{dC}{dq} = \frac{800}{q + 5} \]

a) Find revenue maximum level of \( q \).
b) Is it profitable to produce the 3rd unit? 
c) Profit maximum level of \( q \)? Corresponding price \( p \)?
d) Find the elasticity at \( p = \$50 \). Comment?
e) Find \( p \) for unit elastic demand.