

Directions: Work all problems in the assignment. If you need more room use the back of the page to complete the problem.

Section 3.4

Problem 34. **Minimum Surface Area:** A solid is formed by adjoining two hemispheres to the ends of a right circular cylinder. The total volume of the solid is 12 cubic inches. Find the radius of the cylinder that produces the minimum surface area. Hint: you can think of a small air tank.

Problem 36. **Minimum Area:** The combined perimeter of an equilateral triangle and a square is 10. Find the dimensions of the square and triangle that minimizes the total area.

Problem 40. **Beam Strength:** A wooden beam has a rectangular cross section of height h and width w . The strength S of the beam is proportional to its width and square of its height. What are the dimensions of the strongest beam that can be cut from a round log of radius 24 inches? (Hint: $S = kh^2w$ where k is the proportionality constant.)

Section 3.5

Problem 34. **Elasticity:** The demand function for a product is given by

$$p^3 + x^3 = 9$$

- (a) Find the price elasticity of demand when $x = 2$.
- (b) Find the values of x and p that maximize the revenue.
- (c) For the value of x found in (b), show that the price elasticity of demand has unit elasticity.

Problem 38. **Revenue:** The demand for a car wash is

$$x = 800 - 40p$$

where the current price is \$5.00. Can revenue be increased by lowering the price and thus attracting more customers? Use price elasticity of demand to determine your answer.

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