

EMT111 Practice Problems - Optimization

November 11, 2011

1. The combined perimeter of a circle and a square is 16. Find the dimensions of the circle and square that produce a minimum total area.
2. An open box is to be made from a 6-inch by 6-inch square piece of material by cutting equal squares from each corner and turning up the sides. Find the volume of the largest box that can be made in this manner.
3. You are designing a soft drink container that has the shape of a right circular cylinder. The container is to hold 12 fluid ounces (1 fluid ounce \approx 1.80469 cubic inches). Find the dimensions that will use a minimum amount of construction material.
4. A wooden beam has a rectangular cross section of height h and width w . The strength S of the beam is directly proportional to its width and the square of its height. What are the dimensions of the strongest beam that can be cut from a round log of diameter 24 inches?