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6. Find the greatest volume of a right circular cylinder can have if it is inscribed in a sphere of radius 4?
7. I have enough pure gold (gold!) to coat 3 square inches of surface area. I need to coat a sphere and a cube for my own mysterious reasons. What dimensions should they be in order to maximize the total volume of my golden solids?
8. The fixed monthly cost of operating a plant that produces the Superbox3000®, is \$3000, while the cost of producing each box is \$10. If the box sells for $\$25 - \frac{x}{128}$, where x is the number of boxes made, what is the maximum profit of this venture?
9. An advertisement in the local paper must contain 50 square inches of printed material and 2 inch margins on the top and bottom and 1 inch margins on either side. What dimensions for the advertisement use the least paper?
10. Find the point on the parabola $y = x^2$ which is closest to the point $(0, 3)$.