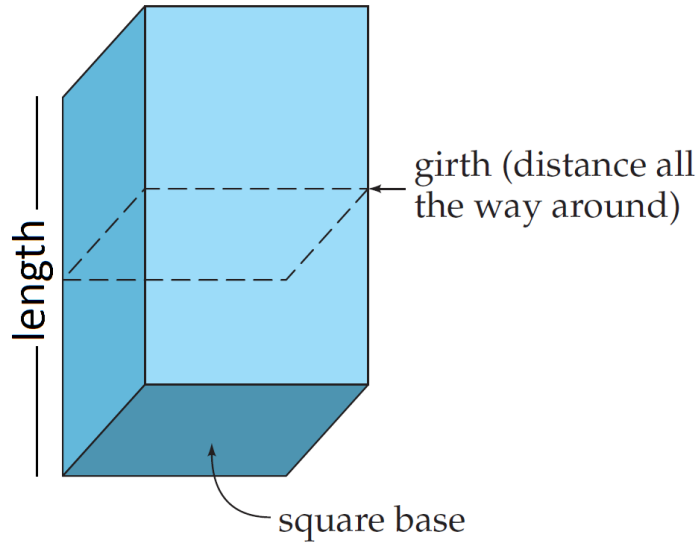Read each problem **very carefully** before starting to solve it. Each problem is worth 5 points. It is necessary to show **all** your work. Correct answers without explanations are worth 0 points. GOOD LUCK!!

1. The U.S. Postal Service will accept a package if its length plus its girth (distance all the way around) does not exceed 84 inches. Find the dimensions of the package with a square base that maximize the volume.

2. Find the slope of the tangent line to the graph of the equation $x^2 + y^2 = xy + 3$ at the point $(x, y) = (1, 2)$.

3. A company's profit from selling x units of an item is $P = 1000x - \frac{1}{2}x^2$ dollars. If sales are growing at the rate of 20 per day, find how rapidly profit is growing when 600 units have been sold.