1. 21st Century Insurance offers internet-order automobile insurance to preferred-risk drivers in the Los Angeles area. The company is the low-cost provider of insurance in the market. But, the company believes its $750 annual premium cannot be raised in order to remain competitive. Subsequently, its rates are expected to remain stable, hence \( P = MR = $750 \). The total cost relationship for the company is given as:

\[
TC = 2,500,000 + 500Q + 0.005Q^2,
\]

where \( Q \) corresponds to the number of policies sold.

2 pts
(a) Calculate the profit-maximizing number of policies sold.
\[
MR = MC \quad Q = 25,000
\]

\( \frac{1}{2} \) pt
(b) Calculate the company’s optimal profit level.
\( \Pi = 625,000 \)

\( \frac{1}{2} \) pt
(c) Calculate the profit margin.
\[
\text{Profit margin} = \left( \frac{\text{business profit}}{\text{sales revenue}} \right) \times 100 = 3.33\%
\]