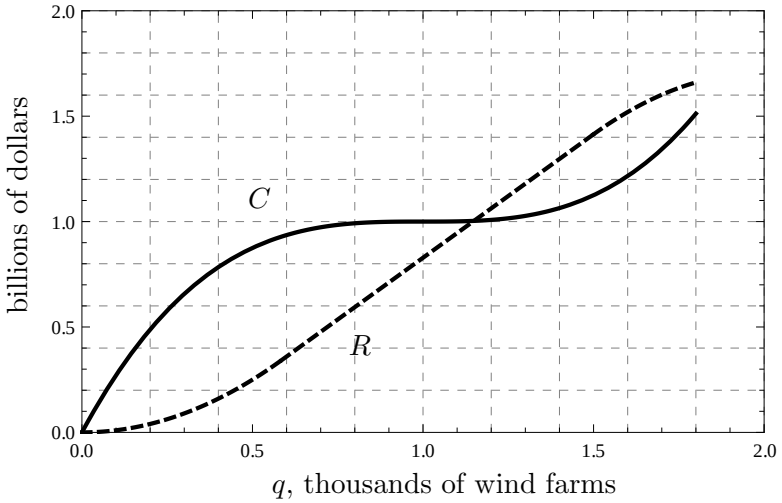
7. [10 points] Airwatt Construction company builds large-scale farms of wind turbines. A graph of cost C and revenue R for the company at different production levels q is shown below. Here cost and revenue are measured in billions of dollars and production level is measured in thousands of wind farms. *In each of the following parts, be sure it is clear how you obtain your answers.*



a. [3 points] Approximate the marginal revenue at $q = 0.8$. Show how you obtain your estimate.

Solution: The marginal revenue is the slope of the tangent line to the revenue curve. At $q = 0.8$ the slope is approximately $0.25/0.2 = 1.25$. This means the marginal revenue is 1.25 billion dollars per thousand wind farms. Or if we reduce the units, it's \$1,250,000 per wind farm.

b. [3 points] Approximate the cost of producing one additional wind farm when $q = 1.6$.

Solution: The marginal cost is the slope of the tangent line to the cost curve. At $q = 1.6$ the slope is approximately 1. This means the marginal cost is 1 billion dollars per thousand wind farms. Reducing units, the cost to produce an additional wind farm when $q = 1.6$ is about \$1 million.

c. [4 points] Approximate the maximum profit which can be achieved by Airwatt. At what production level does this occur?

Solution: The maximum profit occurs at a point where the revenue curve is above the cost curve and MR=MC. This means the slopes of the tangent lines to the curves C and R are equal at the production level q in question. Looking on the graph, it appears this occurs somewhere between $q = 1.5$ and $q = 1.7$, say $q = 1.6$. The vertical distance between C and R at this point is about 0.3. So the maximum profit is about \$300 million and it occurs when 1600 wind farms have been built.