Recall that **marginal cost**, **marginal revenue**, and **marginal profit** represent the rate of change, or slope, of cost, revenue, and profit, respectively.

Another way to think of these terms is:

- **Marginal cost** at a point represents the increase/decrease in cost to produce one additional item.
- **Marginal revenue** at a point represents the increase/decrease in revenue for selling one additional item.
- **Marginal profit** at a point represents the increase/decrease in profit for producing and selling one additional item.

1) Given some cost function $C(q)$, how could you find the rate of change for a specific quantity $q$?

2) Recall marginal cost represents the rate of change of the cost function. If the cost function is $C(q)$, what would the formula representation of the marginal cost function be?

3) Similarly, what is the formula representation of the marginal revenue and given the revenue function $R(q)$?

4) Recall that the profit function $P(q) = R(q) - C(q)$. What do you think the formula representation for marginal profit will be?

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**Suggested Homework Problems**

*Section 3.1*: #1-15 odd, #18-36 even, 37, 41, 46, 54, 55
The graph below represents what it costs for Mad Hatter to produce big foam cowboy hats. Use the function $C(q)$ depicted below to answer the following questions.

1) Estimate the cost to produce 360 big foam cowboy hats. What would the estimated cost per hat be?

2) Estimate the cost to produce one more big foam cowboy hat when the company produces 360 big foam cowboy hats. Would it be worth it to produce one more hat (i.e., would it raise/lower/maintain the cost per hat)?

3) Estimate the graph of the marginal cost function.

*Suggested Homework Problems*
*Section 3.1: #1-15 odd, #18-36 even, 37, 41, 46, 54, 55*
The graph below represents the revenue Mad Hatter receives for selling big foam cowboy hats. Use the function $R(q)$ depicted below to answer the following questions.

1) Estimate the earned revenue for selling 580 big foam cowboy hats. What would the estimated revenue per hat be?

2) Estimate the revenue earned for selling one more big foam cowboy hat when the company sells 580 big foam cowboy hats. Would it be worth it to produce one more hat (i.e., would the revenue per hat increase/decrease/stay the same)?

3) Estimate the graph of the marginal revenue function.

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**Suggested Homework Problems**

Section 3.1: #1-15 odd, #18-36 even, 37, 41, 46, 54, 55
An accountant at Mad Hatter used the cost and revenue functions to produce rough a graphical representation of the company’s profits for selling and producing $q$ big foam cowboy hats.

![Graph of profits](image)

1) Estimate the profit for selling and producing 300 big foam cowboy hats. What would the estimated profit per hat be?

2) Estimate the profit for selling and producing one more big foam cowboy hat when the company sells and produces 300 big foam cowboy hats. Would it be worth it to produce one more hat?

3) What is the maximum profit Mad Hatter earns for selling and producing big foam cowboy hats?

**Suggested Homework Problems**
*Section 3.1*: #1-15 odd, #18-36 even, 37, 41, 46, 54, 55
4) When does Mad Hatter reach their maximum profit? (i.e. how many big foam cowboy hats does Mad Hatter produce and sell when their profit is at its max?)

5) Consider your graphs for marginal cost and marginal revenue when Mad Hatter produces/sells the number of big foam cowboy hats from (4). What do you notice about the values for marginal cost and marginal revenue at this point? *Question to Think About*: *Will this always be the case?*

6) Estimate the graph of the marginal profit function.