Activity 1 : Answer Key

**Exploring Average Cost and Marginal Cost**

As the Chief Analyst, you have been given a data set below for a startup firm called the Chocolate Cookies Company. You have been asked to analyze the firm’s average cost and marginal cost.

1. Complete the table below given the equations you have learned.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Workers** | **Quantity** **Output** | **Fixed Cost** | **Variable** **Cost** | **Total** **Cost** | **Average**  **Cost** | **Marginal** **Cost** |
| 0 | 0 | 100 | 0 | 100 | BLANK | BLANK |
| 1 | 10 | 100 | 10 | 110 | 11.00 | 1.00 |
| 2 | 25 | 100 | 20 | 120 | 4.80 | 00.67 |
| 3 | 45 | 100 | 30 | 130 | 2.89 | 00.50 |
| 4 | 70 | 100 | 40 | 140 | 2.00 | 00.40 |
| 5 | 90 | 100 | 50 | 150 | 1.67 | 00.50 |
| 6 | 105 | 100 | 60 | 160 | 1.52 | 00.67 |
| 7 | 115 | 100 | 70 | 170 | 1.48 | 01.00 |
| 8 | 120 | 100 | 80 | 180 | 1.50 | 02.00 |
| 9 | 122 | 100 | 90 | 190 | 1.56 | 05.00 |
| 10 | 123 | 100 | 100 | 200 | 1.63 | 10.00 |

1. What is the equation for average cost of a product? Why is the average cost for 0 workers left intentionally blank?

**(Sample Answer: AC = TC/Q. The AC for 0 workers is left intentionally blank because you**

**have zero product which means that you would be dividing by zero.)**

1. What is the equation for marginal cost? Why is the marginal cost for 0 workers left intentionally blank?

**(Sample Answer: MC = Change in TC/ Change in Q. You need two points to find the rate of**

**change and at 0 worker, you do not have two sets of data points.)**

1. What is the number of workers that will give the lowest average cost? Explain the implications of average cost associated with hiring this number of workers. Is this the point at which average cost is at its’ lowest?

**(Sample Answer: (7, 1.48). This means that when 7 workers are hired, the average cost of**

**producing each cookie is $1.48. In this situation hiring 7 workers will give the company the**

**lowest cost of production.)**

1. If cookies were sold for $5.00 each, how many cookies should the company produce? Why wouldn’t the company want to produce more than that amount?

**(122, $5.00. This means that when increasing from 8 to 9 workers, the marginal cost of producing another cookie is $5.00. This is not the point at which average total cost is at its lowest. Although increasing employment from 3 to 4 workers will provide the cheapest marginal cost of production for additional cookies, the profit is the greatest when marginal cost equals the marginal revenue (i.e., MR = change in total revenue / change in the quantity of output). In this example, the product price and marginal revenue share the same value; this is common in purely competitive markets where the firm accepts the market price as determined by the market, e.g., agriculture.)**

1. What happens to average cost when marginal cost is greater than average cost?

**(Sample Answer: Average cost must rise.)**

1. Create a scatterplot of total cost against the numbers of cookies produced.



1. Discuss the observed rates of change between different intervals of the graph above and what implications this may have for the company. Describe how these rates of change are related to the calculated marginal cost.

**(As each successive worker is added the number of cookies produced increases at a diminishing rate. As the rate of cookies produced diminishes, marginal cost will rise.)**

1. Why might this company look at marginal cost rather than average cost when determining how many cookies to make and thus how many workers to hire?

**(Marginal cost allows a firm to compare the extra cost of hiring the worker against the extra revenue the employee will generate as a result of the extra product the employee produces; while the average cost gives an alternate perspective of the firm’s production costs.)**