Fred and Carrie’s Research Report

# Washing Machine and Formula Information

Fred and Carrie are thinking of purchasing washing machines that have a 20-pound capacity, meaning that each machine can hold 20 pounds or less. The inequalities below demonstrate the number of machines needed, based on the number of pounds of laundry a customer brings in (n.)

M= number of washing machines needed

n= number of pounds of laundry

 1 if 0 < n ≤ 20

 2 if 20 < n ≤ 40

M = 3 if 40 < n ≤ 60

 4 if 60 < n ≤ 80

 5 if 80 < n ≤ 100

Fred and Carrie expect each load of laundry to cost them $0.97.

**Formula for** **cost per load** (c) = .97\*M

Fred and Carrie plan to charge customers $12.00 per load.

**Formula for sales** (s) =$12\*M

Profit is calculated by subtracting all costs from sales.

**Formula for profit** **per customer** (P) = s-c

# Estimation and Reasonableness

This section focuses on estimation and reasonableness. Use estimation and rounding for each of the questions in this section (numbers 1, 2 and 3).

Fred and Carrie have two goals:

* Sell $2,500 or more per week.
* Spend $250 or less per week.
1. Are their goals reasonable? Why or why not? Be sure to show your work.

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2. If Fred and Carrie purchase 10 washing machines and each washing machine holds 20 pounds of laundry, is it reasonable to expect to wash 1,000 pounds of laundry in one week? Explain why or why not and show your work.

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3. Fred and Carrie took out a loan for $100,000. Assuming they reach their goal of $2,500 in sales per week, what is a reasonable amount of time Fred and Carrie can expect it will take them to pay back the loan? Explain your reasoning and show your work.

**Note:** Assume interest is fixed at 0.00% and the entire profit would go towards the loan.

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# Table of Values

4. Fill in the missing values in the table below. Round dollar amounts to the nearest hundredth (cent).

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| **Weight of Laundry** | **Machines Needed****(M)** | **Sales****(s)** | **Cost per load (c)** | **Profit (P)** | **ΔP** |
|  |  | **sales=$12.00\*M** | **c=$0.97\*M** | **P=s-c** |  |
| 10 lbs |  |  |  |  | 0 |
| 30 lbs |  |  |  |  |  |
| 50 lbs |  |  |  |  |  |
| 70 lbs |  |  |  |  |  |

5. Provide two examples for the number of machines needed to wash a load over 100 pounds. (Choose **any** amount over 100 pounds in your examples; the amount does not matter as long as your math is correct.) Provide the profit for your choices. Show the formulas you used to determine the values.

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| **Machines needed to wash \_\_\_ pounds:** **Machines needed to wash \_\_\_ pounds:** **Profit from \_\_\_\_ pounds:** **Profit from \_\_\_\_ pounds:**  |

6. What does theΔP value represent?

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7. What does ΔPequal for a change from four machines to two machines?

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# Sales per Customer vs. Pounds of Laundry per Customer



8. What does the graph of “Sales per Customer vs. Pounds of Laundry per Customer” (above) show?

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9. Explain the meaning of the open and closed circles on the graph above.

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10. Explain why the graph above contains separate line segments. What does each break represent?

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11. What is the slope of each line segment in the graph above? What does the slope mean?

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12. What is the domain and range of the graph above?

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