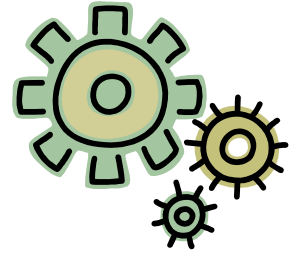


## MANUFACTURING ACTIVITY

We are a manufacturer of “widgets” that sell for \$85 each. Please take the information below and help our company determine whether we are making a **profit** or if we are losing money each month. (It is safe to assume that producing a fraction of a widget is acceptable, because some parts can be finished on the next day or next shift.)



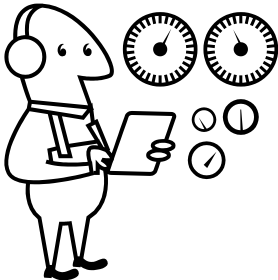
### Demand:

Current widget demand is 100 pieces per month, calculate how much **revenue** is generated each month if we sell 100 widgets at \$85 per widget. \_\_\_\_\_

### Material Cost:

One sheet of material currently costs \$100, and each widget uses  $\frac{1}{2}$  of a sheet. How much does the material cost for one widget? \_\_\_\_\_ What is your monthly **material cost** to produce all 100 widgets? \_\_\_\_\_

### Labor Cost:



Widgets don't just make themselves; we have to pay people to help put the widgets together!

Our current labor rate is \$10 per hour. Assume that an employee works 8 hours a day.

How much does one person make per day? \_\_\_\_\_

Each widget takes 180 minutes to make. How many hours is that? \_\_\_\_\_

How many widgets can one person make in an 8-hour shift? (Fractions are okay.) \_\_\_\_\_

What is the labor cost per widget? \_\_\_\_\_

(Labor cost is the amount of money paid to a person for the creation of ONE item. This is a unit rate!)

If we make 100 widgets a month, what is our total monthly **labor cost**? \_\_\_\_\_

### Total Cost:

If our only two costs for making a widget are material cost and labor cost, how much does it actually cost to make one widget? \_\_\_\_\_

Are we making a profit each month or losing money each month? By how much? \_\_\_\_\_

**Reality Check:**

Can you work 8 straight hours without taking a break, using the restroom or eating? Let's look at how much of the day is actually used for making widgets. Write some reasonable times in the



table to account for time spent not producing while on the job. Using the information from your table, find out how many minutes a person ACTUALLY spends working in an 8-hour day.

Total Minutes in 8 Hours	Morning Break	Lunch Break	Afternoon Break	Restroom Break	Set-Up	Clean-Up	Total Minutes Worked

To find our labor **utilization** (percentage of time an employee ACTUALLY works), complete the following calculation:

$$\begin{array}{l} \text{actual time worked} \rightarrow [ \quad ] \\ \text{time paid} \rightarrow [ \quad ] \end{array} = \frac{\quad}{\quad}$$

**Labor Cost Reconsidered:**

When you consider this utilization, how many parts can REALLY be made? If one person only really works \_\_\_\_\_ minutes, and it takes 180 minutes to make one widget, how many widgets can a person finish in a day? (Remember, it's okay to have a fraction.) \_\_\_\_\_

With this information in mind, what is the ACTUAL labor cost (the amount paid to make one item) per widget? (Remember, employees are paid \$80 a day.) \_\_\_\_\_

What is the difference between our ORIGINAL labor cost, and our new one? \_\_\_\_\_

**Total Cost Reconsidered:**

If the only two costs for making a widget are labor and materials, what is the new cost to produce one widget?

\_\_\_\_\_

If we are producing 100 widgets a month, what is the total cost? \_\_\_\_\_

Are we making a profit each month or losing money each month? By how much? \_\_\_\_\_

**Brainstorm:**

What are some ways we can improve our profits?

## POTENTIAL SOLUTIONS

### Material Management:

One sheet of material still costs \$100. If we can find a way to make 3 widgets with a sheet of material instead of 2, what will be the new material cost per widget? \_\_\_\_\_

What is our new **total cost** if labor costs is still \_\_\_\_\_ per widget? \_\_\_\_\_

If we continue to sell 100 widgets each month, what is the total monthly cost? \_\_\_\_\_

With just this change, how much money are we now making/losing per month? \_\_\_\_\_

### Decrease Production Time:

Suppose we found a way to decrease the amount of labor to 150 minutes per widget.

How many hours is that? \_\_\_\_\_

How many widgets can be made in a day? (Remember, even though a shift is 8 hours, an employee truly WORKS less than 8 hours.) \_\_\_\_\_

What is the labor cost per widget (the amount paid to an employee for each item made)?

Hint – use unit rates to solve! \_\_\_\_\_

What is the total monthly labor cost for all 100 widgets produced? \_\_\_\_\_



With just this change, how much money are we now making/losing per month? \_\_\_\_\_

### Putting It Together:

Suppose we made BOTH of the previous changes. How much money are we now making/losing per month?

\_\_\_\_\_

### Price Changes:

Research suggests that we can sell 150 widgets per month (instead of 100) if we lower our selling price to \$75 each (instead of \$85). Supposing that we made both of the previous changes, what would be our new profit per month?

\_\_\_\_\_

What if we sold 300 widgets at \$75 each; what would be our new profit now? \_\_\_\_\_