# Algebra: Manufacturing Engineer

**Micron Technology, Inc**

**Job Description:** Develop wafer level test strategies and test programs. Provide failure analysis reporting. Monitor device yields, failure rates, and repair rates. Interact with various engineering and product groups to optimize device yields and minimize costs.

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## Problem:

Following the fabrication process of memory chips, wafers are tested for functionality. Wafers are tested with voltage that stresses performance causing those devices that do not meet specifications to fail. "Yield" refers to the number or percentage of acceptable units produced on each wafer compared to the maximum possible.

Yield vs. Parameter – Use graph paper to create an x-y graph of yields vs. electrical parameters measured in volts.

| Parameter | Yield |
|---|---|
| 5v | 50% |
| 10v | 60% |
| 15v | 70% |

1. How does the parameter relate to the yield? (Positive vs. negative correlation)
2. Where do we want the parameter to be for the highest yield?
3. What's the equation of the line? Y = mx+b
4. We did more tests, raising the voltage for the parameter. Plot both the old and new data. Now, where does the graph say to set the volts?

| Old Data | |
|---|---|
| **Parameter** | **Yield** |
| 5v | 50% |
| 10v | 60% |
| 15v | 70% |

| New Data | |
|---|---|
| **Parameter** | **Yield** |
| 20v | 80% |
| 30v | 30% |
| 40v | 20% |

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## Solution:

Use graph paper to create an x-y graph of yields vs. electrical parameters measured in volts.

| Parameter | Yield |
|---|---|
| 5v | 50% |
| 10v | 60% |
| 15v | 70% |

1. How does the parameter relate to the yield? (Positive vs. negative correlation)
   Positive correlation - As voltage increases, the yield percentage increases
2. Where do we want the parameter to be for the highest yield?
   15v would be the parameter that produces the highest yield.

3. What is the equation of the line? Y = mx + b
   50 = mx 5+b
   60 = mx 10+b
   m=2, b=40
   Y=2x+40

| Old Data | |
|---|---|
| **Parameter** | **Yield** |
| 5v | 50% |
| 10v | 60% |
| 15v | 70% |

| New Data | |
|---|---|
| **Parameter** | **Yield** |
| 20v | 80% |
| 30v | 30% |
| 40v | 20% |

4. We did more tests, raising the voltage for the parameter. Plot both the old and new data. Now, where does the graph say to set the volts?
   Based on the new data, set the volts at 20