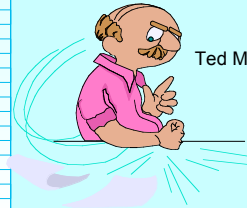


Breakeven Analysis Mkt 210

Ted Mitchell

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3 Breakeven Calculations 210 Students Must Know



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Three Breakevens

- 1) Breakeven Quantity
How many shoes must I sell to cover the extra \$200,000 I want to spend on advertising?
- 2) Breakeven Price
When the price is equal to the average cost per unit
- 3) Breakeven Revenue
How much does my revenue have to increase to cover the extra \$200,000 I want to spend on advertising?

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Basic Profit Equation

$$PQ - VQ - F = Z$$

- P = price
- V = variable cost per unit
- F = total fixed or period costs
- Q = quantity sold
- Z = profit

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Breakeven Means Zero Profit

$$PQ - VQ - F = Z$$

- P = price
- V = variable cost per unit
- F = total fixed of period costs
- Q = quantity sold
- Z = profit set equal to zero = 0

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Breakeven Equation

$$PQ - VQ - F = 0$$

- P = price
- Q = quantity sold
- V = variable cost per unit
- F = total fixed of period costs
- Z = profit set equal to zero = 0

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$$PQ - VQ - F = 0$$

- 1) Breakeven Quantity
 $BEQ = F / (P - V)$
- 2) Breakeven Price
 $BEP = V + F/Q$
- 3) Breakeven Revenue
 $BER = F/Mp$

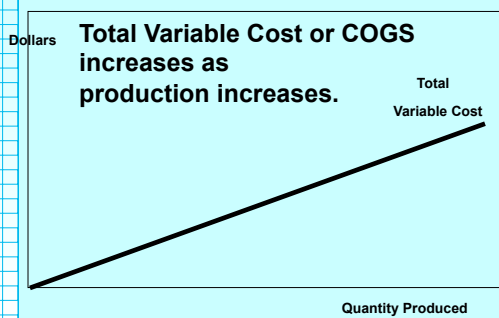
7

Remember!

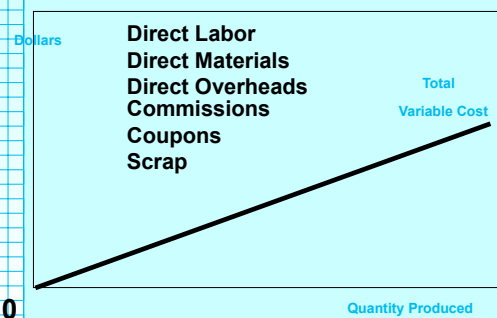
- Difference between a fixed cost, F, and a variable cost, V

8

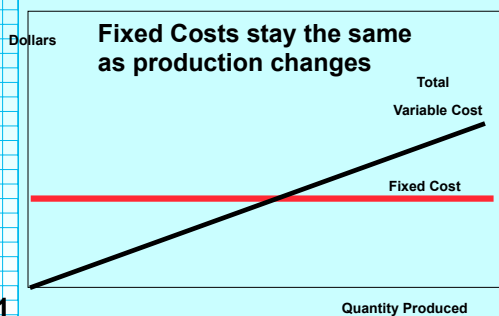
Variable Cost



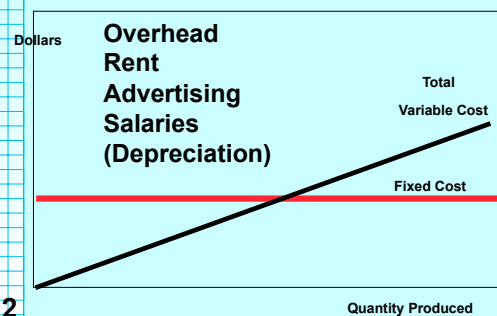
Variable Costs

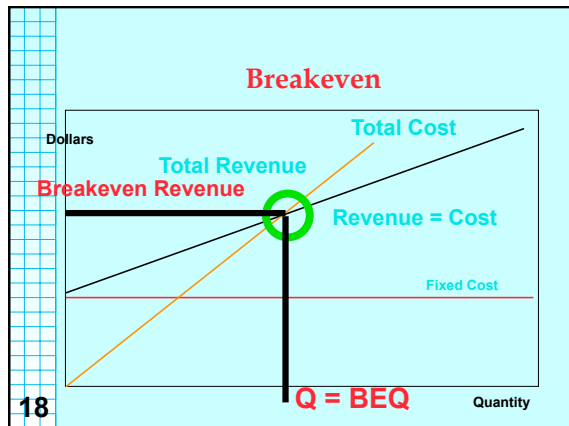
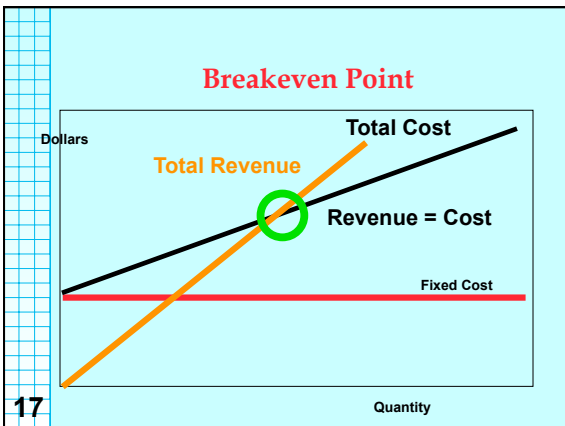
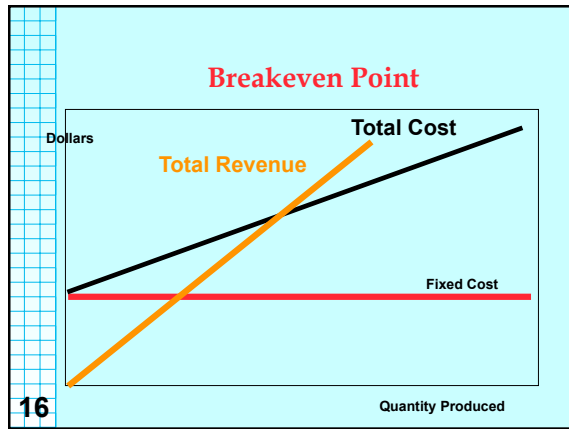
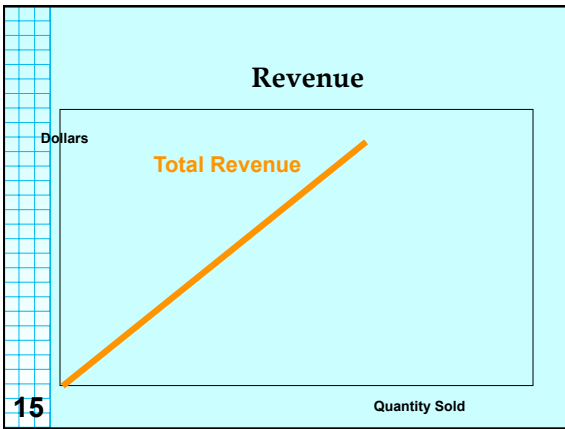
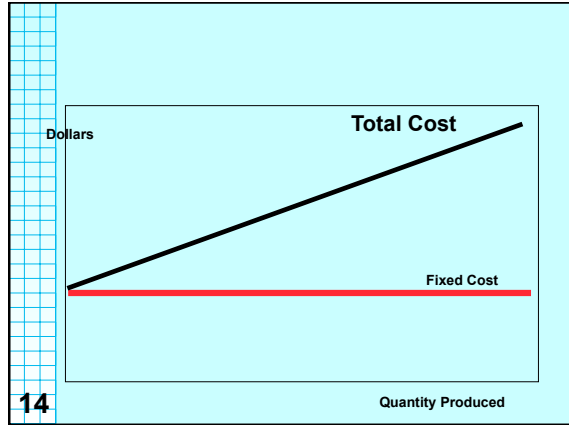
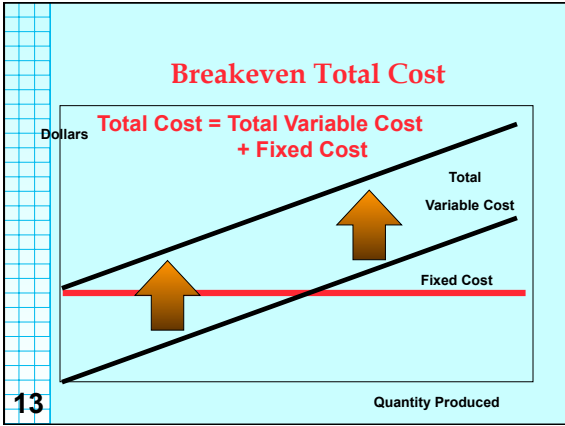


Fixed or Period Cost



Fixed or Period Costs



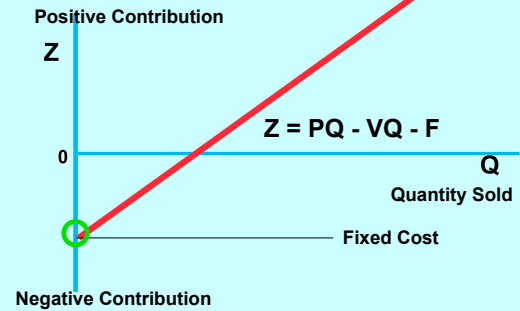


Another way to graph Breakeven

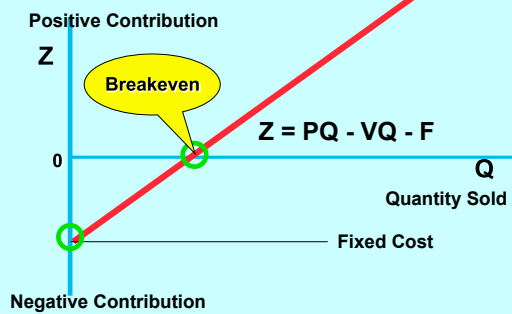
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Plot The Basic Profit Equation



Plot The Profit



Calculating Breakeven Points

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Breakeven Equation

$$PQ - VQ - F = 0$$

- P = **breakeven** price
- Q = **breakeven** quantity sold
- V = **breakeven** variable cost per unit
- F = **breakeven** total fixed of period costs

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Many Breakeven Equations

$$PQ - VQ - F = 0$$

- P = **breakeven** price = $V + F/Q$
- Q = **breakeven** quantity sold = $F/(P-V)$
- V = **breakeven** variable = $P + F/Q$
- F = **breakeven** total fixed = $(P-V)Q$

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Two Classic Equations

$$PQ - VQ - F = 0$$

- P = **breakeven** price = $V + F/Q$
- Q = **breakeven** quantity sold = $F/(P-V)$

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Two Classic Breakevens

Breakeven Price, BEP

$$P = V + F/Q$$

Breakeven Quantity, BEQ

$$Q = \frac{F}{P - V}$$

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Classic

Breakeven Price

$$P = V + F/Q$$

Breakeven Quantity

$$Q = \frac{F}{P - V}$$

Better known as
average cost per unit
or unit cost

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Breakeven Revenue, BER

$$R = (\text{Fixed cost}) \div \text{Markup}$$

$$R = F / Mp$$

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Other Classic Breakevens

Breakeven Revenue

$$R = (\text{Fixed cost}) \div \text{Markup}$$

$$R = F / Mp$$

Where does come from?

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Basic Breakeven Formula

$$PQ - VQ - F = 0$$

- Reorganize for breakeven quantity (a.k.a. $Q^* = \text{BEQ}$)
- $Q^*(P-V) - F = 0$
- $Q^*(P-V) = F$
- **$\text{BEQ} = Q^* = F/(P-V)$**

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Example

- You want to increase your consumer promotions expense for the period by \$240,000. Your current selling price is $P = \$85$ and your current variable cost per pair is $V = \$25$. How many pairs of shoes do you have to sell to breakeven on the \$240,000?

- $BEQ = F/(P-V)$

- $BEQ = \$240,000/(\$85-\$25)$

- $BEQ = \$240,000/\$60 = 4,000$ pairs of shoes

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Boot Strap Research

- Is it reasonable that \$240,000 in promotions can generate sales of an additional 4,000 pairs of shoes?
- What is the number of shoes being sold for the current advertising budget?
- Can we do better by spending it on advertising or sales force?

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What is the number of shoes being sold for the current total promotion budget?

You are selling 65,000 pairs of shoes in the domestic market and the total promotion budget is \$3,000,000

- What is the average promotion cost to sell a pair of shoes?

- Average promotion cost per pair = $\$3,000,000/65,000 = \46 per shoe

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- We need 4,000 pairs sold to breakeven on \$240,000 in consumer promotions
- If the Average total promotion cost per pair = \$46, then what is the average budget to sell 4,000 pairs?

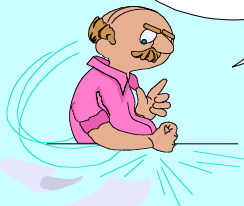
- $4,000 \times \$46 = \$184,000$

- Caveats are?

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$$Q = \frac{F}{P - V}$$

Make This into Breakeven Revenue



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$$Q = \frac{F}{P - V} \quad \text{multiply both sides by } P$$

$$PQ = \frac{F}{P - V} * P$$

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$$Q = \frac{F}{P - V}$$

$$PQ = \frac{F}{P - V} * P$$

$$PQ = \frac{F}{\frac{P - V}{P}}$$

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$$Q = \frac{F}{P - V}$$

$$PQ = \frac{F}{P - V} * P$$

$$PQ = \frac{F}{\frac{P - V}{P}}$$

$$R = \frac{F}{Mp} \quad \text{Breakeven Revenue}$$

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Remember markup on price

- Your current selling price is $P = \$85$ and your current variable cost per pair is $V = \$25$.
- What is your dollar markup?**
- Dollar Markup = $P - V = \$85 - \$25 = \$60$
- What is Your Markup on Price?**
- Markup on Price = $(P - V) / P$
- $Mp = (\$85 - \$25) / \$85 = \$60 / \$85 = 0.706$ or 70.6%

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Example of Breakeven Revenue

- You want to increase your sales force effort for the period by \$240,000. Your current selling price is $P = \$85$ and your current variable cost per pair is $V = \$25$. By how many dollars must your revenues increase to breakeven on the \$240,000?
- $BER = F / (\text{Markup on Price})$
- $BER = F / ((P - V) / P) = F / Mp$
- $BER = \$240,000 / 0.706$
- $BER = \$339,943$

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$$PQ - VQ - F = 0$$

- Breakeven Quantity**
 - $BEQ = F / (P - V)$
- Breakeven Price**
 - $BEP = V + F / Q$
- Breakeven Revenue**
 - $BER = F / Mp$

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Example of Breakeven price

- You are selling $Q = 150,000$ pairs of shoes. Your total fixed costs for the period are $F = \$6,000,000$ and the shoes cost $V = \$20$ per pair to make. What is your Breakeven Price, BEP, or average cost per unit?
- $BEP = V + F / Q$**
- $BEP = \$20 + \$6,000,000 / 150,000$
- $BEP = \$20 + \$40 = \$60$
- You must charge a selling price of \$60 to breakeven
- It costs you an average \$60 per pair to make and sell a pair of shoes?

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- Breakeven Price is the Start of Cost Based Pricing Calculations
- You will use Breakeven price to calculate your selling prices based on the costs of your operation.

**Any Questions on
Breakeven Quantity,
Breakeven Revenue
Breakeven Price?**