Formula table:

Business Mathematics	
$TC = (VC \times Q) + FC$ $TR = SP \times Q$ $Net\ Income = (SP - UVC) \times (Q) - FC$	$Slope = \frac{y_2 - y_1}{x_2 - x_1}$ $Margin = SP - UVC$ $Break\ Even\ Quantity = \frac{FC}{SP - UVC}$

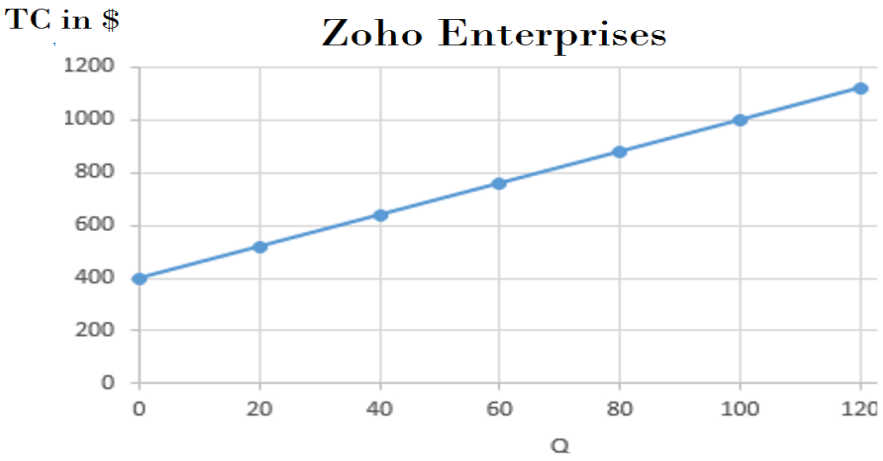
Q1. A restaurant in San Francisco made a total profit of $143,000. If the restaurant had total costs of $298,000 for the year, calculate the restaurant's total revenue for the year.

Answer: TR = $441,000

Q2. A digital TV store in New York sells 150 flat TVs per month. Fixed Costs (FC) per month are $6250 and the unit variable costs are $2.50. How much are the total costs?

Answer: TC = $6,625

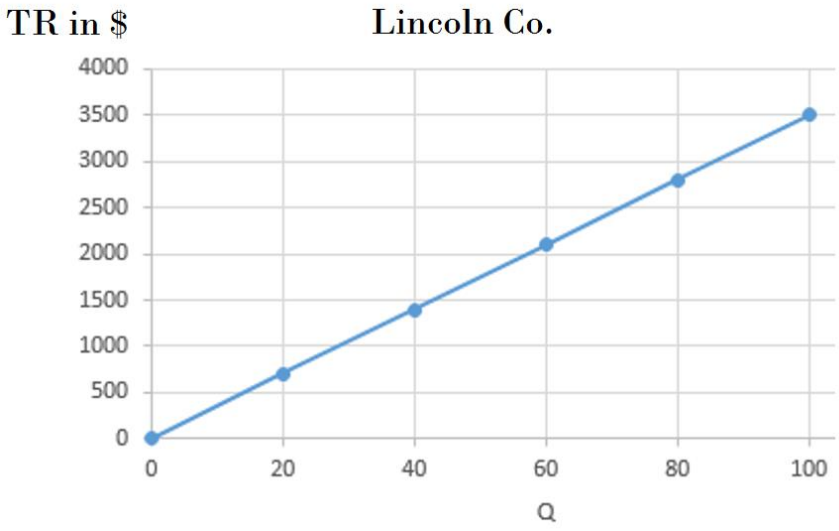
Q3. The graph below is a total cost graph for Zoho Enterprises.



Question: What are the fixed costs for Zoho Enterprises?

Answer: FC = $400

Q4. The graph below is a total revenue graph for Lincoln Co.



Question 1: Calculate the selling price.

Answer: SP = $35

Question 2: Write the total revenue equation.

Answer: TR = 35Q

(a) Calculate the total revenue if 65 units are sold.

Answer: TR = $2275

Q5. The fixed costs for Super Furniture Store are $125,450. The unit variable cost for producing a dinner table is $950. The selling price of the same dinner table is $1600.

a) Calculate the unit contribution margin for the dinner table.

Answer: UCM = $650

b) Find the break-even quantity using the unit contribution margin.

Answer: Break-even Quantity = 193 tables

Q6. Circle the correct answer to complete the following sentence. A business makes a profit when ----------

A) Total Revenue ≤ Total Costs

B) Total Revenue > Total Costs

C) Total Revenue < Total Costs

D) Total Revenue ≥ Total Costs

Answer: B

Q7. ABC Clothing make suits. The unit variable cost to make a suit is $800. The selling price of a suit is $1200. Fixed Costs for the period are $32000. The capacity for the period is 200 suits.

1) Find the break-even point in units.

Answers:

TR = 1200Q

TC = 800Q + 32000

TR = TC

1200Q = 800Q + 32000

1200Q – 800Q = 32000

400Q = 32000

Q = 80

Or using the formula $\frac{32000}{1200-800} = 80$

2) Find the break-even point in dollars.

Answer: $96000

3) Find the break-even point as percentage capacity.

Answer:

$\frac{80}{200} = 0.4 = 40\%$

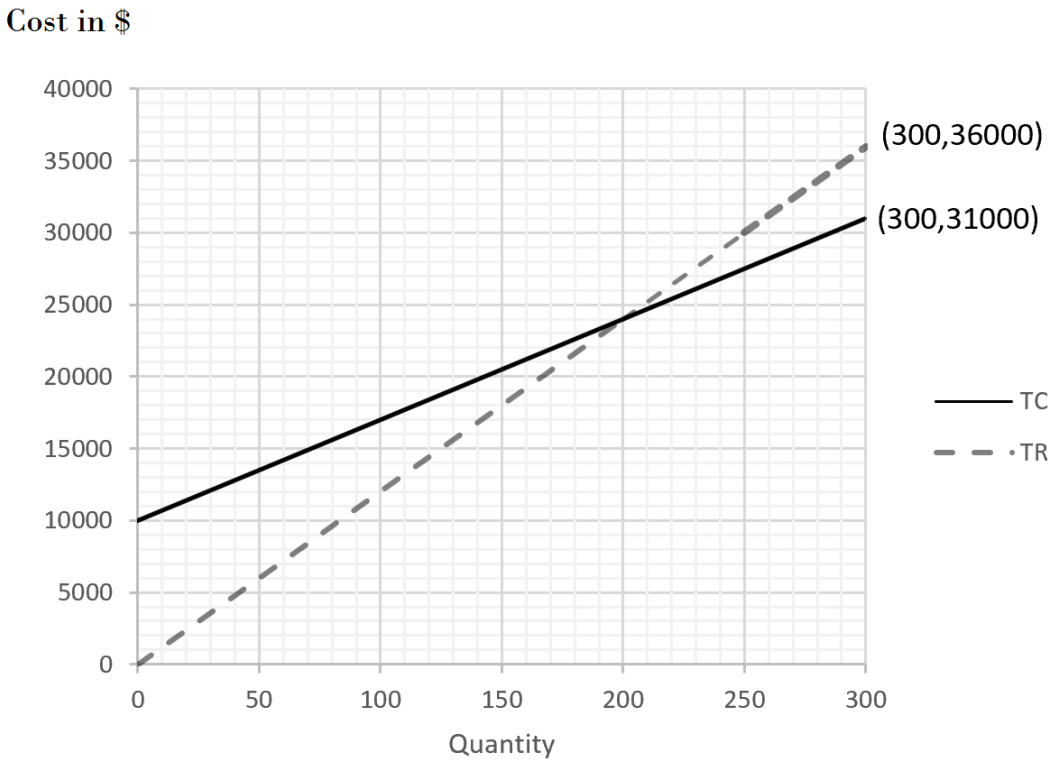
4) If the sales volume is 70% of capacity, do they make a profit or loss? Explain.

Answer: Profit.

Since break-even point is at 40% capacity, anything above that will be profit.

Or any other reasonable explanation.

Q8. **Use the graph below to answer the questions:**



1) Label the regions of profit and loss on the graph.

Answers:

Area to the left of the break-even point: Loss (0.5 marks)

Area to the right of the break-even point: Profit (0.5 marks)

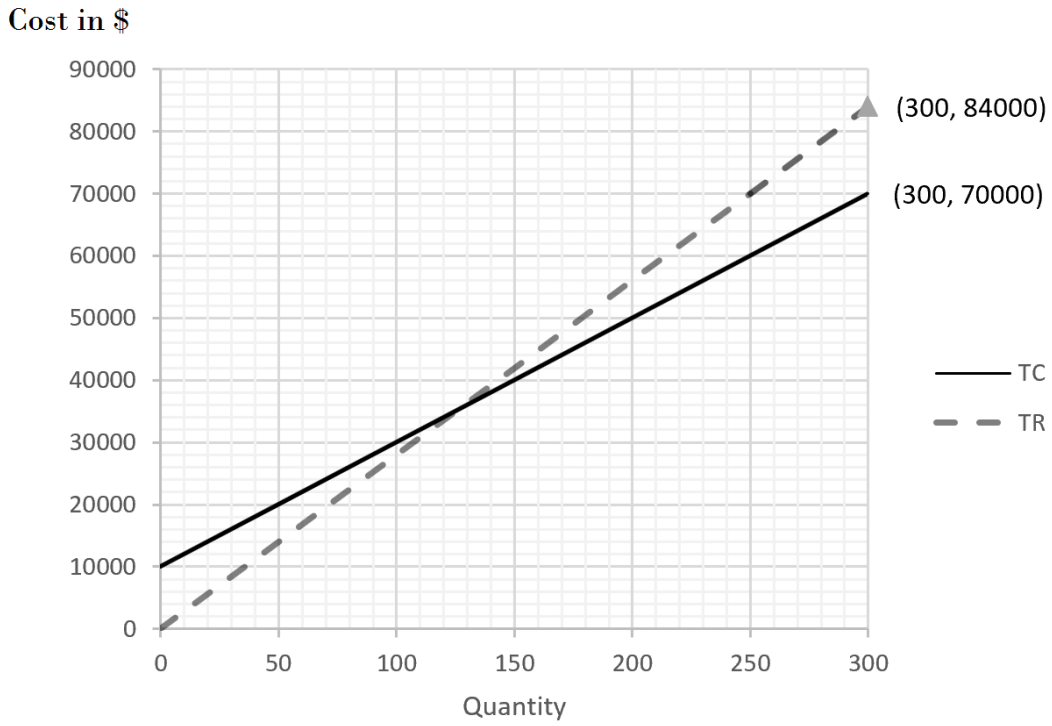
2) Calculate the net income at the full capacity.

Answer:

$Net\ income = 36000 - 31000 = \$5{,}000$

Reading the revenue from the graph = $36,000

Q9. Use the graph below to answer the questions:



(a) Write the total cost equation.

Finding slope = $\frac{70000-10000}{300} = 200$

Equation= $TC = 10000 + 200 \times Q$

(b) If the SP per unit was $280 and company made a profit of $10,000, what quantity was sold?

Answers:

TR = 280 Q

NI = +10,000 = TR – TC = 280Q – (200Q + 10,000)

Q=250

Q10. The variable cost of a certain unit is $45. The selling price of the unit is $75. The capacity for the period is 1000, and the fixed costs are $6,000.

(a) Write the total cost equation if the variable cost is increased to $60.

Answers: $TC = 6000 + 60 \times Q$

(b) Write the total revenue equation when the selling price per unit is decreased by $5.

Answer: $TR = 70 \times Q$

(c) Find the new break-even point in units, using the new selling price and the unit variable cost as set in parts (a) and (b).

Answer:

Break-even point in units = $\frac{6000}{70-60} = 600$

Q11. The variable costs of a certain unit are $80. The selling price of the unit is $120. The capacity for the period is 1500, and the fixed costs are $35000.

a) Calculate the break-even point in units.

Answer: Break-even point before the change = $\frac{35000}{120-80} = 875\ units$

b) Calculate the break-even point in units if the fixed costs increase by 20%.

Answer: $New\ FC = 35000 \times (1 + 0.20) = \$42{,}000$

Break-even point after the change = $\frac{42000}{120-80} = 1050\ units$

c) Compare your answers from parts (a) and (b). What change did you observe to the Break-even point in units?

Answer: 1050 – 875 = 175

Break-even point increases by 175 units.