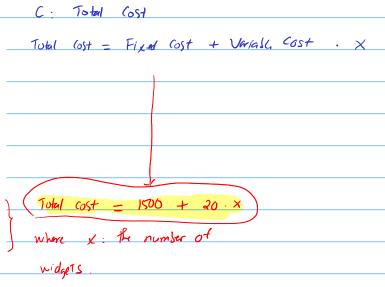
Total Cost The total cost C for a manufacturer during a given time period is a function of the number N of items produced during that period. To determine a formula for the total cost, we need to know two things. The first is the manufacturer's fixed costs. This amount covers expenses such as plant maintenance and insurance, and it is the same no matter how many items are produced. The second thing we need to know is the cost for each unit produced, which is called the variable cost.

Suppose that a manufacturer of widgets has fixed costs of \$1500 per month and that the variable cost is \$20 per widget (so it costs \$20 to produce 1 widget).



$$C(x) = 1500 + 20 x$$

$$\frac{1}{100}$$
cost function is linear.

Example 2

=)

Another widget manufacturer has a variable cost of \$12 per widget, and the total cost is \$3100 when 150 widgets are produced in a month.

What are the fixed costs for this manufacturer?

$$X = 150$$

$$C = 3100$$

$$Total Cost = Fixed Cost + Voriable Cost$$

3100 = F1 xed cost + 1800

Yet another widget manufacturer has determined the following: The total cost is \$2700 when 100 widgets are produced in a month, and the

total cost is \$3500 when 150 widgets are produced

in a month. What are the fixed costs and variable cost for this manufacturer?

$$=$$
 2700 = F + 100 · W

$$\frac{3500}{-2700} = \cancel{\cancel{F}} + 150 \text{ m}$$

$$W - \frac{800}{50} = 16$$

Plug w = 16 to the green equation:

$$3500 = F + 150.16$$

$$=$$
) 3500 $=$ F $+$ 2400

$$=$$
 $F = 3500 - 2400 = 1100 = 605t$.

Total Revenue and Profit This is a continuation of The total revenue R for a manufacturer during a given time period is a function of the number N of items produced during that period. In this exercise, we assume that the selling price per unit of the item is a constant, so it does not depend on the number of items produced. The profit P for a manufacturer is the total revenue minus the total cost. If the profit is zero, then the manufacturer is at a break-even point.

We consider again the manufacturer of widgets in Exercise 13 with fixed costs of \$1500 per month and a variable cost of \$20 per widget. Suppose the manufacturer sells 100 widgets for \$2300 total.

$$F = 1500$$

$$v = 20$$

Let x is the number of widgets to be sold.

The cost to produce X vidgets is:

Total cost C(x) = Fixed cost + 20x

 $\Rightarrow C(x) = 1500 + 20x$

The revenue obtained when selling X vidgets is 23x

Secause $100 \text{ widgets} = {}^{\$}2300 =) \text{ widget} = {}^{\$}23$

The break - event point is when The total cost is the same as

the revenue:

$$1500 + 20 \times - 23 \times$$

$$=$$
 1500 $=$ 23 x -20 x

$$=$$
 1500 $=$ $3x$

$$=$$
) $x = \frac{1500}{3} = 500$.

How many widgets needed to be sold to make at least 1000

$$R(x) - C(x) = 1000$$

$$=) 23x - (1500 + 20x) = 1000$$

$$23x - 1500 - 20x = 1000$$

$$3x - 1500 = 1000$$

$$=$$
 $3x = 1500 + 1000 = 2700$

=)
$$X = \frac{2500}{3} = 833.33 = 834$$
 vidgets should se

podvad.

(an ws)

widget manufacturer has a variable cost of \$12 per widget, and the total cost is \$3100 when 150 widgets are produced in a month.

- @ Fird the fixed cost of this manufactor
- 5) The manufactor sell 100 widgets for \$2000. Find

the price for each item

- (c) Fird the Greak event point for the manufactor
- d) How many items the manufactor has to sell to

hove	the	pro fit	ot	\$ 10,000)	?		