

Profit Function

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

$\uparrow$                                      $\uparrow$   
 Revenue                              Cost  
 \$ coming in                      \$ going out

Cost  $C(x) = mx + b$

$\uparrow$                                      $\uparrow$   
 variable                              fixed Cost  
 Cost

(per-item cost)

Break Even Point

$$\text{Revenue} = \text{Cost}$$

$$R(x) = C(x)$$

When \$ you spent = \$ you made.  
 $[P(x) = 0]$

Ex 9

Fixed cost \$1500

Variable cost per item is \$100

Item sells for \$125

(a) Cost  $C(x) = mx + b = 100x + 1500$

(b) Revenue  $R(x) = 125x$

$[x \text{ is the number of items}$   
 $\text{bought and sold}]$

(c) Profit Function  $P(x) = R(x) - C(x) = 125x - (100x + 1500)$

$$(c) P(x) = 125x - 100x - 1500$$

$$\boxed{P(x) = 25x - 1500}$$

(d) How many items must be sold to break even?

$$R(x) = C(x)$$

$$125x = 100x + 1500$$

$$\begin{array}{r} -100x \quad -100x \\ \hline \end{array}$$

$$\frac{25x}{25} = \frac{1500}{25}$$

$$x = 60$$

60 items must be sold to break even.

Alternatively,  $P(x) = 25x - 1500$

$$0 = 25x - 1500$$