Lesson 20 Applications of Linear Systems

System Models: **Substitution Method** **Set both equations up in Slope – Intercept Form**

y = mx + b	**Cost(x) = mx + b**
y = mx + b	**Revenue(x) = mx**

When the Revenue (Income) and the Cost are the same, you break even!

Examples: Set up the system of equations and solve the system.

1. Suppose a model airplane club publishes a newsletter. Expanses are $0.90 for printing and mailing each copy, plus $600 total for research and writing. The price of the newsletter is $1.50 per copy. How many copies of the newsletter must the club sell to break even?

$0.90 per copy (expense)
$600 → one time
$1.50 per copy (income)

1000 copies need to be sold to break even

$$\text{Cost} = 0.90x + 600$$
$$\text{Income} = 1.50x$$
$$1.50x = 0.90x + 600$$
$$-0.90x \quad -0.90x$$
$$\frac{0.60x}{0.60} = \frac{600}{0.60}$$
$$x = 1000$$

2. Suppose an antique car club publishes a newsletter. Expenses are $0.35 for printing and mailing each copy, plus $770 total for research and writing. The price of the newsletter is $0.55 per copy. How many copies of the newsletter must the club sell to break even?

Cost $0.35 per copy
$770 one time
Income $0.55 per copy

3850 copies need to be sold to break even

$$\text{Cost} = 0.35x + 770$$
$$\text{Income} = 0.55x$$
$$0.55x = 0.35x + 770$$
$$-0.35x \quad -0.35x$$
$$\frac{0.20x}{0.20} = \frac{770}{0.20}$$
$$x = 3850$$