

Graphic Arts
Break Even Worksheet

Name Key

1. Wildcat Printing recently bought some new screen printing equipment for \$2450 and plan on screen printing hoodies for sale. The hoodies cost \$11.50 wholesale. The printing and labor costs \$5.50 for each hoodie. The hoodies will be sold for \$55. How many hoodies would have to be sold for Wildcat Printing to break even?

$$\text{Cost} = 11.50x + 5.50x + 2450 = 17x + 2450$$

$$\text{Revenue} = 55x$$

65 hoodies

$$\begin{array}{r} 17x + 2450 = 55x \\ -17x \quad -17x \\ \hline 2450 = 38x \\ \underline{38} \quad \underline{38} \\ x = 64.5 \end{array}$$

2. A printing company prints banners on a machine that is rented for \$250 a month. The materials and labor for printing a banner is \$5.75. The banners sell for \$35.

- Write an equation for the revenue R in terms of the number of banners sold.
- Write an equation for the printer's expenses in terms of the number of banners.
- How many banners would the printer have to sell in a month to break even?

A) $R = 35x$

B) $E = 250 + 5.75x$

$$\begin{array}{r} 35x = 250 + 5.75x \\ -5.75x \quad -5.75x \\ \hline 29.25x = 250 \\ \underline{29.25} \quad \underline{29.25} \\ x = 8.5 \end{array}$$

9 banners

3. Alpena Graphics wants to determine the break-even point for a screen-printing job. The cost to print each shirt is \$4.50 and overhead costs (labor, equipment upkeep) for the job is \$135. They expect to sell each shirt for \$15. How many shirts must they sell before earning a profit?

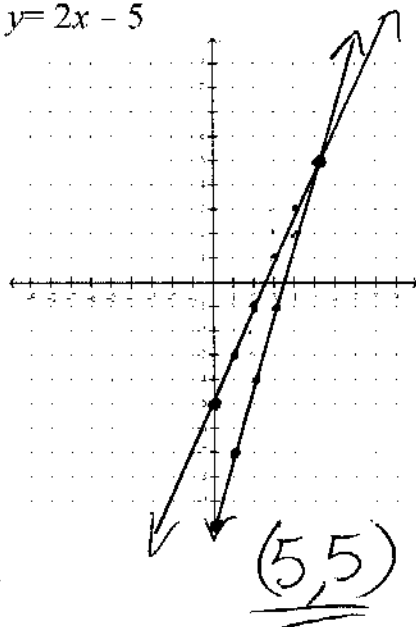
$$\begin{array}{r} \text{Cost} = \text{Revenue} \\ 4.50x + 135 = 15x \\ -4.50x \quad -4.50x \\ \hline 135 = 10.50x \\ \underline{10.50} \quad \underline{10.50} \\ x = 12.86 \end{array}$$

13 shirts

4. Solve by graphing

$$y = 3x - 10$$

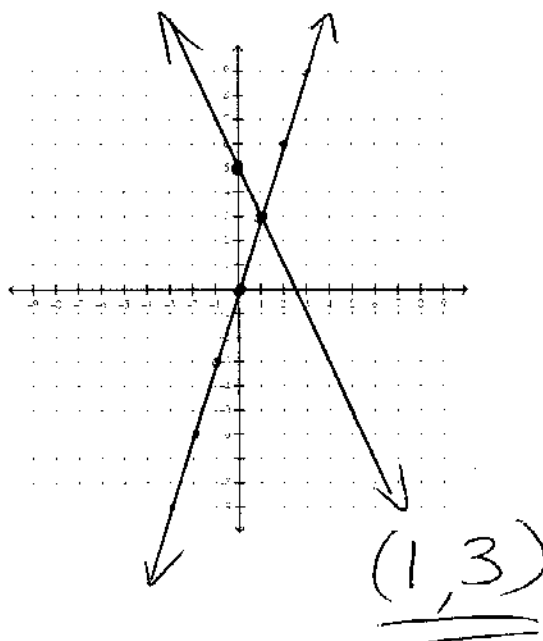
$$y = 2x - 5$$



5. Solve by graphing.

$$y = 3x$$

$$y = -2x + 5$$



6. Solve by substitution.

$$y = -x - 5$$

$$-x + 2y = 14$$

$$-x + 2(-x - 5) = 14$$

$$-x - 2x - 10 = 14$$

$$-3x - 10 = 14$$

$$-3x = 24$$

$$x = -8$$

$$y = -(-8) - 5$$

$$y = 8 - 5$$

$$y = 3$$

$$(-8, 3)$$

8. Solve by substitution.

$$y = x + 3$$

$$6x - 5y = -12$$

$$6x - 5(x + 3) = -12$$

$$6x - 5x - 15 = -12$$

$$x - 15 = -12$$

$$x = 3$$

$$y = 3 + 3$$

$$y = 6$$

$$(3, 6)$$

7. Solve by substitution

$$-3x + 2y = -5$$

$$y = 2x - 10$$

$$-3x + 2(2x - 10) = -5$$

$$-3x + 4x - 20 = -5$$

$$x - 20 = -5$$

$$x = 15$$

$$y = 2(15) - 10$$

$$y = 30 - 10$$

$$y = 20$$

$$(15, 20)$$

9. Solve by substitution.

$$y = 3x - 9$$

$$8x + 3y = 7$$

$$8x + 3(3x - 9) = 7$$

$$8x + 9x - 27 = 7$$

$$17x - 27 = 7$$

$$17x = 34$$

$$x = 2$$

$$y = 3(2) - 9$$

$$y = 6 - 9$$

$$y = -3$$

$$(2, -3)$$

10. You decide to market your own custom computer graphics software. You must invest \$3,255 for computer hardware, and spend \$2.90 to buy and package each disk. If each program sells for \$13.75, how many copies must you sell to break even?

$$\begin{array}{rcl}
 \text{Costs} & = & \text{Revenue} \\
 3255 + 2.90x & = & 13.75x \\
 -2.90x & & -2.90x \\
 \hline
 3255 & = & 10.85x \\
 \frac{3255}{10.85} & & \frac{10.85x}{10.85} \\
 \\
 \boxed{X = 300} & & \text{disks}
 \end{array}$$

11. Alicia bakes specialty cakes to sell for \$15 each. Her monthly fixed costs are \$1200 and her cake ingredients cost \$2.50 each.

- Write an equation for the Revenue R in terms of the number of cakes, x .
- Write an equation for the Expenses E in terms of the number of cakes, x .
- Find the number of cakes Alicia has to sell each month to break even.

$$R = 15x \quad E = 1200 + 2.50x$$

$$\begin{array}{rcl}
 15x & = & 1200 + 2.50x \\
 -2.50x & & -2.50x \\
 \hline
 12.50x & = & 1200 \\
 \frac{12.50x}{12.5} & & \frac{1200}{12.5} \\
 \\
 \boxed{X = 96 \text{ cakes}}
 \end{array}$$

12. Henry plans to sell wood shelves at a craft fair for \$30 each. The craft booth costs \$100 to rent and Henry estimates his expenses to be \$12 a shelf. How many shelves does Henry need to sell to break even?

$$\begin{array}{rcl}
 \text{Costs} & = & \text{Revenue} \\
 12x + 100 & = & 30x \\
 -12x & & -12x \\
 \hline
 100 & = & 18x \\
 \frac{100}{18} & & \frac{18x}{18} \\
 \\
 X & = & 5.6
 \end{array}$$

6 shelves