

**Graphic Arts
Break Even Quiz**

Name

Key

1. Alpena Graphics wants to determine the break-even point for a screen-printing job. The cost to print each shirt is \$6 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?

$\text{Costs} = \text{Revenue}$

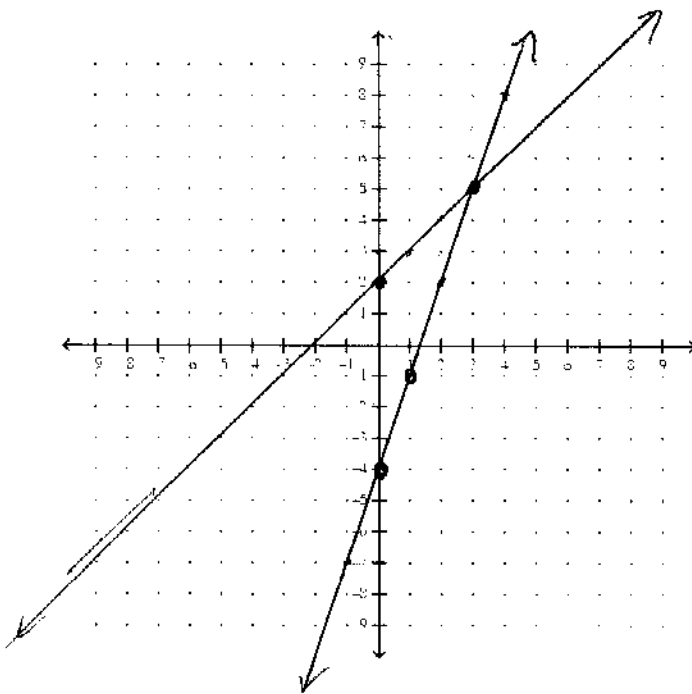
$x = \# \text{ shirts}$

$$\begin{array}{r} 6x + 135 = 15x \\ -6x \quad -6x \\ \hline 135 = 9x \\ \frac{135}{9} = \frac{9x}{9} \\ \boxed{x = 15} \end{array}$$

2. Solve by graphing.

$y = 3x - 4$

$y = x + 2$



(3, 5)

3. Solve by substitution.

$y = 3x + 7$

$y = x - 9$

$$\begin{array}{r} 3x + 7 = x - 9 \\ -x \quad -x \\ \hline 2x + 7 = -9 \\ -7 \quad -7 \\ \hline 2x = -16 \\ \frac{2x}{2} = \frac{-16}{2} \\ x = -8 \end{array}$$

$$\begin{array}{l} y = 3(-8) + 7 \\ y = -24 + 7 \\ y = -17 \\ \underline{\underline{(-8, -17)}} \end{array}$$

4. Solve by substitution.

$$y = 5x - 5$$

$$-4x + 2y = 2$$

$$\begin{aligned} -4x + 2(5x - 5) &= 2 \\ -4x + 10x - 10 &= 2 \\ 6x - 10 &= 2 \\ \underline{+10 \quad +10} & \\ 6x &= 12 \\ \underline{6 \quad 6} & \\ x &= 2 \\ y &= 5(2) - 5 \\ y &= 10 - 5 \\ y &= 5 \end{aligned}$$

$$(2, 5)$$

5. A rental car agency charges a flat fee of $\$32$ plus $\$3$ per day to rent a certain car. Another agency charges a fee of $\$30.50$ plus $\$3.25$ per day to rent the same car.

- a. Write a system of equations to represent the cost c for renting a car at each agency for d days.
b. Find the number of days for which the costs are the same. Round your answer to the nearest whole day.

A. a. $\begin{cases} c = 3.00d + 32 \\ c = 3.25d + 30.50 \end{cases}$
b. 11

C. a. $\begin{cases} c = 3.00d + 30.50 \\ c = 3.25d + 32.00 \end{cases}$
b. 6

B. a. $\begin{cases} c = 3.00d + 32 \\ c = 3.25d + 30.50 \end{cases}$
b. 6

D. a. $\begin{cases} c = 3.00d + 30.50 \\ c = 3.25d + 32.00 \end{cases}$
b. 11

$$\begin{aligned} c &= 32 + 3d & c &= 30.50 + 3.25d \\ 32 + 3d &= 30.50 + 3.25d \\ \underline{-3d \quad -3d} & & \underline{-3d \quad -3d} & \\ 32 &= 30.50 + .25d \\ \underline{-30.50 \quad -30.50} & & \underline{-30.50 \quad -30.50} & \\ 1.5 &= .25d \\ \underline{.25 \quad .25} & & \underline{.25 \quad .25} & \\ d &= 6 \end{aligned}$$