

Solve the following systems of equations graphically and check. If no solution exists, no check is required.

1.  $x + y = -3$

$$y = -x - 3$$

$$m = \frac{-1}{1}$$

$$b = -3$$

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

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

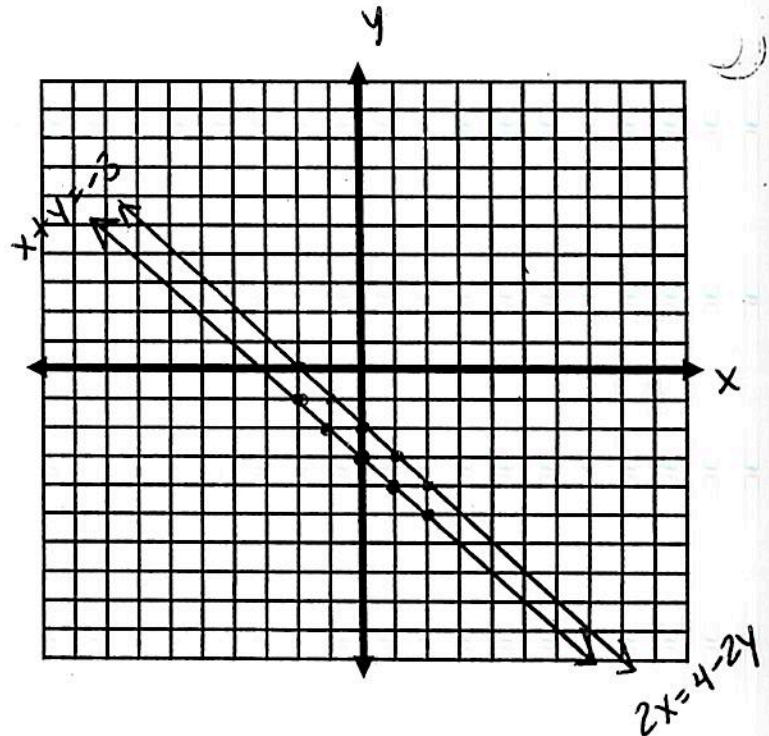
$$-2y = 2x + 4$$

$$y = -x - 2$$

$$m = \frac{-1}{1}$$

$$b = -2$$

no solution



2.  $x + y = -2$

$$y = -x - 2$$

$$m = \frac{-1}{1}$$

$$b = -2$$

$$y = \frac{1}{3}x + 2$$

$$m = \frac{1}{3}$$

$$b = 2$$

common solution  
 $(-3, 1)$

$$x + y = -2$$

$$-3 + 1 = -2$$

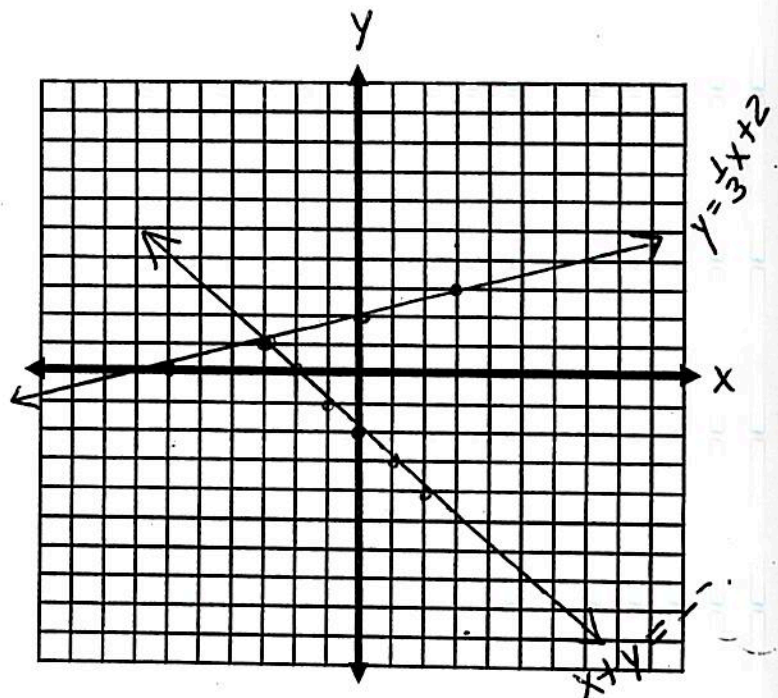
$$-2 = -2 \checkmark$$

$$y = \frac{1}{3}x + 2$$

$$1 = \frac{1}{3}(-3) + 2$$

$$1 = -1 + 2$$

$$2 = 2 \checkmark$$

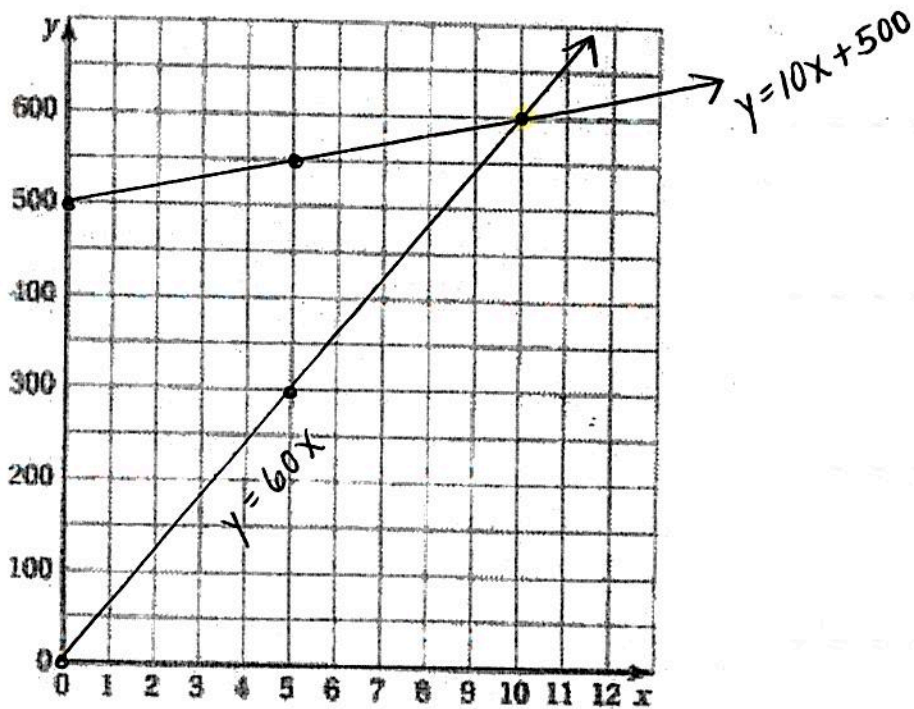


3. Your family starts a bed-and-breakfast. They spend \$500 fixing up a bedroom to rent. The costs for food and utilities is \$10 per night. Your family charges \$60 per night to rent the bedroom. The equation that represents the costs to your family is  $y = 10x + 500$  where  $x$  represents the number of nights the room is rented. The equation that represents the revenue (income) for your family is  $y = 60x$  where  $x$  represents the number of nights the room is rented.

a) Use the cost and revenue equations to complete the table below.

x (number of nights)	0	1	2	3	4	5	6	7	8	9	10	11
Cost $y = 10x + 500$	500	510	520	530	540	550	560	570	580	590	600	610
Revenue $y = 60x$	0	60	120	180	240	300	360	420	480	540	600	660

b) Graph the system.



c) State the point of intersection. What does this point tell us in the context of the situation?

$(10, 600)$   
 ↗ # of nights  
 ↗ cost/revenue

At 10 nights of rental, the cost is the same as the revenue, of \$600.