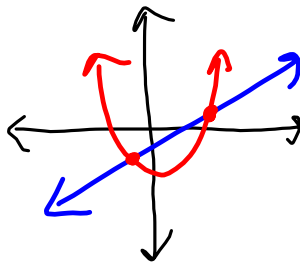
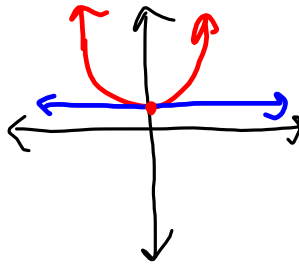


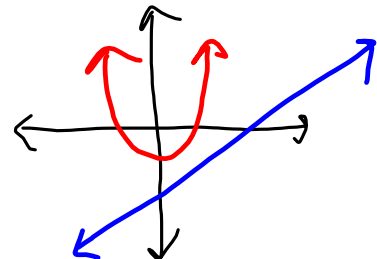
# Sec. 9.8 Systems of Linear and Quadratic Equations



Two solutions



One solution

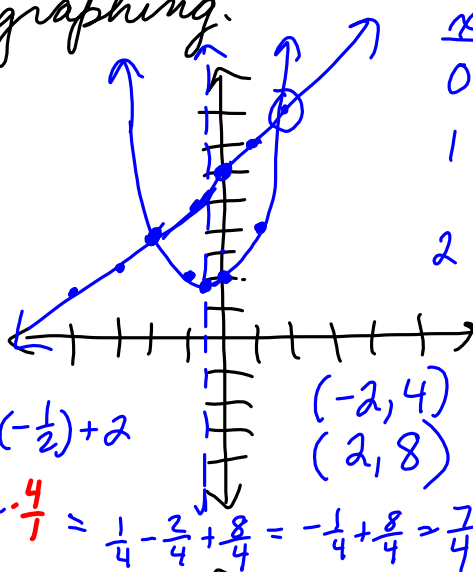


No solution

Problem 1: Solve by graphing.

a.  $y = x^2 + x + 2$   $a=1$   
 $y = x + 6$   $b=1$   
 $m = 1 = \frac{1}{1}$

x	y
0	2
1	4 $1+1+2$
2	8 $4+2+2$



$$\frac{-b}{2a} = \frac{-1}{2 \cdot 1} = -\frac{1}{2}$$

Vertex:  $(-\frac{1}{2}, \frac{7}{4})$

$$(-\frac{1}{2})(-\frac{1}{2}) + (-\frac{1}{2}) + 2 = \frac{1}{4} - \frac{2}{4} + 2 = \frac{1}{4} - \frac{2}{4} + \frac{8}{4} = -\frac{1}{4} + \frac{8}{4} = \frac{7}{4}$$

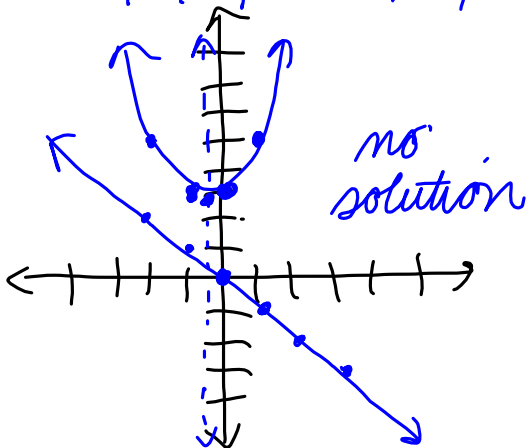
b.  $y = x^2 + x + 3$   
 $y = -x$

$$\frac{-b}{2a} = \frac{-1}{2 \cdot 1} = -\frac{1}{2}$$

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

$$\frac{1}{4} - \frac{2}{4} + 3 = \frac{1}{4} - \frac{2}{4} + \frac{12}{4} = \frac{11}{4} = 2.75$$

$$-\frac{1}{4} + \frac{12}{4} = \frac{11}{4} = 2.75$$



x	y
0	3
1	5 $1+1+3$
-1	3 $(-1)^2 + (-1) + 3$
-2	5 $1-1+3$
	5 $4-2+3$

c.  $y = 2x^2 + 1$  v: (0,1)  
 $y = -2x + 5$   
 $m = -\frac{2}{1}$

x	y		x	y
0	1		0	5
1	3	2+1	-2	9
-1	3	2(-1) <sup>2</sup> +1		
		2(-1)+1		
		2+1		

Problem 2:

$2(-2)^2 + 1$   
 $2(4)^2 + 1$   
 $8 + 1$   
 $9$

The equations  $y = 24x + 15$  and  $y = -x^2 + 120x + 15$  model the daily sales of two types of computers, where  $x$  is the number of days since the computers were put on sale. On what day was the same number of each computer sold? How many computers were sold that day?

$$y = 24x + 15 \rightarrow \begin{cases} y = 24x + 15 \\ -y = -x^2 - 120x - 15 \end{cases}$$

$$-1(y = -x^2 + 120x + 15)$$

96 days

$y = 24(96) + 15$	$0 = x^2 - 96x$
$2304 + 15$	$0 = x(x - 96)$
2319	$x = 0$ $x - 96 = 0$
computers	$+96 + 96$
	$x = 96$

Problem 3: Solve the system

a.  $y = x^2 - 4x + 2$   
 $y = -x$

$-x = x^2 - 4x + 2$	$+x$
$0 = x^2 - 3x + 2$	
$0 = (x - 1)(x - 2)$	
$x - 1 = 0$ $x - 2 = 0$	
$x = 1$ $x = 2$	
$(1, -1)$ $(2, -2)$	
$y = -1$ $y = -2$	

b.  $y - 30 = 12x$   
 $y = x^2 + 11x - 12$

$y - 30 = 12x$	$+30$
$0 = 12x + 30$	
$12x + 30 = x^2 + 11x - 12$	
$-12x - 30 = -12x - 30$	
$0 = x^2 - x - 42$	
$0 = (x + 6)(x - 7)$	
$x + 6 = 0$ $x - 7 = 0$	
$-6 - 6$ $+7 + 7$	
$x = -6$ $x = 7$	
$(-6, -42)$ $(7, 114)$	
$y = 12(-6) + 30$ $y = 12(7) + 30$	
$y = -72 + 30$ $y = 84 + 30$	
$y = -42$ $y = 114$	