HW 3 - 2: Answers   QUIZ TOMORROW!

1. $x = 6, y = 1$

2. $x = -2, y = -3, z = 2$

3. $x = 2, y = 5, z = -1$

4. $x = 1, y = 2, z = -1$

5. $x = 0, y = -3, z = 5$

WARM-UP: Complete with your partner NOTES through Standard form of the equation of a circle

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Solve the following systems.

1. $(5x + 2y = 32)(-3)$
   $6x + 6y = 42$

$-15x - 6y = -96$
$6x + 6y = 42$
———————
$-9x = -54$
$x = 6$

$5(6) + 2y = 32$
$2y = 2$
$y = 1$

$x = 6$
$y = 1$

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2. ① $x - y = 1 \rightarrow x = y + 1$
② $2y + z = -4$
③ $x - 2z = -6$ $x = 2z - 6$

·2 $\quad y + 1 = 2z - 6$
$\qquad \underline{-1 \quad -2z \quad -1}$
$\qquad y - 2z = -7$

2② $\underline{4y + 2z = -8}$
$\qquad 5y = -15$
$\qquad y = -3$

$-3 - 2z = -7$
$\qquad -2z = -4$
$\qquad z = 2$

① $x - y = 1$
$\quad x + 3 = 1$
$\qquad x = -2$

$\left\{ \begin{array}{l} x = -2 \\ y = -3 \\ z = 2 \end{array} \right.$

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3. ① $2x + y + 3z = 4$
② $2y + 3z = 7$
③ $x - y - z = -2$

① $x + y + 3z = 4$
③ $\underline{x - y - z = -2}$
④ $2x + 2z = 2$

2③ $2x - 2y - 2z = -4$
④ $\underline{2y + 3z = 7}$
⑤ $2x + z = 3$

$-1④ \rightarrow \underline{-2x - 2z = -2}$
$\qquad -z = 1$
$\qquad z = -1$

② $z = -1$
$\quad 2y + 3(-1) = 7$
$\qquad 2y = 10$
$\qquad y = 5$

③ $x - y - z = -2$
$\quad x - 5 + 1 = -2$

$\left\{ \begin{array}{l} x = 2 \\ y = 5 \\ z = -1 \end{array} \right.$

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4. ① $x + 3y + z = 6$
② $2x - 3y + z = -5$
③ $2x + 3y - z = 9$

① & ②
$x + 3y + z = 6$
$2x - 3y + z = -5$
———————————
$3x + 2z = 1$

② & ③
$2x - 3y + z = -5$
$2x + 3y - z = 9$
———————————
$4x = 4$
$x = 1$

$3 + 2z = 1$
$z = -1$

$1 + 3y - 1 = 6$
$y = 2$

$\begin{cases} x = 1 \\ y = 2 \\ z = -1 \end{cases}$

5. ① $3x + 2y - z = -11$
② $x + y + z = 2$
③ $2x - y + 2z = 13$

① & ②
$3x + 2y - z = -11$
$x + y + z = 2$
———————————
$4x + 3y = -9$

2 ① & ③
$6x + 4y - 2z = -22$
$2x - y + 2z = 13$
———————————
$8x + 3y = -9$

$-4x - 3y = 9$
$8x + 3y = -9$
———————————
$4x = 0$
$x = 0$

$3y = -9$
$y = -3$

$0 - 3 + z = 2$
$z = 5$

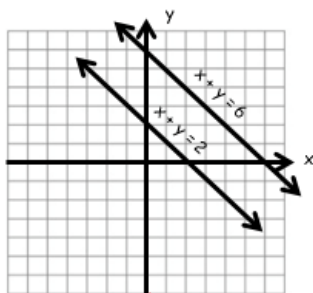$\begin{cases} x = 0 \\ y = -3 \\ z = 5 \end{cases}$

Solving Systems

Graphically

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For the first two examples, x + y = 6 and a second equation have been graphed for you. Determine the solution for each system.
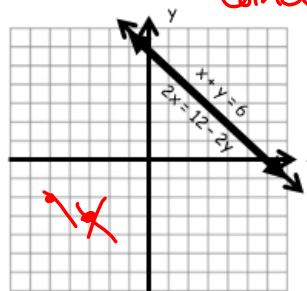
a.

$x + y = 6$
$x + y = 2$

Parallel

Answer

$\emptyset$ or $\{ \; \}$

b.

That Coincide

$x + y = 6$
$2x = 12 - 2y$
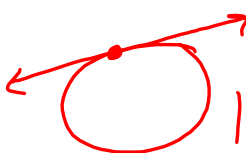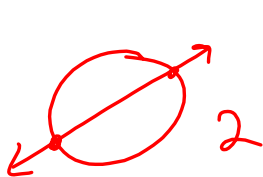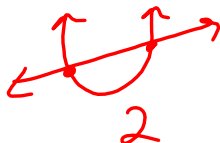
Infinite Solutions

Answer

If you were to graph a circle and a line on the same set of axes, how many solutions are possible? Sketch each possibility.

2   1   0

How about a parabola and a line? Again, sketch each possibility.

2   1   0

The standard form of an equation for a circle is: $(x - h)^2 + (y - k)^2 = r^2$

Where the center is: ___(h, k)___   And the radius is: ___$\sqrt{r^2} = r$___

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Graph the following system and state the solution.

$(x-h)^2 + (y-k)^2 = r^2$

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

center: ___(2, -3)___
radius: ___$\sqrt{4} = 2$___

$\frac{\Delta y}{\Delta x}$

$x - y = 3 \rightarrow \quad -y = -x + 3$
$y = \underline{x - 3} \qquad \frac{-y}{-1} = \frac{-x}{-1} = \frac{3}{-1}$

move $m = \underline{1 = \frac{rise}{run} = \frac{1}{1}} \rightarrow \quad y = x - 3$
begin $b = \underline{-3} \qquad\qquad y = mx + b$

Solution: $\{(0, -3), (2, -1)\}$

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

$x - y = 3$
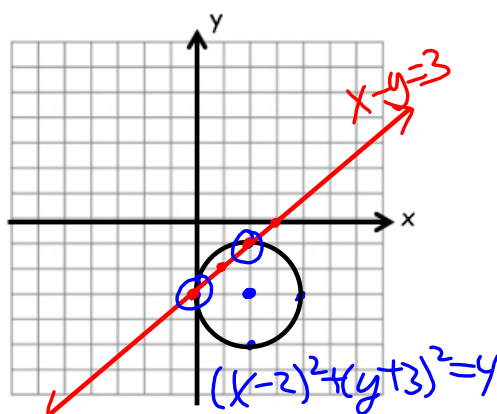
Solve each of the following systems graphically.

2. $y = -2x + 3$ — line
     $y = x^2 - 6x + 3$ — parabola $\longrightarrow y_2 =$ zoom 6

$y_1 =$

x 5-7 pts

x	1	2	3	4	5	0	6
y	-2	-5	-6	-5	-2	3	3

$m = \dfrac{-2}{1} = \dfrac{-2}{1} \longrightarrow$
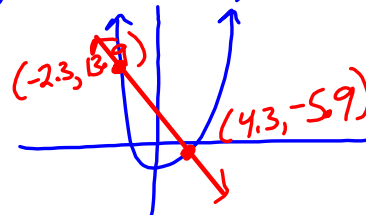
$b = 3$

Solution: $\{(4, -5), (0, 3)\}$

$y = -2x + 3$
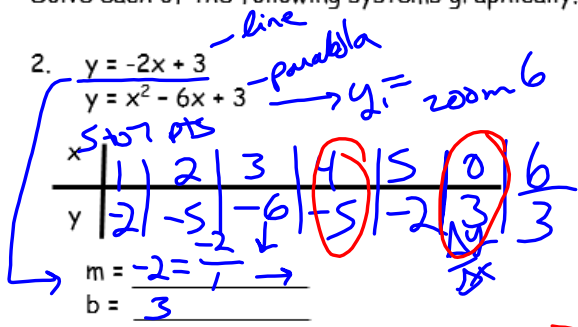
$y = x^2 - 6x + 3$

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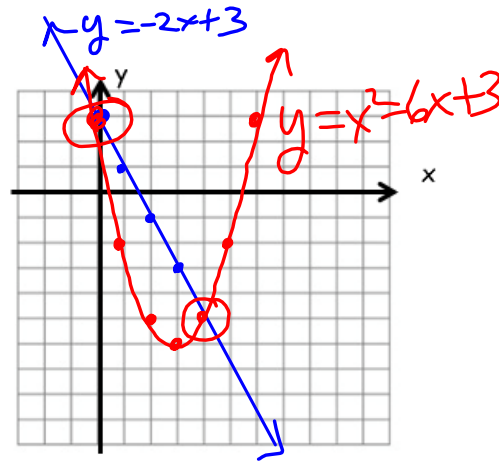
3 & 4.   Find the solutions to the nearest tenth using your graphing calculator.
         Include a sketch with labeled points of intersection and the window you used to
         see the graph with all points of intersection. (on your calculator)

3. $y_1 = x^2 - 5x - 3$ ⎱ zoom 6
     $y_2 = -3x + 7$

(change Window)

Solution: $\{(-2.3, 13.9), (4.3, -5.9)\}$

Xmin ___−10___   Ymin ___−10___ ⎱ use
                                   2nd
Xmax ___10___   Ymax ___20___ ⎰ trace
                                   5 (Intersect)
                                 Enter-Enter-Enter
                                 -Can only find 1 pt at a time
                                 - redo 2nd-trace-5 +
                                   more mouse closer
                                   to another point before
                                   Enter's
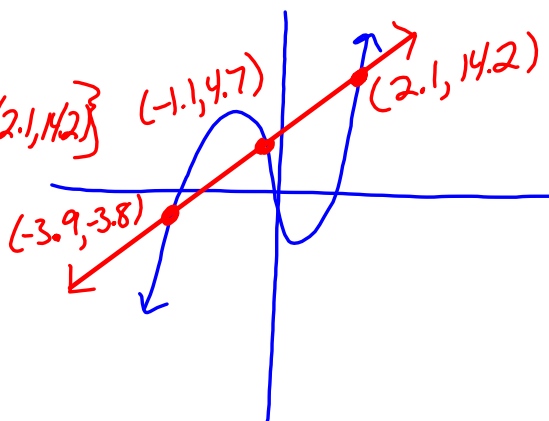
$(-2.3, 13.9)$ $(4.3, -5.9)$

4. $y_1 =$ $y = x^3 + 3x^2 - 3x - 1$ ⎤ Zoom 6
   $y_2 =$ $y = 3x + 8$ ⎦

Solution: $\{(-3.9, -3.8)(-1.1, 4.7), (2.1, 14.2)\}$

Change window Xmin ___−10___ Ymin ___−10___

Xmax ___10___ Ymax ___20___

Then 2nd-trace - 5 (Intersect) for each of 3 points

(−1.1, 4.7) (2.1, 14.2)

(−3.9, −3.8)

Review Completing the Square. Set up. Do not solve. $ax^2 + bx + c$

$a = 1$

$x^2 + 4x = 6$

$x^2 + 4x + \boxed{4} = 6 + \boxed{4}$

$\left(\dfrac{b}{2}\right)^2 = \left(\dfrac{4}{2}\right)^2 = 2^2 = 4$

$(x+2)^2 = 10$

Rewrite the equation of the ⟨circle⟩ by completing the square in both x and y. Describe and graph the circle represented by the equation.
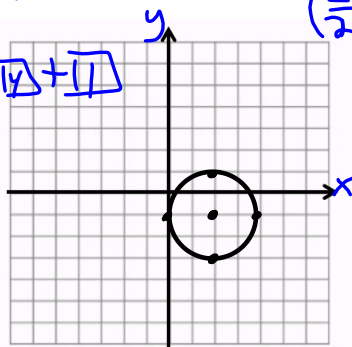
$(x \pm h)^2 + (y - k)^2 = r^2$ $\left(\frac{b}{2}\right)^2$ $\left(\frac{-4}{2}\right)^2 = (-2)^2 = 4$

$\left(\frac{2}{2}\right)^2 = (1)^2 = 1$

5. $\underline{x^2} + y^2 - \underline{4x} + 2y + 1 = 0$

$x^2 - 4x + \boxed{4} + y^2 + 2y + \boxed{1} = -1 + \boxed{4} + \boxed{1}$
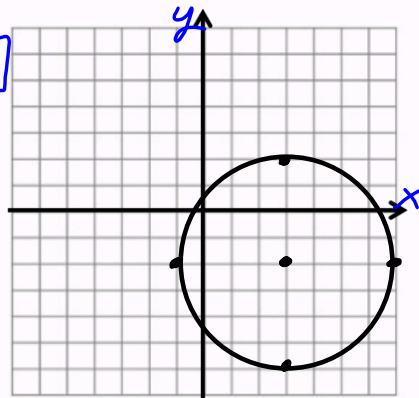
$(x-2)^2 + (y+1)^2 = 4$

Center: $(2, -1)$

Radius: 2

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6. $x^2 + y^2 - 6x + 4y - 3 = 0$

$\left(\frac{-6}{2}\right)^2 = (-3)^2 = 9$ $\left(\frac{4}{2}\right)^2 = (2)^2 = 4$

$x^2 - 6x + \boxed{9} + y^2 + 4y + \boxed{4} = 3 + \boxed{9} + \boxed{4}$
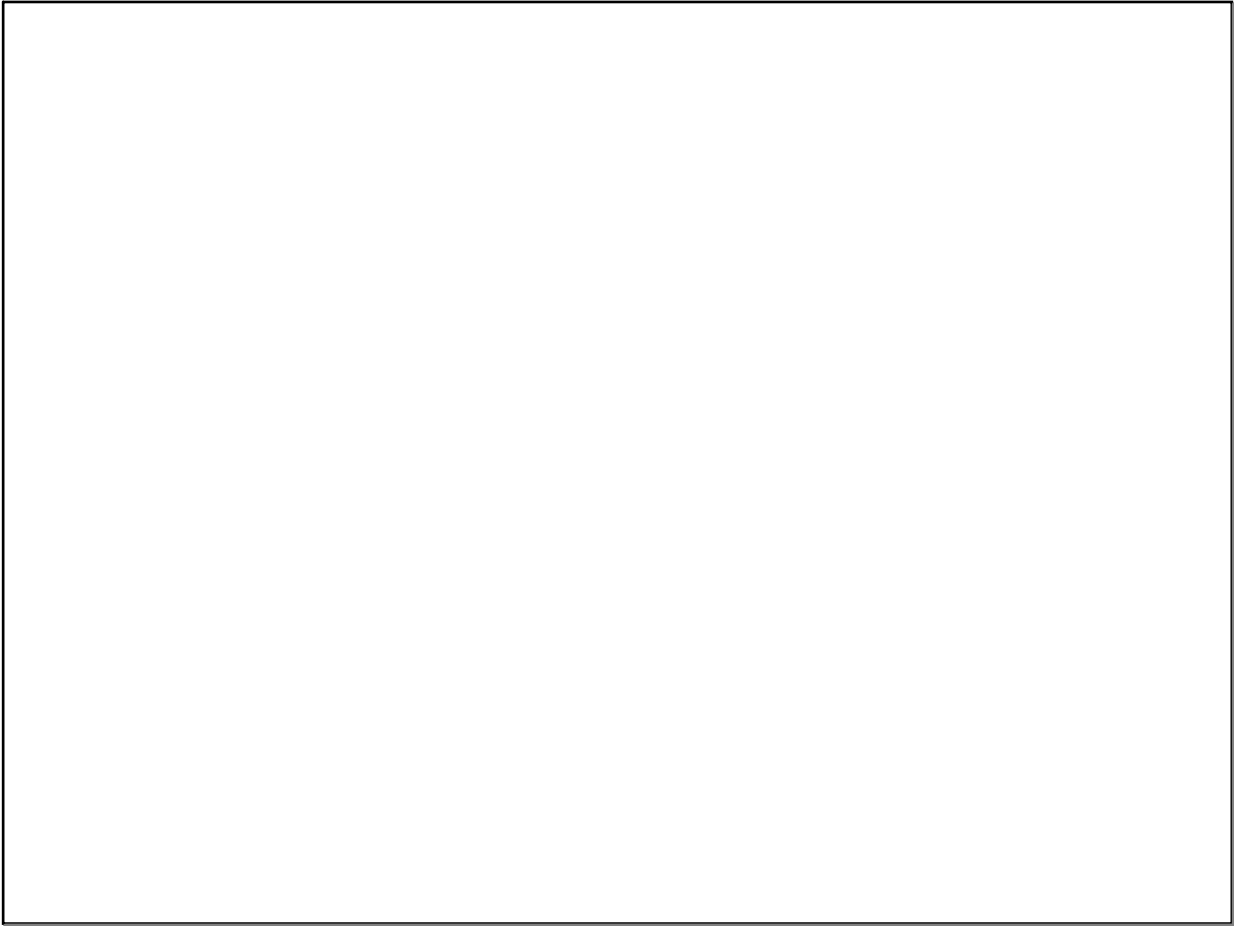
$(x-3)^2 + (y+2)^2 = 16$

Center: $(3, -2)$

Radius: 4

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