# HW 3 - 3:  Answers

1.  {(2, 1)}

2.  {(-2, -3), (1, 3)}

3.  {(1, -1), (3, -3)}

4.  $(x + 1)^2 + (y - 2)^2 = 9$

    {(-4, 2), (2, 2)}

5.  $(x - 2)^2 + (y + 3)^2 = 16$

    {(2, 1), (-2, -3)}

HW #5
Quest. #1

1.　a.　Solve graphically:

$x + 2y = 4 \rightarrow y = -\frac{1}{2}x + 2$

$-3x + y = 7 \quad y = 3x - 5$

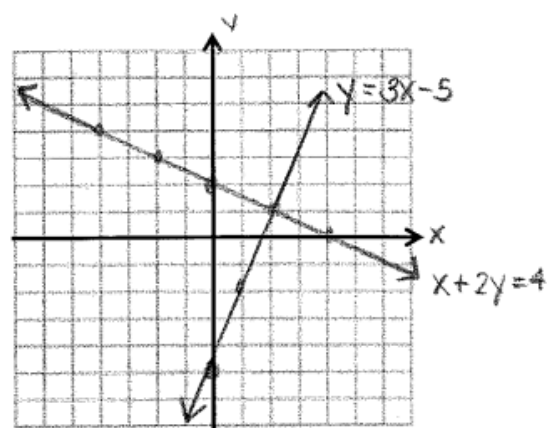$m = -1/2 \qquad m = 3 \qquad (2, 1)$

$b = 2 \qquad\quad b = -5$



$y = 3x - 5$

$x + 2y = 4$

　b.　Solve the same system algebraically.

$3(x + 2y = 4)$

$-3x + y = -5$

_____

$3x + 6y = 12$

$-3x + y = -5$

_____

$7y = 7$

$y = 1$

$x + 2 = 4$

$x = 2$

$(2, 1)$

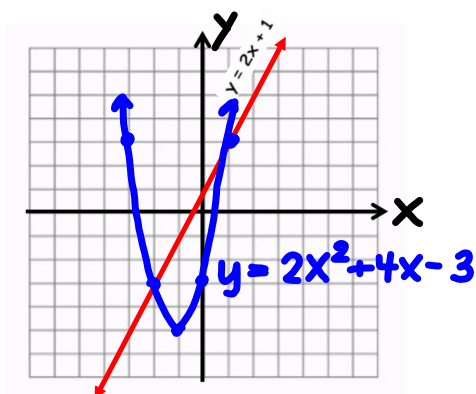Solve graphically.  Be sure to include all required parts.

<span style="color:red">HW 3-5 #1</span>

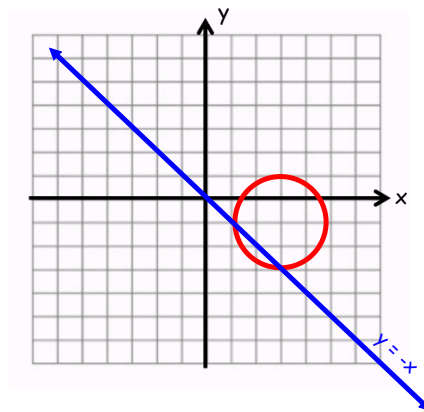$y = 2x + 1$

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

table

$\{(1,3),(-2,-3)\}$



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

3.  $(x-3)^2 + (y+1)^2 = 4$
    $\phantom{xxxxxxxxxxxxxxxx}_1$

    $y = -x$          $m = -1 \quad b = 0$

    center: $(3, -1)$

    radius 2

    Answer: $\{(1, -1), (3, -3)\}$

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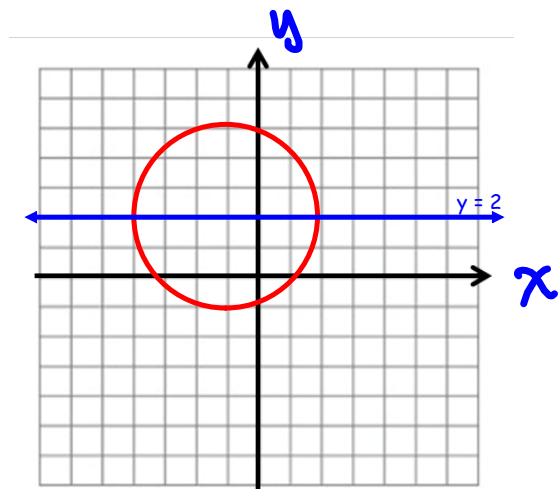    $y = 2$

$x^2 + 2x + 1 + y^2 - 4y + 4 = 4 + 1 + 4$
$(x + 1)^2 + (y - 2)^2 = 9$
center: (-1, 2)
radius: 3

Answer:

{(-4, 2), (2, 2)}

5.   $x^2 + y^2 - 4x + 6y - 3 = 0$
     $x - y = 1$

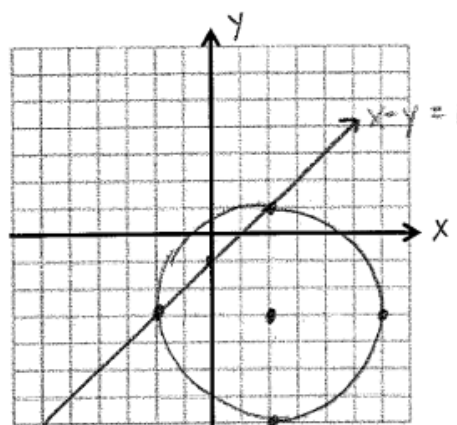$x^2 - 4x + 4 + y^2 + 6y + 9 = 3 + 4 + 9$

$(x - 2)^2 + (y + 3)^2 = 16$

center $(2, -3)$

radius: 4

$y = x - 1$

$m = 1$

$b = -1$

$\{(2, 1), (-2, -3)\}$

**U3D4**

# Solving Systems

# Algebraically

Solve the two equations from yesterday algebraically.

Steps to consider:
1.   Solve the linear equation for x or y.
2.   Substitute into the circle (or parabola) equation.
3.   Solve.
4.   Substitute your answer into the linear equation to solve for the remaining variable.
5.   Express your answer as points in solution   ie {(2, 3), (-1, 4)}

1.  $x^2 + y^2 = 25$
    $4x + 3y = 0$
    $3y = -4x$
    $y = -\frac{4}{3}x$

$x^2 + \left(-\frac{4}{3}x\right)^2 = 25$

$\frac{9}{9}x^2 + \frac{16}{9}x^2 = 25$

$\left(\frac{9}{25}\right)\frac{25}{9}x^2 = 25\left(\frac{9}{25}\right)$

$\sqrt{x^2} = \sqrt{9}$

$x = \pm 3$

| $x = 3$ | $x = -3$ |
|---------|----------|
| $4(3) + 3y = 0$ | $4(-3) + 3y = 0$ |
| $12 = -3y$ | $-12 = -3y$ |
| $-4 = y$ | $y = 4$ |
| $(3, -4)$ | $(-3, 4)$ |

$\{(3, -4), (-3, 4)\}$

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

$x - y = 3$

$y = \boxed{x - 3}$

$(\underline{x - 2})(\underline{x - 2}) + (x - 3 + 3)^2 = 4$

$x^2 - 4x + 4 + x^2 = 4$

$2x^2 - 4x + 4 = 4$

$\qquad \quad -4 \quad -4$

$2x^2 - 4x = 0$

$2x(x - 2) = 0$

| $2x = 0$ | $x - 2 = 0$ |
|---|---|
| $x = 0$ | $x = 2$ |
| $0 - y = 3$ | $2 - y = 3$ |
| $-y = 3$ | $-y = 1$ |
| $y = -3$ | $y = -1$ |

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

Solve the systems algebraically:

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

4.   $y = x^2 - 6x + 3$
     $y = \boxed{2x - 13}$

$$2x - 13 = x^2 - 6x + 3$$
$$0 = x^2 - 8x + 16$$
$$0 = (x-4)(x-4)$$
$$x - 4 = 0$$
$$x = 4$$
$$y = 2(4) - 13$$
$$y = -5$$
$$\{(4, -5)\}$$

**Day 5 Notes #4**

5.　$x^2 + y^2 = 1$　→　center = $(0,0)$　$r = 1$

$\dfrac{2y}{2} = \dfrac{x}{2} + \dfrac{1}{2}$　$y = \dfrac{1}{2}x + \dfrac{1}{2}$　$m = \dfrac{1}{2}$　$\dfrac{\frac{1}{2}}{1}$

(hint: only one solution can be obtained　$b = \dfrac{1}{2}$
graphically.  You must find the second solution
algebraically)

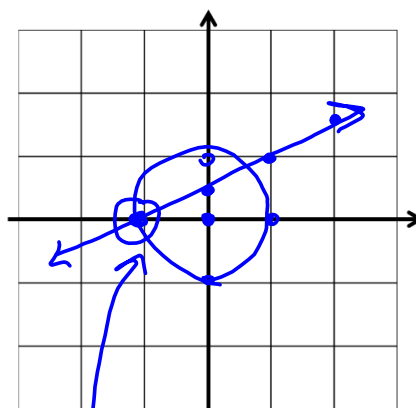→ $2y = x + 1$

$\boxed{2y - 1} = x$

$(2y-1)^2 + y^2 = 1$

$(2y-1)(2y-1) + y^2 = 1$

$4y^2 - 4y + 1 + y^2 = 1$

$5y^2 - 4y = 0$

$y(5y-4) = 0$



$\{(-1,0), (\tfrac{3}{5}, \tfrac{4}{5})\}$

| $y = 0$ | $5y - 4 = 0$ |
|---|---|
| $2(0) = x + 1$ | $5y = 4$ |
| $0 = x + 1$ | $y = \tfrac{4}{5}$ |
| $-1 = x$ | $2(\tfrac{4}{5}) = x + 1$ |
| $(-1, 0)$ | $\tfrac{8}{5} = x + 1$ |
| | $\tfrac{3}{5} = x$ |
| | $(\tfrac{3}{5}, \tfrac{4}{5})$ |