

HW 3 - 3: Answers

1. $\{(2, 1)\}$
2. $\{(-2, -3), (1, 3)\}$
3. $\{(2, 1)\}$
4. $(x - 2)^2 + (y + 3)^2 = 16$
 $\{(2, 1), (-2, -3)\}$
5. $x = 1, y = -1, z = 2$

HW 3 - 4: Answers

1. $\{(1, 5), (5, -3)\}$
2. $\{(-7, 4), (4, 26)\}$
3. $\{(4, 3), (-4, -3)\}$
4. $\{(1, 3)\}$
5. $x = 2, y = -2, z = 3$
6. $\{(-2.7, -19.4), (2.7, -8.6)\}$

Aug 13-9:18 AM

1. a. Solve graphically:

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

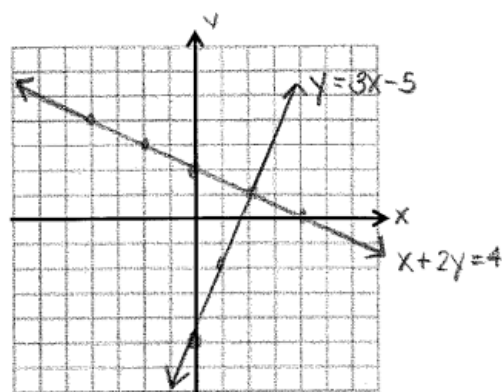
$$-3x + y = -5 \rightarrow y = 3x - 5$$

$$m = -\frac{1}{2}$$

$$b = 2$$

$$m = 3$$

$$b = -5$$

 $(2, 1)$ 

- b. Solve the same system algebraically.

$$\begin{array}{r} 3(x + 2y = 4) \\ -3x + y = -5 \\ \hline 3x + 6y = 12 \\ -3x + y = -5 \\ \hline 7y = 7 \\ y = 1 \end{array}$$

$$x + 2 = 4$$

$$x = 2$$

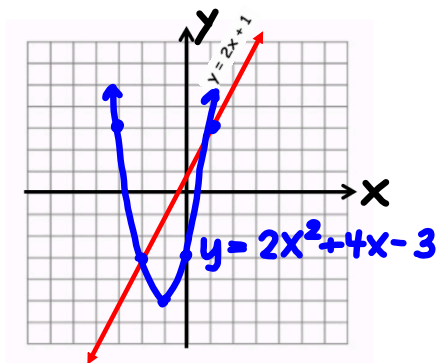
 $(2, 1)$

Aug 13-12:04 PM

Solve graphically. Be sure to include all required parts.

$$y = 2x + 1$$

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

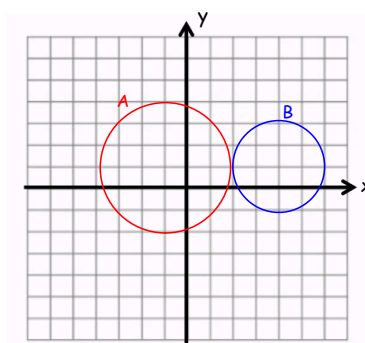


Sep 9-8:47 PM

3. A: $(x+1)^2 + (y-1)^2 = 16$

B: $(x-4)^2 + (y-1)^2 = 4$

Answer: $\{(2, 1)\}$



Sep 9-8:49 PM

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

$x - y = 1$

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

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

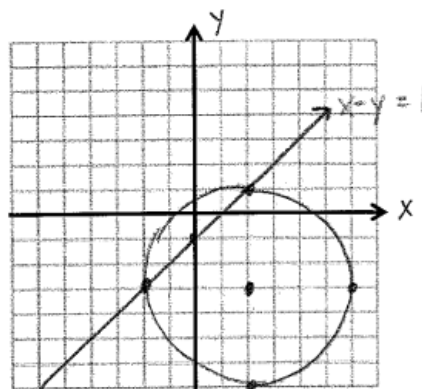
center: $(2, -3)$

radius: 4

$y = x - 1$

$m = 1$

$b = -1$



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

Aug 13-12:05 PM

5. Solve the following system of equations algebraically.

① $2x - y + 3z = 9$

② $x + 4y + 4z = 5$

③ $3x + 2y + 2z = 5$

2① & ③

$4x - 2y + 6z = 18$

$3x + 2y + 2z = 5$

$7x + 8z = 23$ ④

4① & ②

$8x - 4y + 12z = 36$

$x + 4y + 4z = 5$

$9x + 16z = 41$ ⑤

$-2④ + ⑤$

$-14x - 16z = -46$

$9x + 16z = 41$

$-5x = -5$

$x = 1$

$7 + 8z = 23$

$8z = 16$

$z = 2$

$① 2(1) + y + 3(2)$

$2 - y + 6 = 9$

$y = -1$

Solve
2 var, 2 EQ
system

$x = 1$

$y = -1$

$z = 2$

HW 3 - 4: Answers

1. $\{(1, 5), (5, -3)\}$
2. $\{(-7, 4), (4, 26)\}$
3. $\{(4, 3), (-4, -3)\}$
4. $\{(1, 3)\}$
5. $x = 2, y = -2, z = 3$
6. $\{(-2.7, -19.4), (2.7, -8.6)\}$

Aug 13-9:18 AM

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

$2x + y = 7$

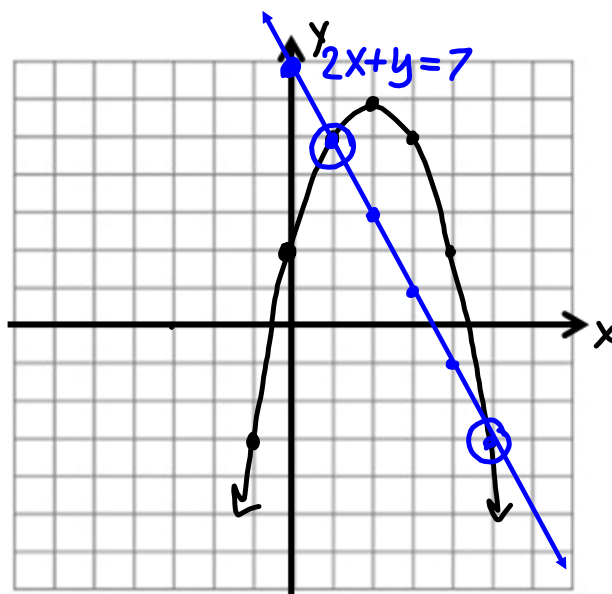
$y = -2x + 7$

$m = -2$

$b = 7$

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

$\{(1, 5), (5, -3)\}$



Oct 16-1:28 PM

2. $y = x^2 + 5x - 10$
 $y = 2x + 18$

$$x^2 + 5x - 10 = 2x + 18$$

$$x^2 + 3x - 28 = 0$$

$$(x+7)(x-4) = 0$$

$$\begin{array}{l|l} x = -7 & x = 4 \\ y = 2(-7) + 18 & y = 2(4) + 18 \\ y = 4 & y = 26 \end{array}$$

$$\{(-7, 4), (4, 26)\}$$

Sep 9-9:32 PM

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

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

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

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

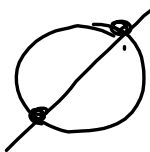
$$\sqrt{x^2} = \sqrt{16}$$

$$x = \pm 4$$

$$\begin{array}{l} x = 4 \\ y = \frac{3}{4}(4) \\ y = 3 \end{array}$$

$$\begin{array}{l} x = -4 \\ y = \frac{3}{4}(-4) \\ y = -3 \end{array}$$

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



Sep 9-9:33 PM

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

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

$$x^2 - 2x + 1 = 0$$

$$(x-1)^2 = 0$$

$$x-1 = 0$$

$$x = 1$$

$$y = 6(1) - 3$$

$$y = 3$$

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

Sep 9-9:33 PM

5.

① $3x - y + z = 11$

② $x + 4y - 2z = -12$

③ $2x + 2y - z = -3$

$$\rightarrow \cdot 2 \Rightarrow 6x - 2y + 2z = 22$$

① $3x - y + z = 11$

2① $6x - 2y + 2z = 22$

③ $2x + 2y - z = -3$

② $x + 4y - 2z = -12$

④ $5x + y = 8$

⑤ $7x + 2y = 10$

$$\begin{aligned} x &= 2 \\ y &= -2 \\ z &= 3 \end{aligned}$$

-2④ $-2(5x + y = 8)$

⑤ $\begin{array}{r} 7x + 2y = 10 \\ -10x - 2y = -16 \\ \hline 7x + 2y = 10 \\ -3x = -6 \end{array}$

$\rightarrow x = 2$
 ⑤ $\begin{array}{r} 7(2) + 2y = 10 \\ 2y = -4 \\ y = -2 \end{array}$

① $\begin{array}{r} 3(2) + 2 + z = 11 \\ z = 3 \end{array}$

Sep 9-9:33 PM

6. 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.

$$y = -3x^2 + 2x + 8$$

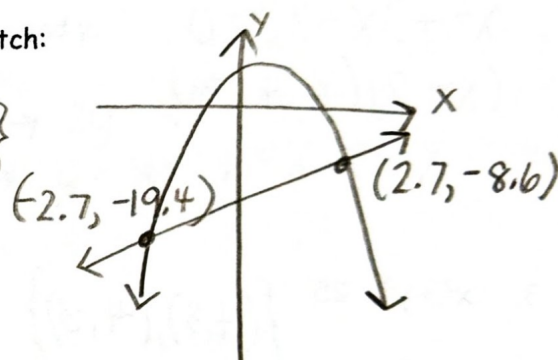
$$y = 2x - 14$$

Sketch:

Solution: $\{(-2.7, -19.4), (2.7, -8.6)\}$

Xmin -10 Ymin -25

Xmax 10 Ymax 10

**U3D5**

Parabolas

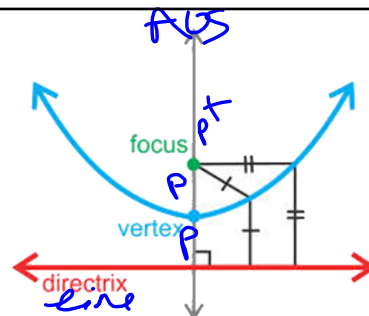
Parabola → The set of all points equidistant from a fixed point (focus) and a fixed line (directrix).

The focus is always inside the curve of the parabola.

The graph will always bend away from the directrix.

The vertex will always be on the parabola - right in the middle.

The axis of symmetry connects the focus and the vertex.



This is true no matter which way the parabola opens.

Aug 13-11:33 AM

Equation (Standard Form):

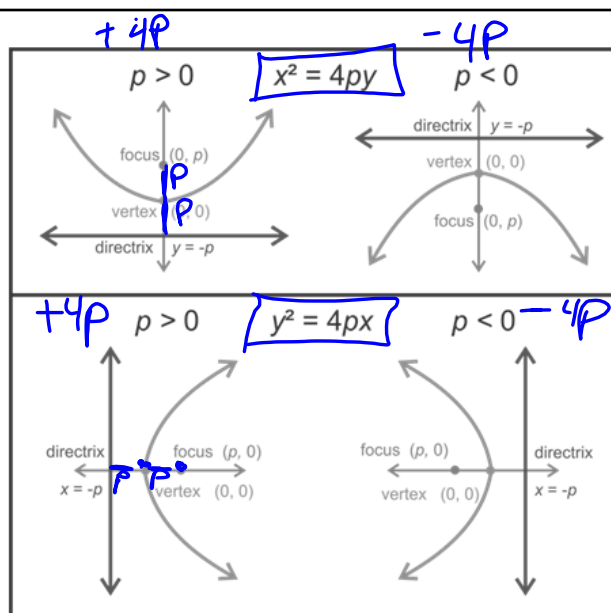
$$(x - h)^2 = 4p(y - k)$$

$$(y - k)^2 = 4p(x - h)$$

$(h, k) \rightarrow$ vertex

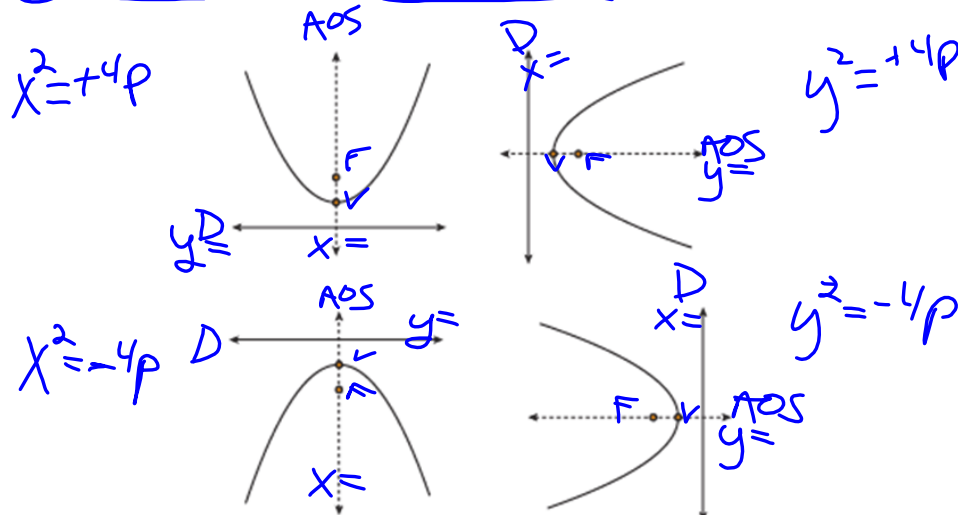
$x^2 \rightarrow \cup \cap$

$y^2 \rightarrow \hookrightarrow \curvearrowright$



Aug 13-11:33 AM

For each of the images given, determine a possible equation for the parabola. Label the focus (F), vertex (V), directrix ($y =$ or $x =$) and axis of symmetry ($y =$ or $x =$).



Aug 13-11:35 AM

Graph each of the parabolas given without the use of a calculator. Find and label all parts.

1. $(x+1)^2 = 12(y-2)$

$|4p| = 12$
opening width = 6+6

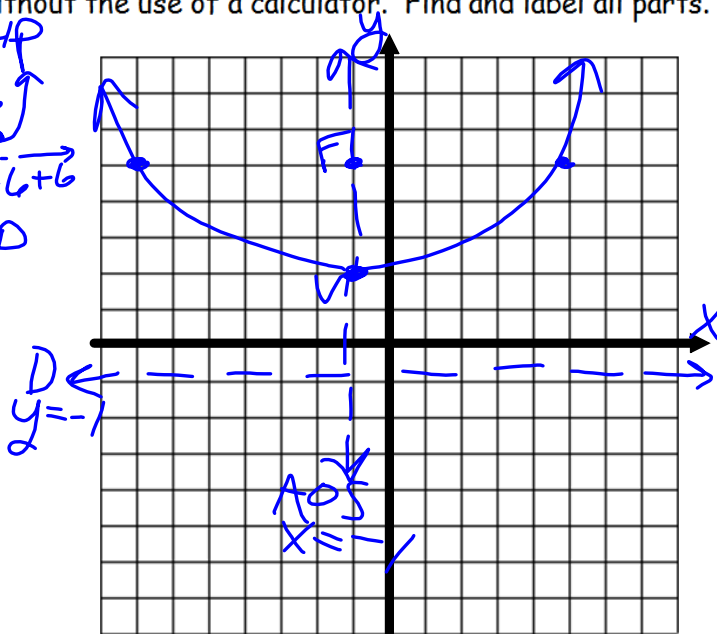
$p = 3$
 $V \rightarrow F, V \rightarrow D$

Vertex: $(-1, 2)$

Focus: $(-1, 5)$

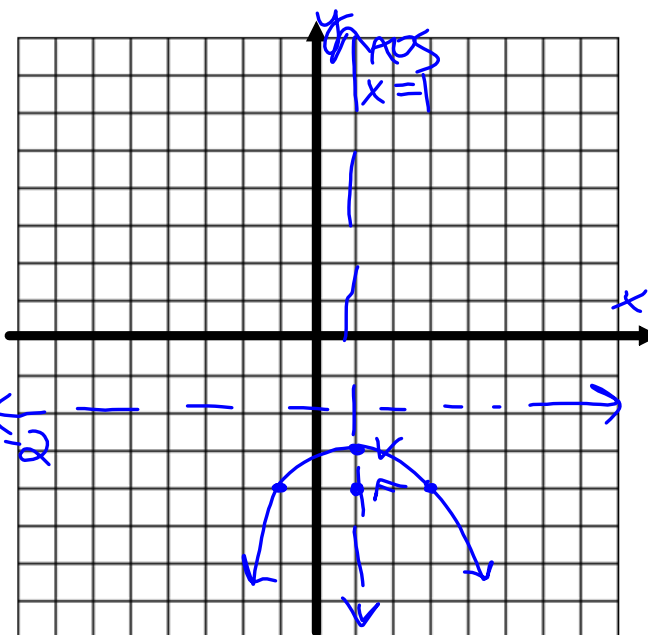
Directrix: $y = -1$

AOS: $x = -1$



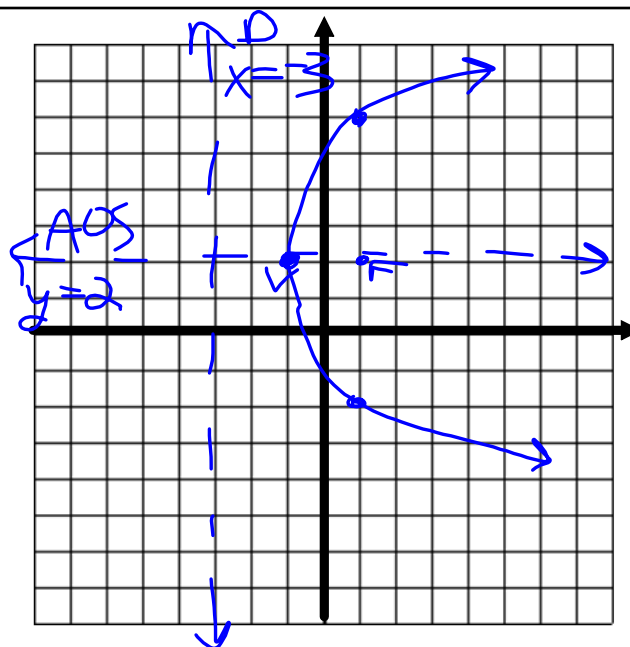
Aug 13-11:35 AM

2. $(x-1)^2 = -4(y+3)$ $x^2 = -4p$
 $|4p| = \frac{4}{\text{width } 2+2} \rightarrow$
 $p = 1$ $V-F, V-D$
 Vertex: $(1, -3)$
 Focus: $(1, -4)$
 Directrix: $y = -2$
 AOS: $x = 1$



Aug 13-11:36 AM

3. $(y-2)^2 = 8(x+1)$ $y^2 = +4p$
 $|4p| = \frac{8}{\text{width } 4+4} \rightarrow$
 $4p = 8$
 $p = 2$ $V-F, V-D$
 Vertex: $(-1, 2)$
 Focus: $(1, 2)$
 Directrix: $x = -3$
 AOS: $y = 2$



Aug 13-11:36 AM

