

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

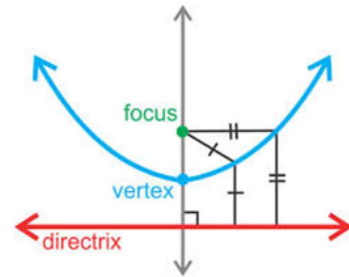
The focus (always a point) is always inside the curve of the parabola.

The graph will always bend away from the directrix (always a line)

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

The axis of symmetry connects the focus and the vertex.

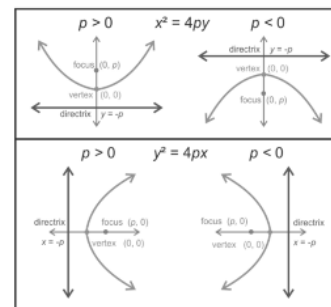
This is true no matter which way the parabola opens.



Equation (Standard Form):

$$(x - h)^2 = 4p(y - k) \quad \text{or} \quad (y - k)^2 = 4p(x - h)$$

Given the equation $(x-3)^2 = 8(y+2)$, find the vertex, focus and directrix



Vertex_____ Focus_____ Directrix_____

Given that the directrix is $x = 2$ and the focus is $(6,3)$, find the vertex and the equation of the parabola.

*Please refer to section 29 in your Algebra 2 CC Review Packet for information about Parabolas.

Substitution/Elimination

Remember to get the linear equation equal to x or y and substitute the linear equation for x or y into the other equation given equation.

- Solve the system of equations algebraically (Let's just set up the substitution and get the equation equal to zero)

$$(x-3)^2 + (y+4)^2 = 9$$

$$x + y = 4 \Rightarrow y = 4 - x$$

$$\begin{aligned} (x-3)(x-3) + (8-x)(8-x) &= 9 \\ x^2 - 3x - 3x + 9 + 64 - 8x - 8x + x^2 &= 9 \\ 2x^2 - 22x + 73 &= 9 \\ 2x^2 - 22x + 64 &= 0 \end{aligned}$$

$$\div 2 \Rightarrow x^2 - 11x + 32 = 0$$

etc

$$x = \quad x =$$

$$y = \quad y =$$

sub into line

- Let's discuss the process. Solve the following system of equations algebraically for all values of x , y , and z .

$$x + 3y + 5z = 45 \Rightarrow 7x + 7z = 35$$

$$6x - 3y + 2z = -10 \Rightarrow 4x + 10z = 62$$

$$-2x + 3y + 8z = 72$$

- Combine 2 equations to eliminate 1 var.
- Combine 2 diff. equations to eliminate same variable
- Solve 2x2 system

Regents Review #2 - Other Systems

Words you might see:

Solve

Intersect

State the solutions

All mean \rightarrow Set equal to each other and solve

Pay attention to the directions.

If it is multiple choice, you can ASK, JUST PLUG IT IN, TABLE, or GRAPH
CALC INTERSECT.Solve "System"
- answers for all
variablesTheresa is comparing the graphs of $y = 2^x$ and $y = 5^x$. Which of the following is true?

1. The y-intercept of $y = 2^x$ is $(0, 2)$ and the y-intercept of $y = 5^x$ is $(0, 5)$
2. Both graphs have a y-intercept of $(0, 1)$ and $y = 2^x$ is steeper.
3. Both graphs have a y-intercept of $(0, 1)$ and $y = 5^x$ is steeper.
4. Neither graph has a y-intercept.

Which ordered pair is in the solution set of the system of equations shown below?

$$y^2 - x^2 + 32 = 0$$

$$3y - x = 0$$

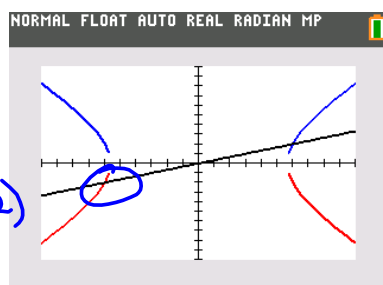
1. $(2, 6)$
2. $(3, 1)$
3. $(-1, -3)$
4. $(-6, -2)$

$$y^2 = x^2 - 32$$

$$y = \pm \sqrt{x^2 - 32}$$

$$3y = x$$

$$y = \frac{x}{3}$$

 $(-6, -2)$

If it says SOLVE ALGEBRAICALLY - No other method will be accepted for full credit. Check on calculator with intersect when possible.

Solve the following system of equations algebraically:

$$\begin{array}{l} 5 = y - x \\ 4x^2 = -17x + y + 4 \end{array}$$

$\xrightarrow{\quad}$

$$x + 5 = y$$

\nwarrow

$$4x^2 = -17x + x + 5 + 4$$

$$4x^2 + 16x - 9 = 0$$

$$(2x+9)(2x-1) = 0$$

$2x+9=0$ $x = -9/2$ $5 = y - (-9/2)$ $1/2 = y$	$2x-1=0$ $x = 1/2$ $5 = y - 1/2$ $11/2 = y$
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$$\left\{ \left(-\frac{9}{2}, \frac{1}{2} \right), \left(\frac{1}{2}, \frac{11}{2} \right) \right\}$$

Determine algebraically the x-coordinate of all points where the graphs of $xy = 10$ and $y = x + 3$ intersect.