

Review Topics for Regents Review #1

- Quadratic Formula
- Complex Numbers
- Parabolas
- Systems of Equations
- Substitution

Quadratic Formula

X =

*On your reference sheet

When entering the Quadratic Formula into your calculator, remember that you have the Alpha y= command to plug in the whole equation at once to evaluate. This command will only work for real answers and not for imaginary answers.

Example: The solutions to the equation $-\frac{1}{2}x^2 = -6x + 20$ are

1. $-6 \pm 2i$

2. $-6 \pm 2\sqrt{19}$

3. $6 \pm 2i$

4. $6 \pm 2\sqrt{19}$

Complex Numbers

Please refer to Section 1 in the Algebra 2 Common Core Review Packet 2019. Remember, your calculator will do the powers of i through i^6 .

$i^2 = -1$

$i^{35} = -i$

$$\begin{array}{l} 1 = i^0 \\ i = i^1 \\ -1 = i^2 \\ -i = i^3 \\ 1 = i^4 \end{array}$$

$$i^{35} = (i^4)^8 \cdot i^3 = -i$$

$$4 \overline{) 35} \begin{array}{r} 8 \text{ R } 3 \\ - 32 \\ \hline 3 \end{array}$$

Remember that complex numbers travel in pairs. They are called conjugates. For example, if one root of an equation is $2+i$ the other root is $2-i$.

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.

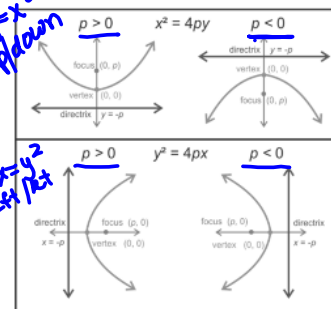
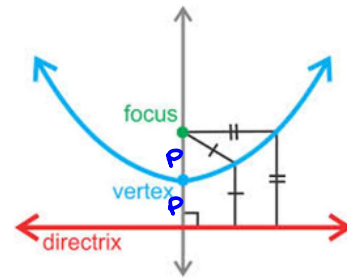
The axis of symmetry connects the focus and the vertex.

This is true no matter which way the parabola opens.

Equation (Standard Form):

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

u/d *l/r* $(h, k) = \text{vertex}$ *y=x^2* *up/down*



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

$4p=8$ $p=2$ *up/down*
Vertex $(3, -2)$ Focus $(3, 0)$ Directrix $y = -4$

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

$V = (4, 3)$ $p = 2$ $(y-k)^2 = 4p(x-h)$ $(y-3)^2 = 8(x-4)$

*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)

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

$$x + y = 4$$

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

$$x + 3y + 5z = 45$$

$$6x - 3y + 2z = -10$$

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