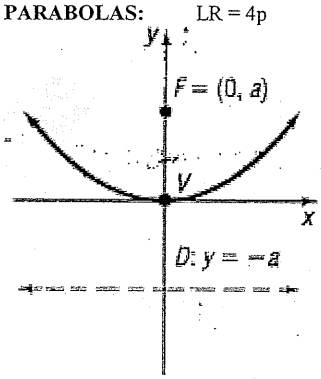
Analytic Geometry **Conics: Parabola Day 1** March 9, 2015 (Mon)

Parabola: a conic section where the distance from 1 fixed point (focus) and a line is equal.

PARABOLAS: LR = 4p



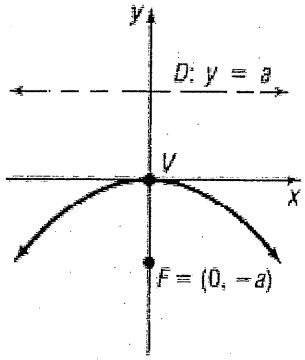
Graph opens up
(Think $y = x^2$)

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

Vertex (h, k)
p: distance from vertex to focus (inside parabola)
p: distance from vertex to directrix (line outside parabola)

Axis of Symmetry(AOS) : x = h

LR = |4p|



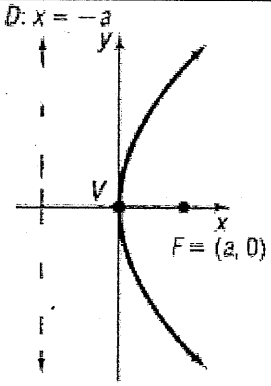
Graph opens down
(Think $y = -x^2$)

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

Vertex (h, k)
p: distance from vertex to focus (inside parabola)
p: distance from vertex to directrix (line outside parabola)

AOS: x = h

LR = |4p|



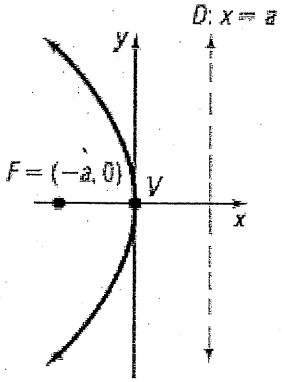
Graph opens right
(Think $x = y^2$)

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

Vertex (h, k)
p: distance from vertex to focus (inside parabola)
p: distance from vertex to directrix (line outside parabola)

AOS: y = k

LR = |4p|



Graph opens left
(Think $x = -y^2$)

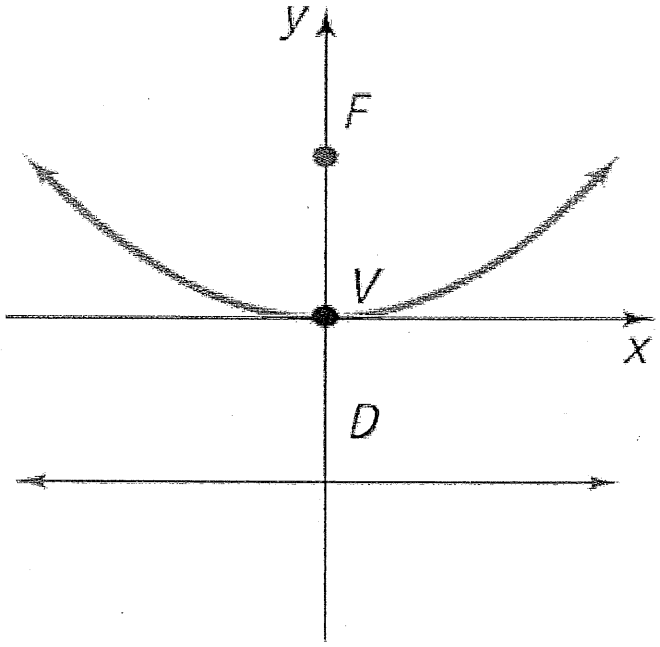
$(y - k)^2 = 4p\,(x - h)$

Vertex (h, k)
p: distance from vertex to focus (inside parabola)
p: distance from vertex to directrix (line outside parabola)

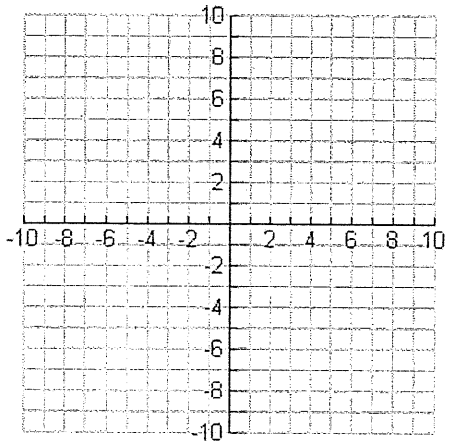
AOS: y = k

LR = |4p|

Graph the parabola: State the vertex, AOS, focus, directrix, and LR



1. $(x - 2)^2 = 8(y + 1)$



Vertex: _____

AOS: _____

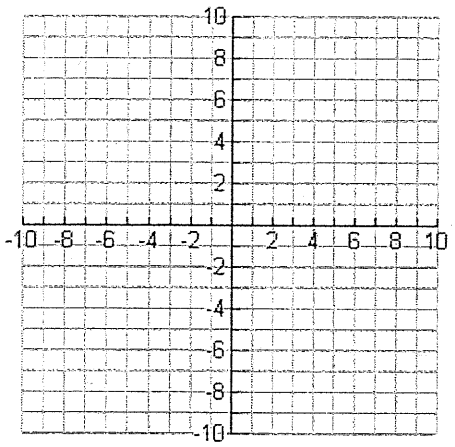
Focus: _____

Directrix: _____

LR: _____

Graph the parabola: State the vertex, AOS, focus, directrix, and LR

2. $(y + 3)^2 = -20x$



Vertex: _____

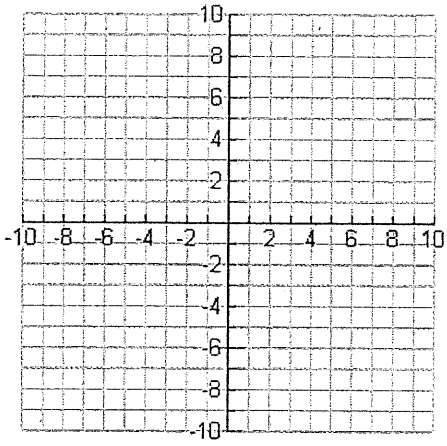
AOS: _____

Focus: _____

Directrix: _____

LR: _____

3. $(x + 4)^2 = 16(y - 2)$



Vertex: _____

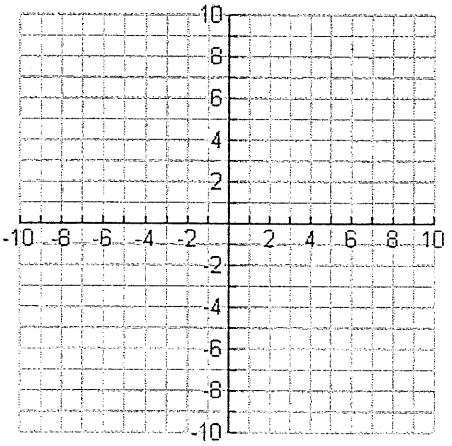
AOS: _____

Focus: _____

Directrix: _____

LR: _____

4. $(y - 3)^2 = 12(x - 1)$



Vertex: _____

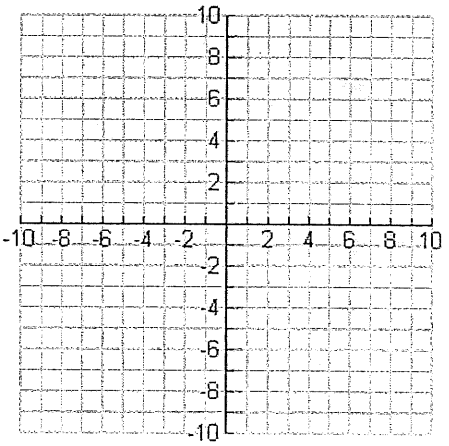
AOS: _____

Focus: _____

Directrix: _____

LR: _____

5. $(x - 5)^2 = -4(y + 5)$



Vertex: _____

AOS: _____

Focus: _____

Directrix: _____

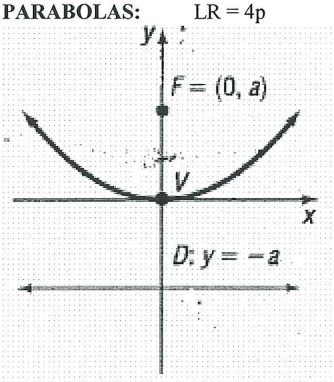
LR: _____

Conics: Parabola Day 1 March 9, 2015 (Mon)

Key

Parabola: a conic section where the distance from 1 fixed point (focus) and a line is equal.

PARABOLAS: LR = 4p



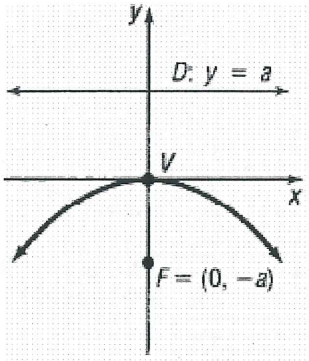
Graph opens up
(Think $y = x^2$)

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

Vertex (h, k)
p: distance from vertex to focus (inside parabola)
p: distance from vertex to directrix (line outside parabola)

Axis of Symmetry(AOS) : x = h

LR = $|4p|$



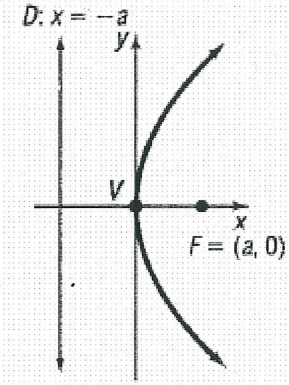
Graph opens down
(Think $y = -x^2$)

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

Vertex (h, k)
p: distance from vertex to focus (inside parabola)
p: distance from vertex to directrix (line outside parabola)

AOS: x = h

LR = $|4p|$



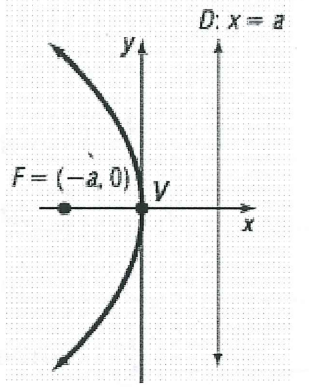
Graph opens right
(Think $x = y^2$)

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

Vertex (h, k)
p: distance from vertex to focus (inside parabola)
p: distance from vertex to directrix (line outside parabola)

AOS: y = k

LR = $|4p|$



Graph opens left
(Think $x = -y^2$)

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

Vertex (h, k)
p: distance from vertex to focus (inside parabola)
p: distance from vertex to directrix (line outside parabola)

AOS: y = k

LR = $|4p|$

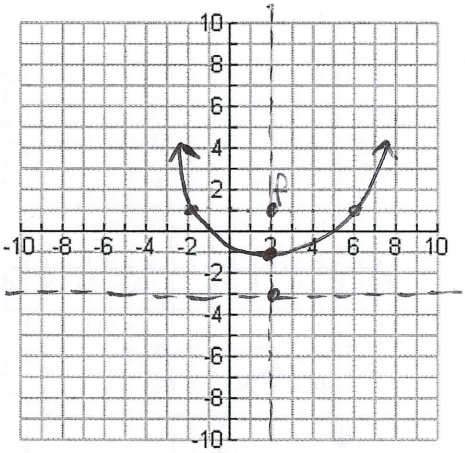
Graph the parabola: State the vertex, AOS, focus, directrix, and LR

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

1. $(x - 2)^2 = 8(y + 1)$

$4p = 8$

$p = 2$



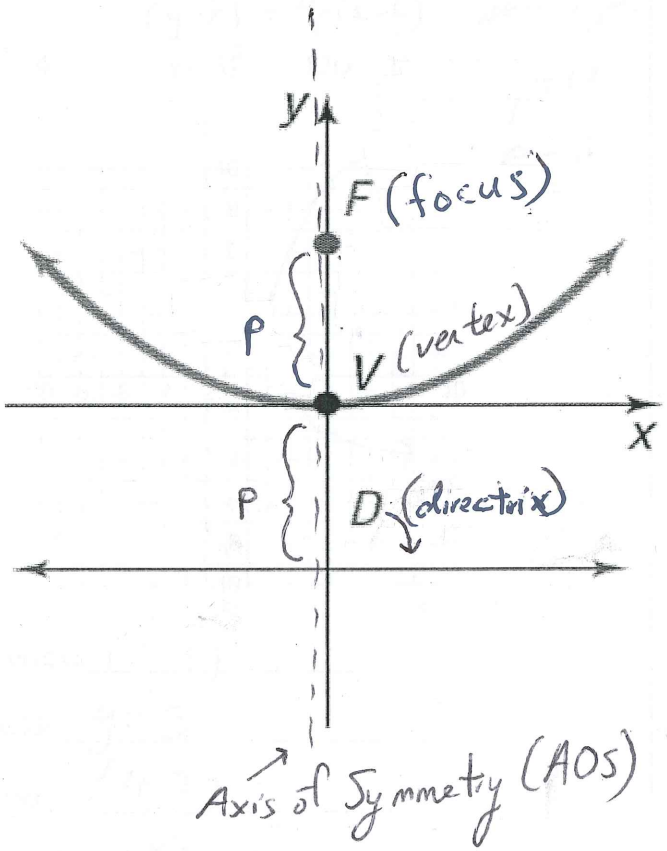
Vertex: (2, −1)

AOS: x = 2

Focus: (2, 1)

Directrix: y = −3

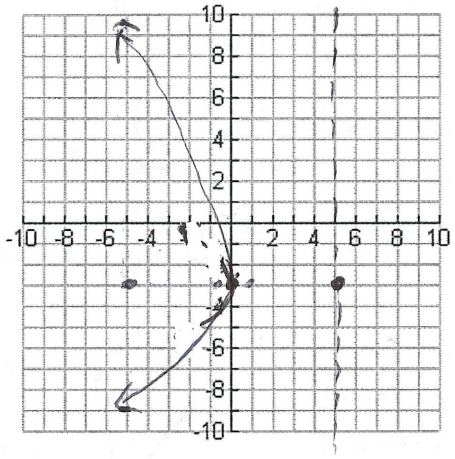
LR: $4p = 8$ $4(2) = 8$



Graph the parabola: State the vertex, AOS, focus, directrix, and LR

2. $(y + 3)^2 = -20x$ $(y-k)^2 = 4p(x-h)$

opens left $(y+3)^2 = -20(x-0)$



$4p = -20$

$p = -5$

Vertex: $(0, -3)$

AOS: $y = -3$

Focus: $(-5, -3)$

Directrix: $x = 5$

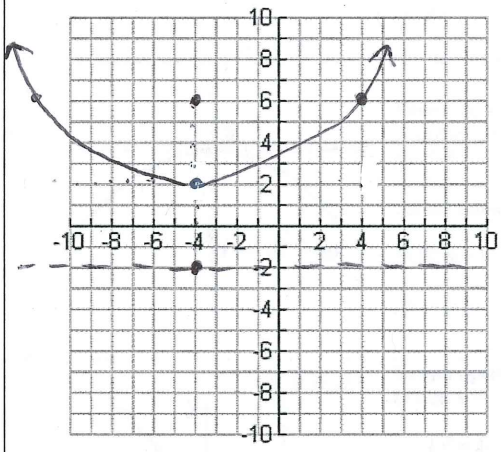
LR: $4(5) = 20$

3. $(x + 4)^2 = 16(y - 2)$ $(x-h)^2 = 4p(y-k)$

opens up

$4p = 16$

$p = 4$



Vertex: $(-4, 2)$

AOS: $x = -4$

Focus: $(-4, 6)$

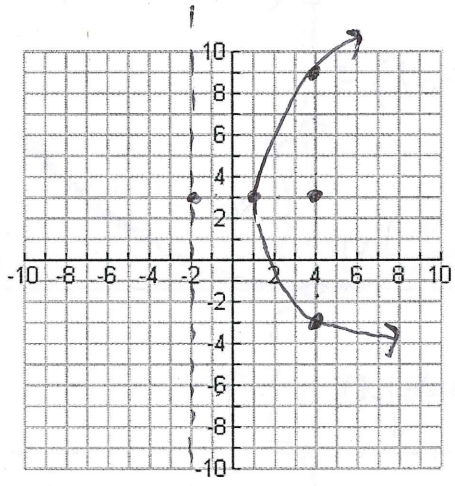
Directrix: $y = -2$

LR: $4(4) = 16$

4. $(y - 3)^2 = 12(x - 1)$ $(y-k)^2 = 4p(x-h)$ opens right

$4p = 12$

$p = 3$



Vertex: $(1, 3)$

AOS: $y = 3$

Focus: $(4, 3)$

Directrix: $x = -2$

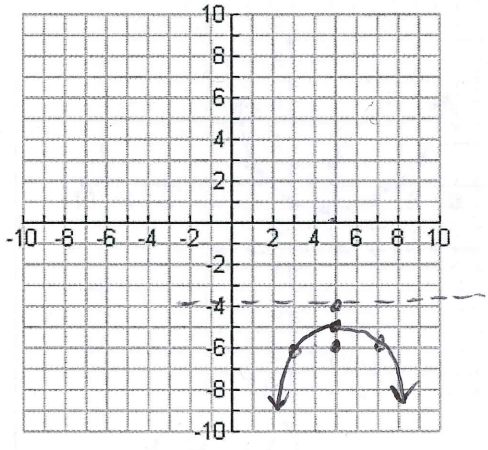
LR: $4(3) = 12$

5. $(x - 5)^2 = -4(y + 5)$ $(x-h)^2 = 4p(y-k)$

opens down

$4p = -4$

$p = -1$



Vertex: $(5, -5)$

AOS: $x = 5$

Focus: $(5, -6)$

Directrix: $y = -4$

LR: $4(1) = 4$