Conic Sections: Day 7

Parabolas (Day 2)

Completing the Square for Parabolas

① $y^2 - 6x + 2y + 13 = 0$

$y^2 + 2y = 6x - 13$

$y^2 + 2y + \underline{1} = 6x - 13 + \underline{1}$

$(y+1)^2 = 6x - 12$

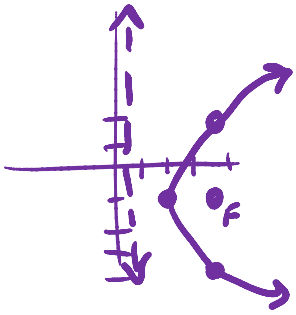
$(y+1)^2 = 6(x-2)$

opens Right

Vertex $(2, -1)$

$4p = 6$

$p = \frac{6}{4} = \frac{3}{2}$



② $y = -x^2 + 2x - 7$

$x^2 - 2x = -y - 7$

$x^2 - 2x + \underline{1} = -y - 7 + \underline{1}$

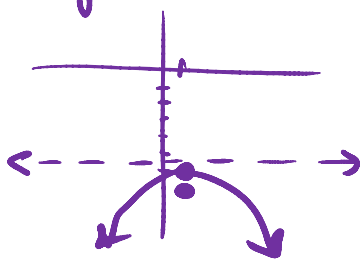
$(x-1)^2 = -y - 6$

$(x-1)^2 = -(y+6)$

vertex $(1, -6)$

$4p = -1$

$p = -\frac{1}{4}$ opens down



③ $3x^2 - 6x = 6y - 15$

$3(x^2 - 2x + \underline{1}) = 6y - 15 + \underline{3}$

$3(x-1)^2 = 6y - 12$

$3(x-1)^2 = 6(y-2)$

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

vertex $(1, 2)$

$4p = 2$

$p = \frac{1}{2}$ opens Up