

Graphing and Properties of Parabolas

For each equation, identify the vertex, the value of p , focus, axis of symmetry, and directrix. Then graph the parabola.

opens
↑

1. $(x-3)^2 = 12(y-7)$ opens toward y axis

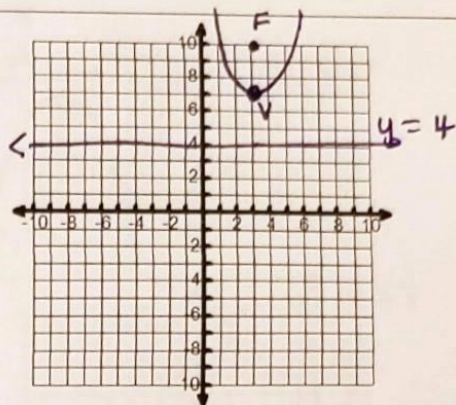
Vertex: $(3, 7)$ $(x-3)^2 = 4(3)(y-7)$

$P = 4p = 12$ $p = 3$

Axis of symmetry: $x = 3$

Focus: $(3, 10)$

Directrix: $y = 4$



opens
↓

2. $(x+1)^2 = -12(y-6)$ opens toward y axis

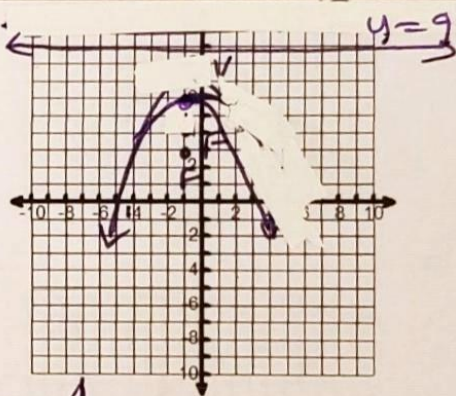
Vertex: $(-1, 6)$ $(x+1)^2 = 4(-3)(y-6)$

$P = 4p = -12$
 $p = -3$

Axis of symmetry: $x = -1$

Focus: $(-1, 3)$

Directrix: $y = 9$



opens
right

3. $(y-4)^2 = 20(x+2)$ opens toward x axis

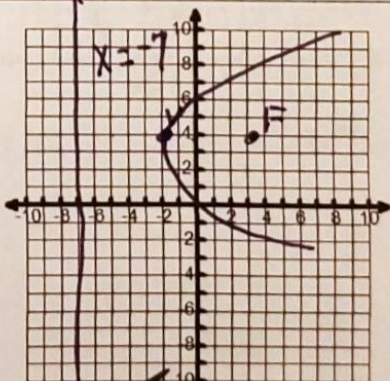
Vertex: $(-2, 4)$ $(y-4)^2 = 4(5)(x+2)$

$P = 4p = 20$ $p = 5$

Axis of symmetry: $y = 4$

Focus: $(3, 4)$

Directrix: $x = -7$



opens
right

4. $(y+5)^2 = 24(x-1)$

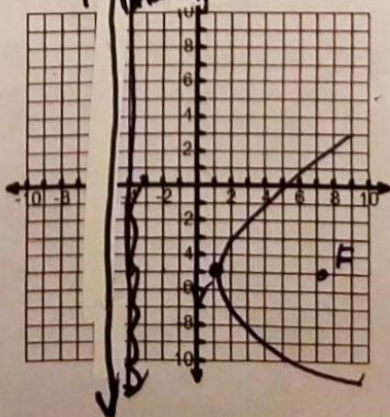
Vertex: $(1, -5)$ $(y+5)^2 = 4(6)(x-1)$

$P = 4p = 24$ $p = 6$

Axis of symmetry: $y = -5$

Focus: $(7, -5)$

Directrix: $x = -5$



5. $(x+8)^2 = -4(y+2)$ opens toward y

Vertex: $(-8, -2)$

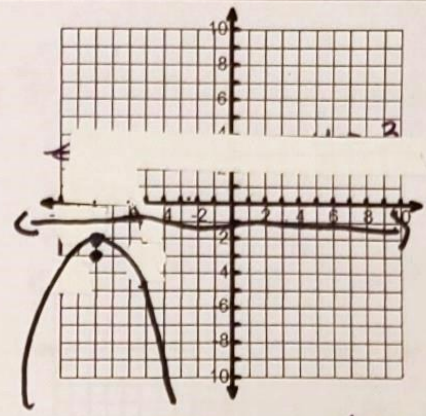
$P = 4p = -4 \quad p = -1 \quad (x+8)^2 = +4(-1)(y+2)$

Axis of symmetry: $x = -8$

Focus: $(-8, -3)$

Directrix: $y = -1$

opens
↓



6. $(y+5)^2 = -12(x-4)$ opens toward x

Vertex: $(4, -5)$

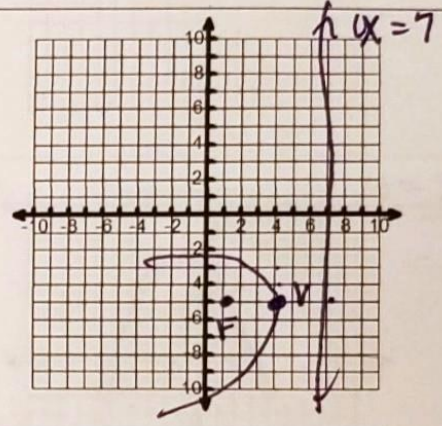
$P = 4p = -12 \quad p = -3 \quad (y+5)^2 = 4(-3)(x-4)$

Axis of symmetry: $y = -5$

Focus: $(1, -5)$

Directrix: $x = 7$

opens
left



7. $(x+3)^2 = 16(y+1)$ opens toward y

Vertex: $(-3, -1)$

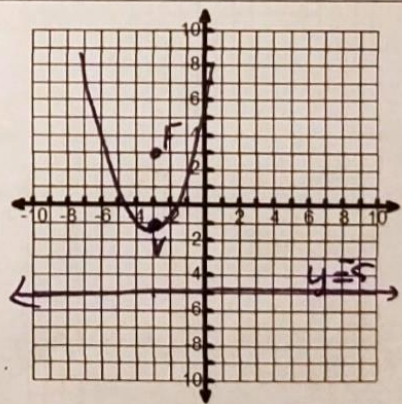
$P = 4p = 16 \quad p = 4 \quad (x+3)^2 = 4(4)(y+1)$

Axis of symmetry: $x = -3$

Focus: $(-3, 3)$

Directrix: $y = -5$

opens
up



8. $(y-1)^2 = -4(x+6)$ opens toward x

Vertex: $(-6, 1)$

$P = 4p = -4 \quad p = -1 \quad (y-1)^2 = +4(-1)(x+6)$

Axis of symmetry: $y = 1$

Focus: $(-7, 1)$

Directrix: $x = -5$

opens
left

