Parabola – Writing Equations WS Name Key

Tell whether the parabola opens up, down, left or right.

1. $x^2 = -8y$ down (neg)
2. $y^2 = 16x$ right (pos)
3. $y^2 = -24x$ left (neg)
4. $x^2 = 12y$ up (pos)
5. $\frac{-3y^2}{-3} = \frac{-18x}{-3}$ $y^2 = 6x$ right
6. $\frac{-2x^2}{-2} = \frac{22y}{-2}$ $x^2 = -11y$ down

Write the equation of each parabola in standard form.
Identify the length of the Latus Rectum and p.

7. $x^2 - 8x + 3y + 10 = 0$

$x^2 - 8x = -3y - 10$

$x^2 - 8x + 16 = -3y - 10 + 16$

$(x-4)^2 = -3y + 6$

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

$\frac{4p}{4} = \frac{-3}{4}$

length LR: 3

p= $-3/4$ $p = -\frac{3}{4}$

8. $y^2 - 2y = 3x + 5$

$y^2 - 2y + 1 = 3x + 5 + 1$

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

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

lenth of LR: 3

p= $3/4$ $\frac{4p}{4} = \frac{3}{4}$

9. $y^2 + 6y - 2x + 9 = 0$

$y^2 + 6y = 2x - 9$

$y^2 + 6y + 9 = 2x - 9 + 9$

$(y+3)^2 = 2x$

length LR: 2

p= $1/2$ $4p = 2$, $p = \frac{2}{4}$

10. $x^2 + 2x + 4y + 13 = 0$

$x^2 + 2x + 1 = -4y - 13 + 1$

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

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

lenth of LR: 4

p= -1 $4p = -4$

11. $\frac{2y^2 - 20y + 54}{2} = \frac{4x}{2}$

$y^2 - 10y + 27 = 2x$

$y^2 - 10y + 25 = 2x - 27 + 25$

$(y-5)^2 = 2x - 2$

$(y-5)^2 = 2(x-1)$

length LR: 2

p= $1/2$ $4p = 2$

12. $x^2 + 8x + 20 = y$

$x^2 + 8x + 16 = y - 20 + 16$

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

lenth of LR: 1 $4p = 1$

p= $1/4$

x - pos ↷ | y - pos ↶

x^2 Neg ↷ | y^2 Neg ↶

Write the standard form of the equation of the parabola with the given criteria

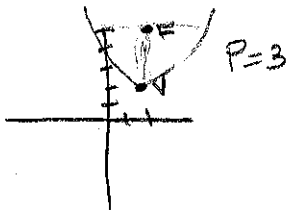
13. Vertex at (2, 2) and focus at (2, 5)

h K

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

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

$\boxed{(x-2)^2 = 12(y-2)}$

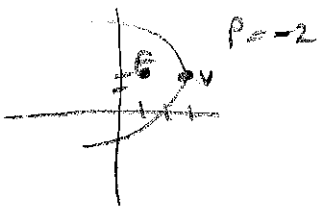


14. Vertex at (3, 2) and focus at (1, 2)

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

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

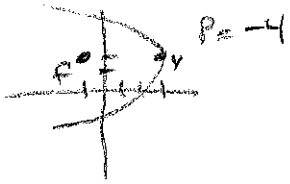
$\boxed{(y-2)^2 = -8(x-3)}$



15. Vertex at (3, 2) and focus at (-1, 2)

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

$\boxed{(y-2)^2 = -16(x-3)}$

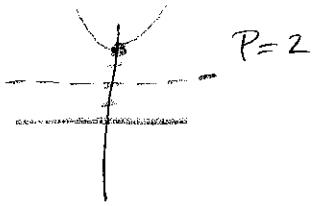


16. Vertex at (0, 4) and directrix y = 2

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

$x^2 = 4(2)(y-4)$

$\boxed{x^2 = 8(y-4)}$

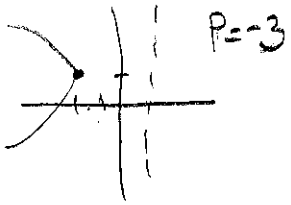


17. Vertex at (-2, 1) and directrix x = 1

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

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

$\boxed{(y-1)^2 = -12(x+2)}$

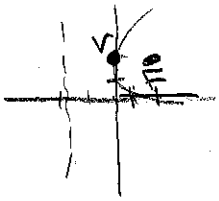


18. Focus at (2, 2) and directrix x = -2

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

$(y-2) = 4(2)(x-0)$

$\boxed{(y-2)^2 = 8x}$

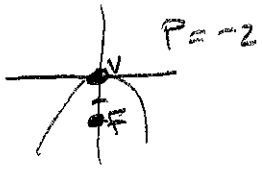


19. Vertex at (0, 0) and focus at (0, -2)

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

$(x-0)^2 = 4(-2)(y-0)$

$\boxed{x^2 = -8y}$

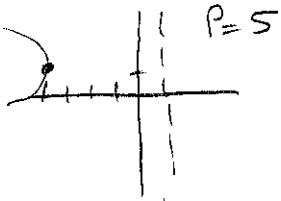


20. Vertex at (-4, 1) and directrix x = 1

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

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

$(y-1)^2 = -20(x+4)$



21. Focus at (2, 5) and directrix y = 3

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

$(x-2)^2 = 4(1)(y-4)$

$(x-2)^2 = 4(y-4)$