

$x^2/\text{pos-up}$
 $x^2/\text{neg-down}$

$y^2/\text{pos-right}$
 $y^2/\text{neg-left}$

Parabola - Writing Equations WS

Name Key

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

1. $x^2 = -8y$ d

2. $y^2 = 16x$ r

3. $y^2 = 24x$ L

4. $x^2 = 12y$ u

5. $\frac{-3y^2}{-3} = \frac{-18x}{-3}$ r

6. $\frac{-2x^2}{-2} = \frac{22y}{-2}$

$y^2 = 6x$

$x^2 = -10y$ d

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

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

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

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

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

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

length LR: 3

p = $-3/4$

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

p = $-3/4$

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

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

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

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

length of LR: 3

p = $3/4$

$4p = 3$

p = $3/4$

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 = $1/2$

p = $1/2$

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

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

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

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

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

length of LR: 4

p = -1

$4p = -4$

p = -1

11. $2y^2 - 20y + 54 = 4x$

$2y^2 - 20y = 4x - 54$

$2(y^2 - 10y + 25) = 4x - 54 + 50$

$\frac{2(y-5)^2}{2} = \frac{4x-4}{2}$

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

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

length LR: 2

p = $1/2$

$4p = 2$

p = $1/2$

p = $1/2$

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

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

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

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

length of LR: 1

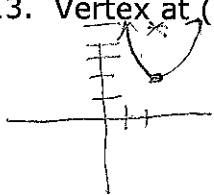
p = $1/4$

$4p = 1$

p = $1/4$

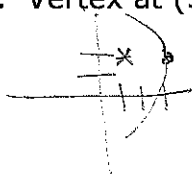
Write the standard form of the equation of the parabola with the given criteria

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



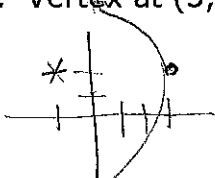
$$\begin{aligned} (x-h)^2 &= 4p(y-k) \\ (x-2)^2 &= 4(3)(y-2) \\ \boxed{(x-2)^2 &= 12(y-2)} \end{aligned}$$

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



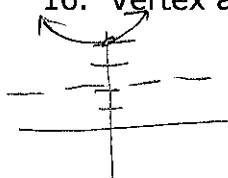
$$\begin{aligned} (y-k)^2 &= 4p(x-h) \\ (y-2)^2 &= 4(-2)(x-3) \\ \boxed{(y-2)^2 &= -8(x-3)} \end{aligned}$$

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



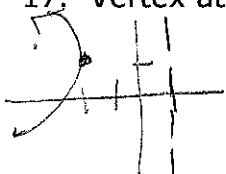
$$\begin{aligned} (y-k)^2 &= 4p(x-h) \\ (y-2)^2 &= 4(-4)(x-3) \\ \boxed{(y-2)^2 &= -16(x-3)} \end{aligned}$$

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



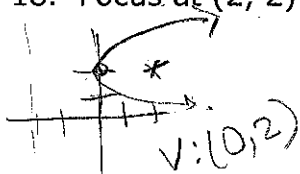
$$\begin{aligned} (x-h)^2 &= 4p(y-k) \\ (x-0)^2 &= 4(2)(y-4) \\ \boxed{x^2 &= 8(y-4)} \end{aligned}$$

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



$$\begin{aligned} (y-k)^2 &= 4p(x-h) \\ (y-1)^2 &= 4(-3)(x-(-2)) \\ \boxed{(y-1)^2 &= -12(x+2)} \end{aligned}$$

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



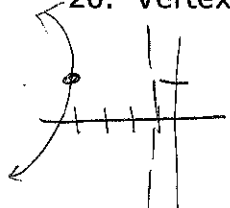
$$\begin{aligned} (y-k)^2 &= 4p(x-h) \\ (y-2)^2 &= 4(2)(x-0) \\ \boxed{(y-2)^2 &= 8x} \end{aligned}$$

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



$$\begin{aligned} (x-h)^2 &= 4p(y-k) \\ (x-0)^2 &= 4(-2)(y-0) \\ \boxed{x^2 &= -8y} \end{aligned}$$

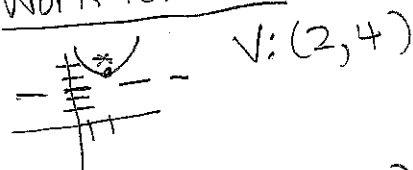
20. Vertex at (-4, 1) and directrix $x = 1$



$$\begin{aligned} (y-k)^2 &= 4p(x-h) \\ (y-1)^2 &= 4(-5)(x-(-4)) \\ \boxed{(y-1)^2 &= -20(x+4)} \end{aligned}$$

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

WORK for # 21



$$\begin{aligned} (x-h)^2 &= 4p(y-k) \\ (x-2)^2 &= 4(1)(y-4) \\ \boxed{(x-2)^2 &= 4(y-4)} \end{aligned}$$