

# HW: Worksheet Review Parabolas

9)  $y = -\frac{1}{4}x^2$

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

11)  $x = -\frac{1}{8}y^2$

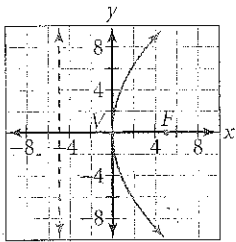
12)  $y-2 = -\frac{1}{8}(x-2)^2$

13)  $x-1 = -\frac{1}{8}(y-2)^2$

14)  $y+2 = \frac{1}{8}(x+2)^2$

17

17.



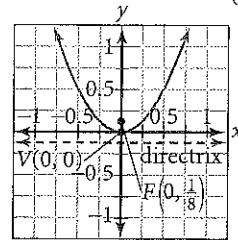
directrix

vertex: (0, 0); focus: (5, 0);

directrix:  $x = -5$

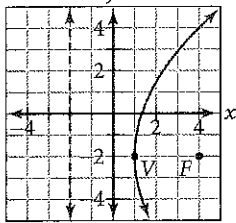
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20. vertex: (0, 0); focus:  $(0, \frac{1}{8})$ ; directrix:  $y = -\frac{1}{8}$



22

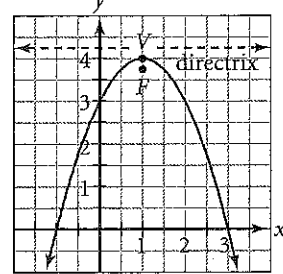
22. vertex: (1, -2); focus: (4, -2); directrix:  $x = -2$



directrix

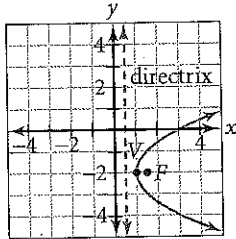
23

23. vertex: (1, 4); focus:  $(1, \frac{15}{4})$ ; directrix:  $y = \frac{17}{4}$



29

29. vertex: (1, -2); focus:  $(\frac{3}{2}, -2)$ ; directrix:  $x = \frac{1}{2}$



37)  $y = -\frac{1}{20}x^2$

41)  $x = \frac{1}{8}y^2$

43)  $y = -\frac{1}{48}x^2$

45)  $x = \frac{1}{12}y^2$

29. Rewrite  $x - 1 = \frac{1}{2}(y + 2)^2$  as  $x - 1 = \frac{1}{4\left(\frac{1}{2}\right)}[y - (-2)]^2$ .

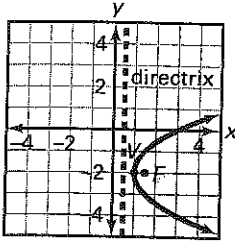
Then  $h = 1$ ,  $k = -2$ , and  $p = \frac{1}{2}$ .

Since  $p > 0$ , the parabola opens to the right.

vertex:  $(1, -2)$

focus:  $\left(\frac{3}{2}, -2\right)$

directrix:  $x = \frac{1}{2}$



30.  $x^2 + 4x - 6y = -10$

$$-6y + 10 = -x^2 - 4x$$

$$6y - 10 = x^2 + 4x$$

$$6y - 10 + 2^2 = x^2 + 4x + 2^2$$

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

$$y - 1 = \frac{1}{6}(x + 2)^2$$

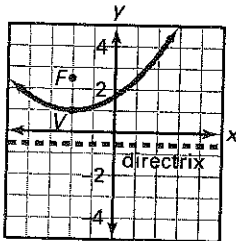
Therefore,  $h = -2$ ,  $k = 1$ , and  $\frac{1}{4p} = \frac{1}{6}$ , so  $p = \frac{3}{2}$ .

Since  $p > 0$ , the parabola opens upward.

vertex:  $(-2, 1)$

focus:  $\left(-2, \frac{5}{2}\right)$

directrix:  $y = -\frac{1}{2}$



31.  $x^2 - 6x + 10y = 1$

$$10y - 1 = -x^2 + 6x$$

$$10y - 1 - 3^2 = -(x^2 - 6x + 3^2)$$

$$10y - 10 = -(x - 3)^2$$

$$y - 1 = -\frac{1}{10}(x - 3)^2$$

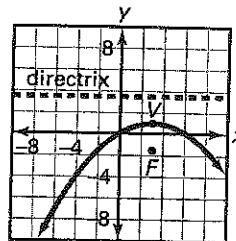
Therefore  $h = 3$ ,  $k = 1$ , and  $\frac{1}{4p} = -\frac{1}{10}$ , so  $p = -\frac{5}{2}$ .

Since  $p < 0$ , the parabola opens downward.

vertex:  $(3, 1)$

focus:  $\left(3, -\frac{3}{2}\right)$

directrix:  $y = \frac{7}{2}$



$$\begin{aligned}
 32. \quad x^2 - 8x - y + 20 &= 0 \\
 -y + 20 &= -x^2 + 8x \\
 y - 20 &= x^2 - 8x \\
 y - 20 + 4^2 &= x^2 - 8x + 4^2 \\
 y - 4 &= (x - 4)^2
 \end{aligned}$$

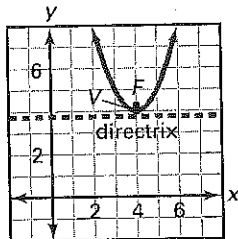
Therefore,  $h = 4$ ,  $k = 4$ , and  $\frac{1}{4p} = 1$ , so  $p = \frac{1}{4}$ .

Since  $p > 0$ , the parabola opens upward.

vertex:  $(4, 4)$

focus:  $(4, \frac{17}{4})$

directrix:  $y = \frac{15}{4}$



$$\begin{aligned}
 34. \quad 4x + y^2 - 6y &= 9 \\
 4x - 9 &= -y^2 + 6y \\
 4x - 9 - 3^2 &= -(y^2 - 6y + 3^2) \\
 4x - 18 &= -(y - 3)^2 \\
 x - \frac{9}{2} &= -\frac{1}{4}(y - 3)^2
 \end{aligned}$$

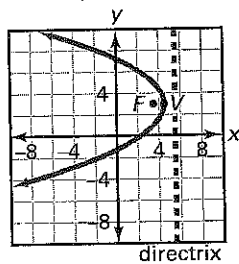
Therefore,  $h = \frac{9}{2}$ ,  $k = 3$ , and  $\frac{1}{4p} = -\frac{1}{4}$ , so  $p = -1$ .

Since  $p < 0$ , the parabola opens to the left.

vertex:  $(\frac{9}{2}, 3)$

focus:  $(\frac{7}{2}, 3)$

directrix:  $x = \frac{11}{2}$



$$\begin{aligned}
 33. \quad 4x + y^2 + 3y &= -5 \\
 4x + 5 &= -y^2 - 3y \\
 4x + 5 - (\frac{3}{2})^2 &= -[y^2 + 3y + (\frac{3}{2})^2] \\
 4x + \frac{11}{4} &= -(y + \frac{3}{2})^2 \\
 x + \frac{11}{16} &= -\frac{1}{4}(y + \frac{3}{2})^2
 \end{aligned}$$

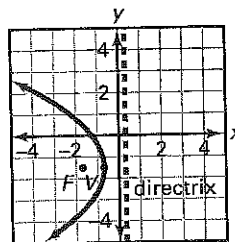
Therefore,  $h = -\frac{11}{16}$ ,  $k = -\frac{3}{2}$ , and  $\frac{1}{4p} = -\frac{1}{4}$ , so  $p = -1$ .

Since  $p < 0$ , the parabola opens to the left.

vertex:  $(-\frac{11}{16}, -\frac{3}{2})$

focus:  $(-\frac{27}{16}, -\frac{3}{2})$

directrix:  $x = \frac{5}{16}$



$$\begin{aligned}
 35. \quad -14x + 2y^2 - 8y &= 20 \\
 -14x - 20 &= -2y^2 + 8y \\
 7x + 10 &= y^2 - 4y \\
 7x + 10 + 2^2 &= y^2 - 4y + 2^2 \\
 7x + 14 &= (y - 2)^2 \\
 x + 2 &= \frac{1}{7}(y - 2)^2
 \end{aligned}$$

Therefore,  $h = -2$ ,  $k = 2$ , and  $\frac{1}{4p} = \frac{1}{7}$ , so  $p = \frac{7}{4}$ .

Since  $p > 0$ , the parabola opens to the right.

vertex:  $(-2, 2)$

focus:  $(-\frac{1}{4}, 2)$

directrix:  $x = -\frac{15}{4}$

