#9 Pre-Calculus Worksheet
WS Intro to Conics and Parabolas

Name: Key
Period: _____

Identify each conic section.

1. $(x-2)^2+(y+1)^2=14$ circle	2. $y=(x-2)^2-5$ parabola	3. $\frac{(x-2)^2}{14}+\frac{(y+1)^2}{25}=1$ ellipse
4. $4(x-2)^2+7(y+1)^2=14$ ellipse	5. $\frac{(x-2)^2}{14}-\frac{(y+1)^2}{25}=1$ hyperbola	6. $\frac{(x-2)^2}{4}-\frac{(y+1)^2}{4}=1$ hyperbola
7. $x^2-9y^2+2x+126y+43=0$ hyperbola	8. $x^2-18y+12x=126$ parabola	9. $x^2+9y^2+2x+126y+433=0$ ellipse
10. $9x^2+9y^2+2x+y+3=0$ circle	11. $6x^2-6y^2+2x+16y+3=0$ hyperbola	12. $3y^2-60x+2y-24=0$ parabola

Identify the conic section. Then rewrite in standard form by completing the square.

13. $2x^2+2y^2+8x-12y-24=0$ circle

$x^2+y^2+4x-6y-12=0$

$(x^2+4x+\underline{2^2})+(y^2-6y+\underline{3^2})=12+4+9$

$(x+2)^2+(y-3)^2=25$

14. $3x^2+12x-5y+7=0$ parabola

$(3x^2+12x+\_\_)+7-\_\_=5y$

$3(x^2+4x+\underline{2^2})+7-\underline{12}=5y$

$\frac{3(x+2)^2-5}{5}=\frac{5y}{5}$

$\frac{3}{5}(x+2)^2-1=y$

15. $4y^2-9x^2+16y+18x-29=0$ hyperbola

$(4y^2+16y+\_\_)+(-9x^2+18x+\_\_)=29+\_\_+\_\_$

$4(y^2+4y+\underline{2^2})-9(x^2-2x+\underline{1^2})=29+16+\underline{\quad}$

$4(y+2)^2-9(x-1)^2=36$

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

16. $4x^2+9y^2-48x+72y+144=0$ ellipse

$(4x^2-48x+\_\_)+(9y^2+72y+\_\_)=-144+\_\_+\_\_$

$4(x^2-12x+\underline{6^2})+9(y^2+8y+\underline{4^2})=-144+\underline{144}+\underline{144}$

$4(x-6)^2+9(y+4)^2=144$

$\frac{(x-6)^2}{36}+\frac{(y+4)^2}{16}=1$

Rewrite the parabola in vertex form. Then find the requested info and graph.

17. $x=\frac{1}{4}(y+3)^2+2$

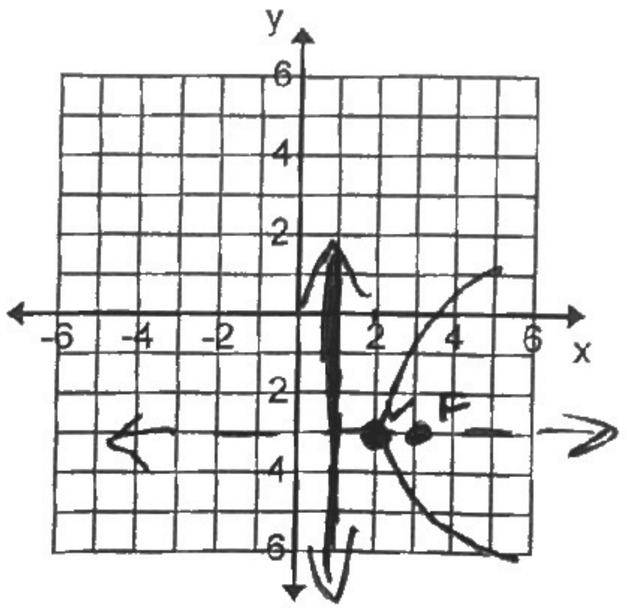
Vertex: $(2,-3)$

Axis of Symmetry: $y=-3$

Focus: $(3,-3)$

Directrix: $x=1$

$\frac{1}{4}=\frac{1}{4p}$ $p=1$



18. $x^2-2x+4y+13=0$

$(x^2-2x+\underline{1^2})+13-1=4y$

$\frac{(x-1)^2+12}{4}=\frac{4y}{4}$

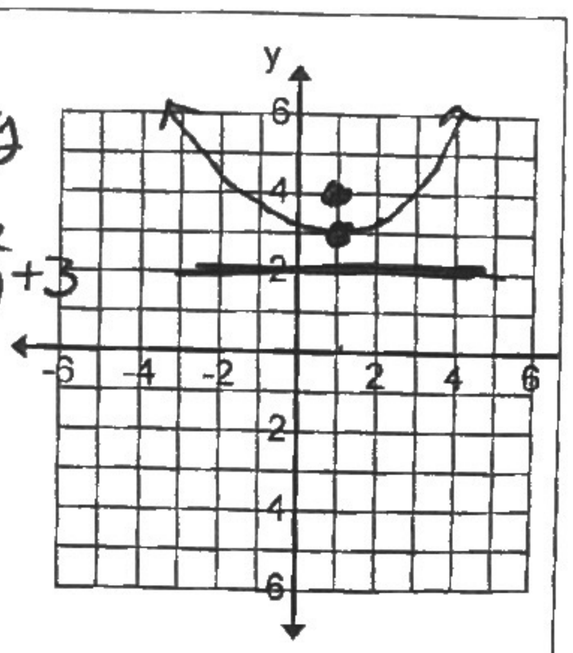
$y=\frac{1}{4}(x-1)^2+3$

Vertex: $(1,3)$

Axis of Symmetry: $x=1$

Focus: $(1,4)$

Directrix: $y=2$



19. $y^2+2x+4y+2=0$

$(y^2+4y+\underline{2^2})+2-\underline{4}=-2x$

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

Vertex: (1, −2)

Axis of Symmetry: $y=-2$

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

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

Directrix: $x=1.5$

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

$4p=2$

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

20. $x^2-18x+12y=126$

$(x^2-18x+\underline{9^2})-126=-12y$ (−81)

$\frac{(x-9)^2-207}{-12}=\frac{-12y}{-12}$

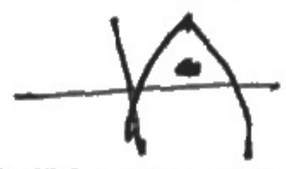
Vertex: (9, 17.25)

Axis of Symmetry: $x=9$

Focus: (9, 14.25)

Directrix: $y=20.25$

$y=-\frac{1}{12}(x-9)+17.25$

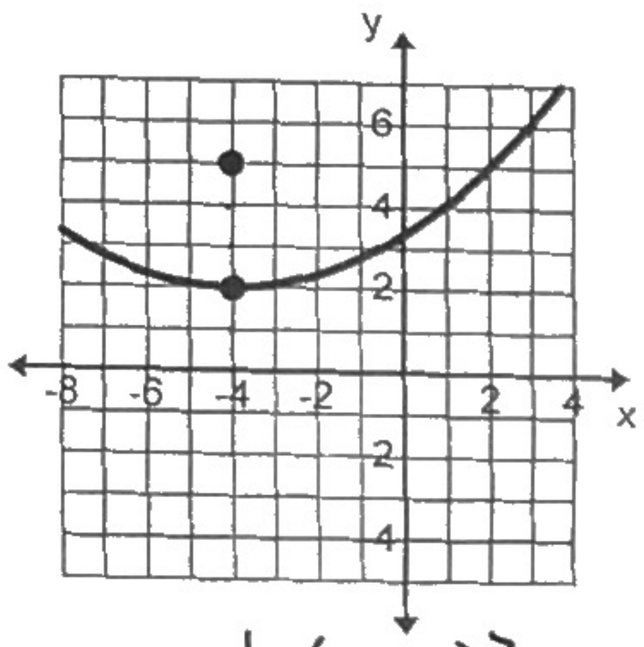


$\frac{1}{12}=\frac{1}{4p}$

$4p=12$ $p=3$

Write each parabola's equation in STANDARD FORM ($y=a(x-h)^2+k$ or $x=a(y-k)^2+h$)

21.



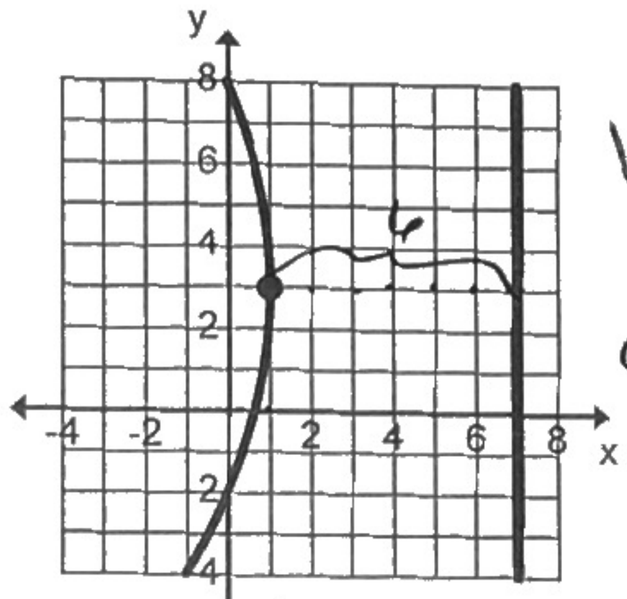
V: (−4, 2)

$p=3$

$a=\frac{1}{12}$

$y=\frac{1}{12}(x+4)^2+2$

22.



V: (1, 3)

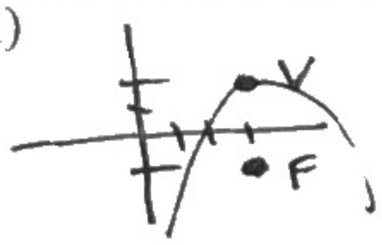
$p=6$

$a=-\frac{1}{24}$

$x=-\frac{1}{24}(y-3)^2+1$

23. Vertex (3, 2) and Focus (3, −1)

$y=-\frac{1}{12}(x-3)^2+2$

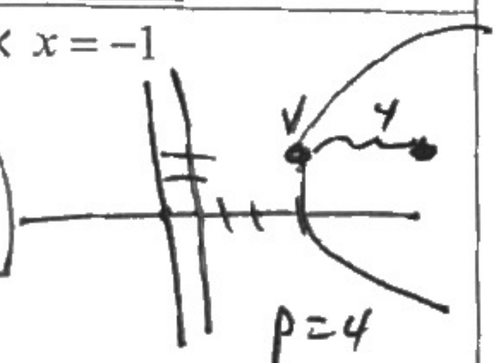


$p=3$

$a=\frac{1}{12}$

24. Vertex (3, 2) and Directrix $x=-1$

$x=\frac{1}{16}(y-2)^2+3$

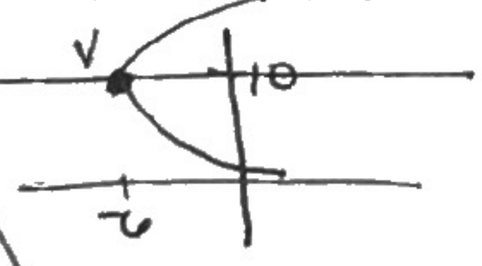


$p=4$

$a=\frac{1}{16}$

25. Vertex (−6, 10), an axis of symmetry of $y=10$ and $p=4$ (open ?)

$a=\frac{1}{16}$



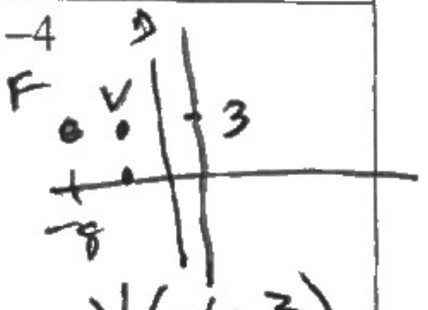
$x=\frac{1}{16}(y-10)^2-6$

OR

$x=-\frac{1}{16}(y-10)^2-6$

26. Focus (−8, 3) and Directrix $x=-4$

$x=-\frac{1}{8}(y-3)^2-6$



V(−6, 3)

$p=2$

$a=\frac{1}{8}$

27. Which point on the parabola is closest to the focus? Explain your reasoning.

Vertex

28. Without graphing, determine the quadrants in which the graph $x=-1/8(y-5)^2+2$ will have NO points. Explain your reasoning.

QIV