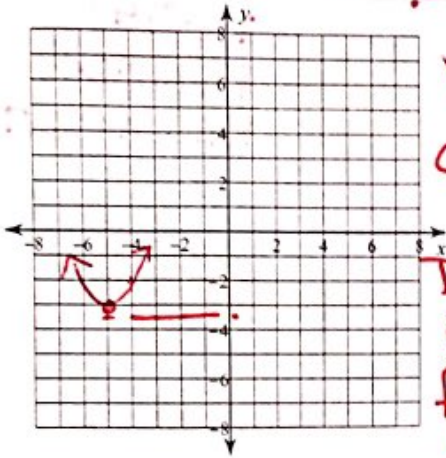


Conics Study Guide

Graph the following conic sections. Find all applicable information.

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

Parabola



$V(-5, -3)$

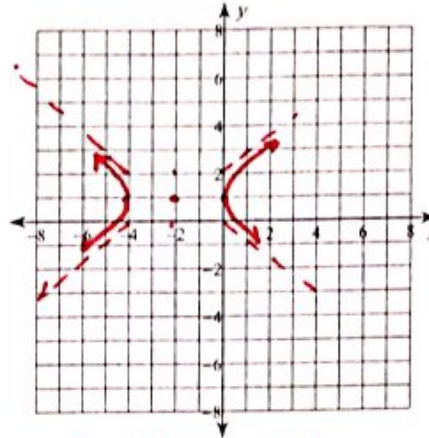
$C = \frac{1}{4}(1) = \frac{1}{4}$

Directrix $y = -2\frac{1}{4}$

focus $(-5, -2\frac{3}{4})$

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

hyperbola



$V(-2, 1)$

$a = 2$
 $b = 1$

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

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

$y = \frac{1}{2}x + 2$

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

$y - 1 = -\frac{1}{2}x - 1$

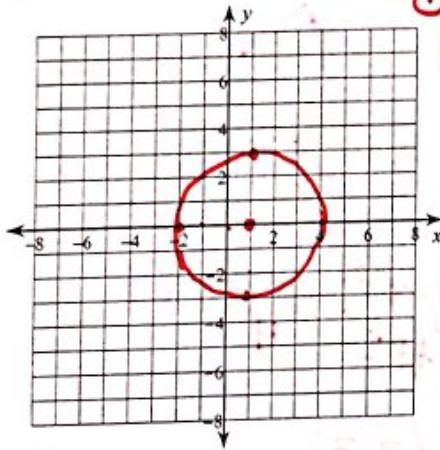
$y = -\frac{1}{2}x + 0$

$f: C^2 = 4 + 1 = 5$
 $C = \sqrt{5}$

$(-2 \pm \sqrt{5}, 1)$

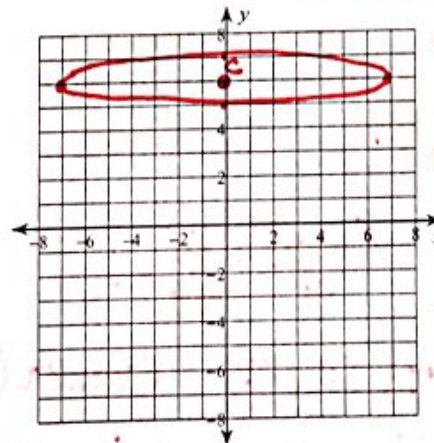
3) $(x - 1)^2 + y^2 = 9$

Circle
 $C(1, 0)$
 $r = 3$



4) $\frac{x^2}{49} + (y - 6)^2 = 1$

ellipse
 $C(0, 6)$
 $a = 7$ $b = 1$



$C^2 = 48$
 $C = 4\sqrt{3}$

Major: $y = 6$

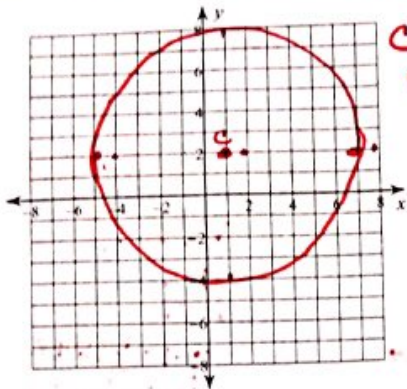
Minor: $x = 0$

$f(0 \pm 4\sqrt{3}, 6)$

Circle

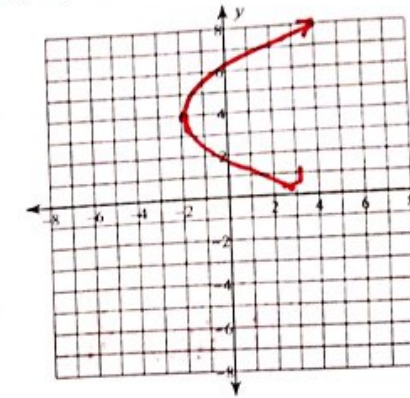
5) $x^2 + y^2 - 2x - 4y - 11 = 0$

$x^2 - 2x + 1 + y^2 - 4y + 4 = 11 + 1 + 4$
 $(x-1)^2 + (y-2)^2 = 16$



C(1,2)
r=6

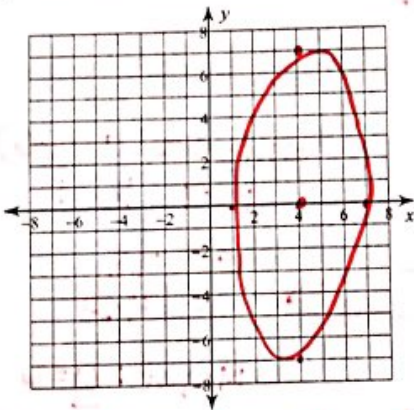
Parabola



$y = \frac{1}{3}(y-4)^2 - 2$
 V(-2,4)
 F(-1.25,4)
 Dir: X=-2.75

7) $49x^2 + 9y^2 - 392x + 343 = 0$

ellipse

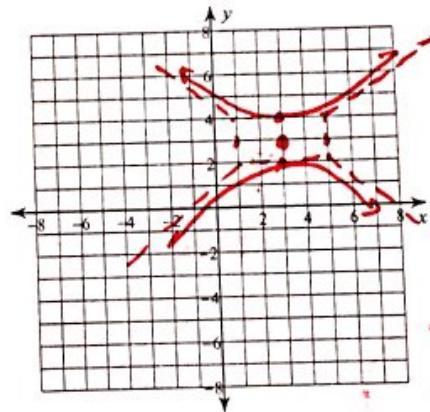


$\frac{(x-4)^2}{9} + \frac{y^2}{49} = 1$

V(4,7) (4,-7) Center(4,0)
 CoV: (7,0) (1,0) f(4, ±2√10)
 Max: x=4 (4, 2√10)
 Min y=0 (4, -2√10)

8) $-x^2 + 4y^2 + 6x - 24y + 23 = 0$

hyperbolz



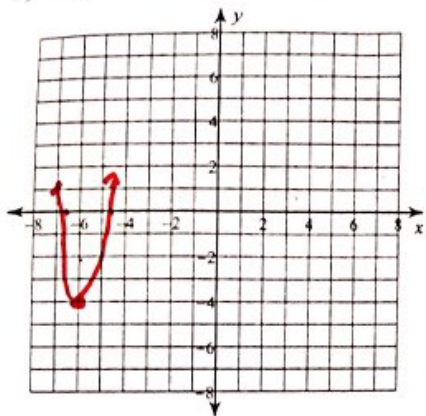
$\frac{(y-3)^2}{1} - \frac{(x-3)^2}{4} = 1$

C(3,3)
 V(3,4) (3,2)
 F(3, 3±√5)

asy:
 $y = \frac{1}{2}x + 1.5$
 $y = -\frac{1}{2}x + 4.5$

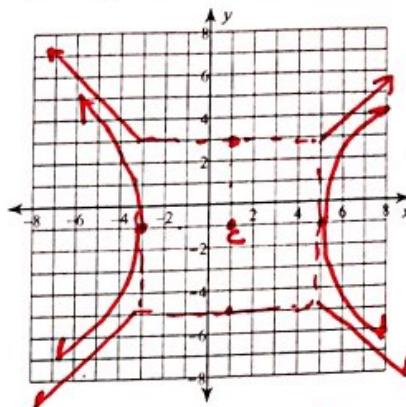
Parabola

9) $-3x^2 - 36x + y - 104 = 0$



$y = 3(x+6)^2 - 4$
 V(-6, -4)
 f(-6, -47/12)
 Dir $y = -49/12$

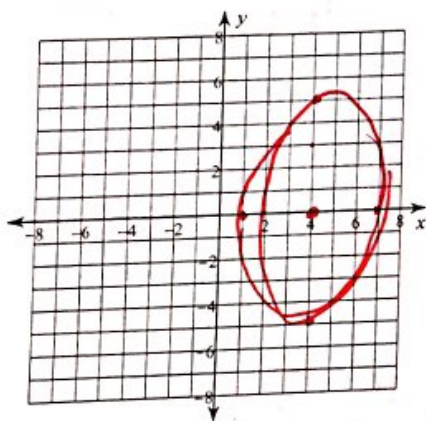
10) $x^2 - y^2 - 2x - 2y - 16 = 0$



hyperbola
 c(1, -1)
 v(5, -1)
 (-3, -1)
 f(1 ± 4√2, -1)
 Asy: $y = x - 2$
 $y = x$

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

11) $25x^2 + 9y^2 - 200x + 175 = 0$ ellipse



$\frac{(x-4)^2}{9} + \frac{(y)^2}{25} = 1$

c(4, 0)
 v(4, 5)(4, -5)
 f(4, 4)(4, -4)
 Max $x = 7$
 Min $y = 0$
 COV: (7, 0)(1, 0)

Use the information provided to write the standard form equation of each circle.

12) Center: (10, 16)
 Point on Circle: (11, 15)

$(x-10)^2 + (y-16)^2 = 2$

13) Center: (-10, -10)
 Radius: 5

$(x+10)^2 + (y+10)^2 = 25$

Use the information provided to write the vertex form equation of each parabola.

14) Vertex: $(8, 0)$, Focus: $(8, \frac{1}{12})$

$$y = 3(x-8)^2$$

15) Vertex: $(-1, 5)$, Directrix: $x = -\frac{15}{16}$

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

Use the information provided to write the standard form equation of each hyperbola.

16) Vertices: $(-3, -3), (-3, -11)$
 Foci: $(-3, -7 + \sqrt{137}), (-3, -7 - \sqrt{137})$

$$\frac{(y+7)^2}{16} - \frac{(x+3)^2}{121} = 1$$

17) Vertices: $(-3, 7), (-3, -11)$

Asymptotes: $y = \frac{9}{7}x + \frac{13}{7}$

$y = -\frac{9}{7}x - \frac{41}{7}$

$$\frac{(y+2)^2}{81} - \frac{(x+3)^2}{49} = 1$$

Use the information provided to write the standard form equation of each ellipse.

18) Vertices: $(5, 8), (-13, 8)$
 Foci: $(-4 + \sqrt{65}, 8), (-4 - \sqrt{65}, 8)$

$$\frac{(x+4)^2}{81} + \frac{(y-8)^2}{46} = 1$$

19) Center: $(7, 3)$
 Vertex: $(0, 3)$
 Focus: $(7 + 3\sqrt{5}, 3)$

$$\frac{(x-7)^2}{49} + \frac{(y-3)^2}{4} = 1$$