Review Assorted Conics 2
Circles, Ellipses, Hyperbolas & Parabolas

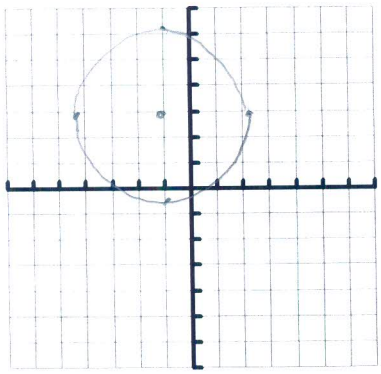
Name Fuston

1. Graph and provide the requested information:

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

c = (-1, 3)

r = $\sqrt{10}$



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

c = 4

c = (2, 0)

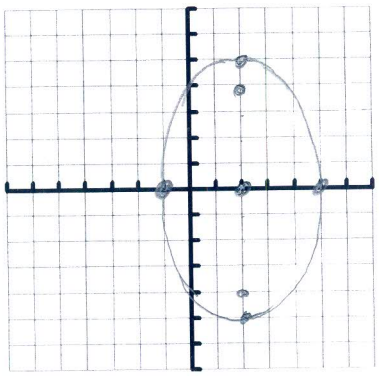
v = (2, 5) (2, -5)

cv = (-1, 0) (5, 0)

f = (2, 4) (2, -4)

major axis length = 10

minor axis length = 6



c. $16x^2-9y^2=144$

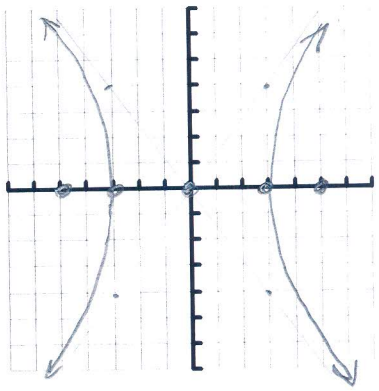
$\frac{x^2}{9}-\frac{y^2}{16}=1$

c = (0, 0)

v = (-3, 0) (3, 0)

f = (-5, 0) (5, 0)

asymptotes = $y=\pm\frac{4}{3}x$



d. $\frac{(y-2)^2}{25}-\frac{(x+3)^2}{4}=1$

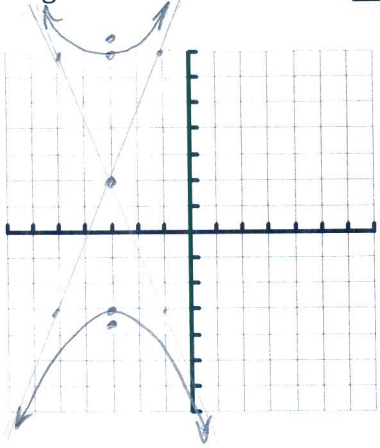
c = (-3, 2)

v = (-3, 7) (-3, -3)

f = $(-3, 2\pm\sqrt{29})$

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

length of transverse axis = 10



e. $(x+4)+(y-2)^2=0$

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

v = (-4, 2)

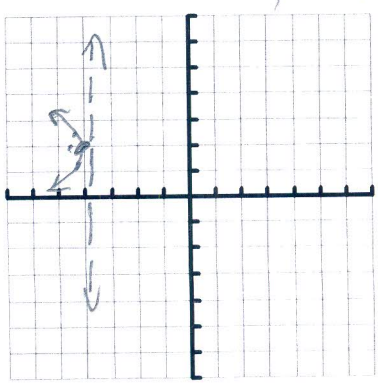
$4p=1$

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

f = $(-4\frac{1}{2}, 2)$

directrix = $x=-3\frac{3}{4}$

e of LR = $(-4\frac{1}{2}, 1\frac{1}{2})(-4\frac{1}{2}, 2\frac{1}{2})$



f. $4(y-1)^2=16(x-5)$

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

v = (5, 1)

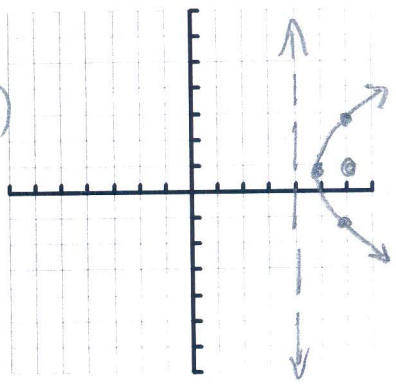
$4p=4$

$p=1$

f = (6, 1)

directrix = $x=4$

e of LR = (6, 3) (6, -1)



2. Name the conic and write it in standard form:

a. $x^2 + y^2 - 6x - 2y + 1 = 0$

Circle

$(x^2 - 6x + 9) + (y^2 - 2y + 1) = -1 + 1 + 9$

$\boxed{(x-3)^2 + (y-1)^2 = 9}$

b. $6x^2 - 12 = 6y^2$

hyperbola

$6x^2 - 6y^2 = 12$

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

$(9x^2 + 54x\ \ ) + (4y^2 - 16y\ \ ) = -61$

$9(x^2 + 6x + 9) + 4(y^2 - 4y + 4) = -61 + 81 + 16$

$9(x+3)^2 + 4(y-2)^2 = 36$

c. $9x^2 + 4y^2 + 54x - 16y + 61 = 0$

Ellipes

$\boxed{\frac{(x+3)^2}{4} + \frac{(y-2)^2}{9} = 1}$

d. $9x^2 - 4y^2 + 36x - 8y - 40 = 0$

hyperbola

$9x^2 + 36x - 4y^2 - 8y = 40$

$9(x^2 + 4x + 4) - 4(y^2 + 2y + 1) = 40 + 36 - 4$

$9(x+2)^2 - 4(y+1)^2 = 72$

$\boxed{\frac{(x+2)^2}{8} - \frac{(y+1)^2}{18} = 1}$

e. $x^2 + x - y = 5$

parabola

$x^2 + x = y + 5$

$x^2 + x + \frac{1}{4} = y + 5 + \frac{1}{4}$

$\boxed{(x + \frac{1}{2})^2 = y + 5\frac{1}{4}}$

3. Write the standard form of the given conic using the given information:

a. circle with center (–2, 3) and diameter 8

$r = 4$

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

b. horizontal ellipse with center at (3, –4); major axis length 8; minor axis length 4

$\boxed{\frac{(x-3)^2}{16} + \frac{(y+4)^2}{4} = 1}$

c. circle with center (1, 4) and passes through (2, –1)

$r = \sqrt{(2-1)^2 + (-1-4)^2} = \sqrt{1+25} = \sqrt{26}$

$\boxed{(x-1)^2 + (y-4)^2 = 26}$

d. hyperbola with vertices (1, 2) and (5, 2) and the slope of one asymptote is $\frac{3}{2}$

horizontal

$\frac{y}{x} = \frac{3}{2}$

$\boxed{\frac{(x-3)^2}{4} - \frac{(y-2)^2}{9} = 1}$

e. ellipse with vertices at (2, 1) and (6, 1); co-vertices at (4, 2) and (4, 0)

$c(4,1)$ horizontal $\quad b = 1$

$a = 2$

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

f. hyperbola with vertices $(0, \pm 2)$ and foci $(0, \pm 4)$

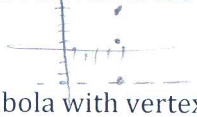
$16 - 4$

$b = \sqrt{12}$

$C(0,0)$

$\boxed{\frac{y^2}{4} - \frac{x^2}{12} = 1}$

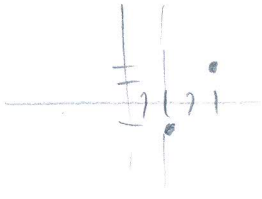
g. parabola with focus (5, 5), directrix: $y = -3$



$V: (5,1)$

$\boxed{(x-5)^2 = 16(y-1)}$

h. parabola with vertex (2, -1), passes through (4, 2), $p > 0$, axis of symmetry: $x = 2$



Plug in and solve for p

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

$(4-2)^2 = 4p(2+1)$

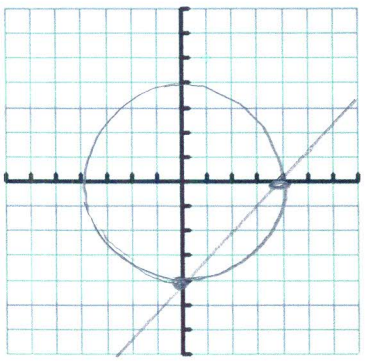
$4 = 12p \quad p = \frac{1}{3}$

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

4. Solve the systems of equations by graphing.

a. $x^2 + y^2 = 16$

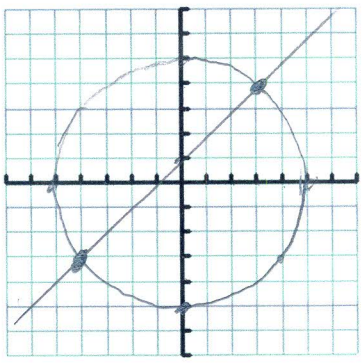
$x - y = 4$ $\quad y = x - 4$



(0, −4) (4, 0)

b. $x^2 + y^2 = 25$

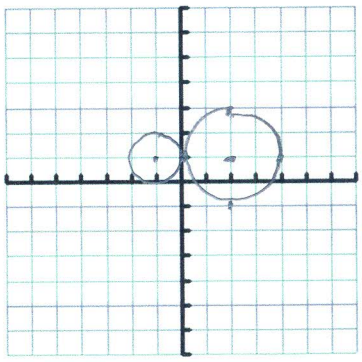
$y = x + 1$



(−4, −3) (3, 4)

* c. $(x + 1)^2 + (y - 1)^2 = 1$

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



(0, 1)

5. Solve the systems algebraically.

a. $x^2 + y^2 = 5$

$y = -x + 3$

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

$x^2 + x^2 - 6x + 9 = 5$

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

$x^2 - 3x + 2 = 0$

$(x-2)(x-1) = 0$

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

(2, 1) (1, 2)

b. $x^2 - 2x + y^2 - 2y = 6$

$y = 2 - x$

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

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

$2x^2 - 4x - 6 = 0$

$x^2 - 2x - 3 = 0$

$(x-3)(x+1) = 0$

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

(3, −1) (−1, 3)

* c. $4x^2 + 9y^2 - 36y = 0$

$x^2 + 9y - 27 = 0$

$x^2 = 27 - 9y$

$4(27 - 9y) + 9y^2 - 36y = 0$

$108 - 36y + 9y^2 - 36y = 0$

$9y^2 - 72y + 108 = 0$

$y^2 - 8y + 12 = 0$

$(y-6)(y-2) = 0$

$y = 6$	$y = 2$
$x^2 = 27 - 54$	$x^2 = 27 - 18$
$x^2 = -27$	$x^2 = 9$
	$x = \pm 3$

(+3, 2) (−3, 2)