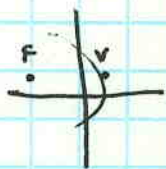


Chp 7

1. a. parabola
 $F(2,1)$ $V(-5,1)$
 h, k

$p=7$

$(y-1)^2 = 28(x+5)$



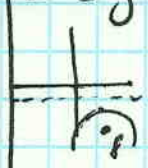
b. $dy = -1$ $F(3,5)$

$2p=4$

$p=2$

$V(3,-2)$

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



c. $dx = -1$ $V(-5,1)$ $p=4$

$(y-1)^2 = -16(x+5)$



2a. $3y^2 + 6y + 15 = 12x$

$3(y^2 + 2y + 9 - 9) = 12x - 15$

$3(y+3)^2 - 27 = 12x - 15$

$3(y+3)^2 = 12x + 12$

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

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

$V(-1, -3)$

$F(0, -3)$

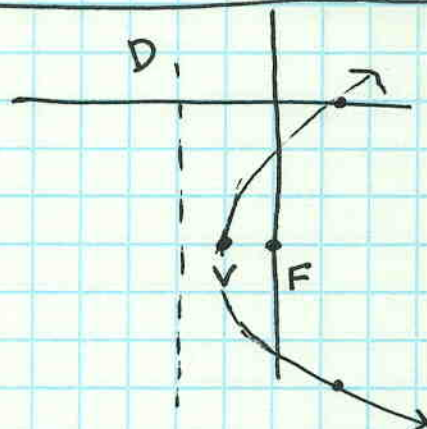
LoS $y = -3$

d $x = -2$

pt $y = 0$

$3^2 = 4x + 4$

$5 = 4x$ $x = \frac{5}{4}$



b. $8y = -4x^2 - 24x - 12$

$8y + 12 = -4(x^2 + 6x + 9 - 9)$

$8y + 12 = -4(x+3)^2 + 36$

$8y - 24 = -4(x+3)^2$

$8(y-3) = -4(x+3)^2$

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

$V(-3, 3)$

$F(-3, 2.5)$

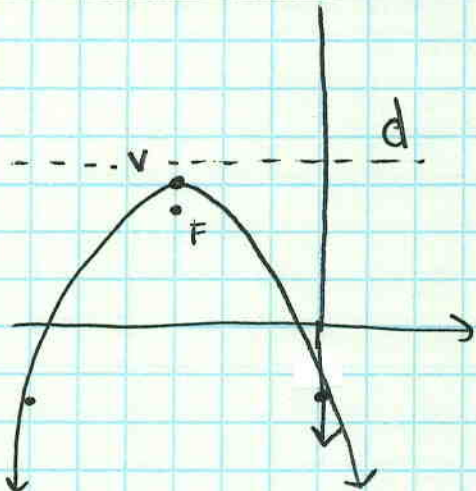
LoS $x = -3$

d $y = 3.5$

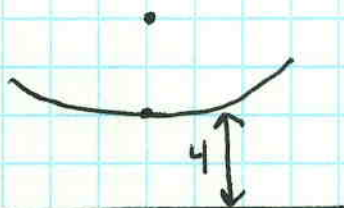
pt $x = 0$

$-2y + 6 = 9$

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



3



Receiver is 8ft off the ground.

4. a. Maj (7, -2) to (-1, -2)
Min (3, 0) to (3, -4)
center (3, -2)
a = 4 b = 2 non-vert.

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

- b. V (-2, 4) (-2, 8)
min L = 10
center (-2, 2)
a = 6 b = 5

$$\frac{(x+2)^2}{25} + \frac{(y-2)^2}{36} = 1$$

verticue

- c. F (-6, 9) (-6, -3)

Maj L = 20

Center (-6, 3)

c = 6 a = 10

$$a^2 - b^2 = c^2$$

$$100 - b^2 = 36$$

$$b = 8$$

$$\frac{(x+6)^2}{64} + \frac{(y-3)^2}{100} = 1$$

- d. V (4, 5) (4, 1)

CV (2, 3) (6, 3)

center (4, -3)

a = 6 b = 2

$$\frac{(x-4)^2}{4} + \frac{(y+3)^2}{36} = 1$$

verticue

5. R = 15 C = (6, 8)
 $(x-6)^2 + (y-8)^2 = 15^2$

- b. d = 22 center (-2, 7)
r = 11 $(x+2)^2 + (y-7)^2 = 11^2$

6. a $3x^2 + y^2 - 42x + 4y + 142 = 0$

$$3(x^2 - 14x + 49 - 49) + (y^2 + 4y + 4 - 4) = -142$$

$$3(x-7)^2 - 147 + (y+2)^2 - 4 = -142$$

$$3(x-7)^2 + (y+2)^2 = 9$$

$$\frac{(x-7)^2}{3} + \frac{(y+2)^2}{9} = 1$$

$$c^2 = 9 - 3$$

$$c^2 = 6$$

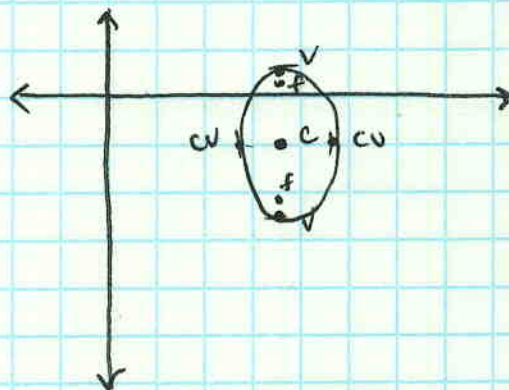
$$c = \sqrt{6}$$

center (7, -2)

Vertices (7, -5) (7, 1)

Co-Vertices (8.13, -2) (5.27, -2)

Foci (7, -4.45) (7, -1.45)



$$6b. 5x^2 + 2y^2 + 30x - 16y + 27 = 0$$

$$5(x^2 + 6x + 9 - 9) + 2(y^2 - 8y + 16 - 16) = -27$$

$$5(x+3)^2 - 45 + 2(y-4)^2 - 32 = -27$$

$$5(x+3)^2 + 2(y-4)^2 = 50$$

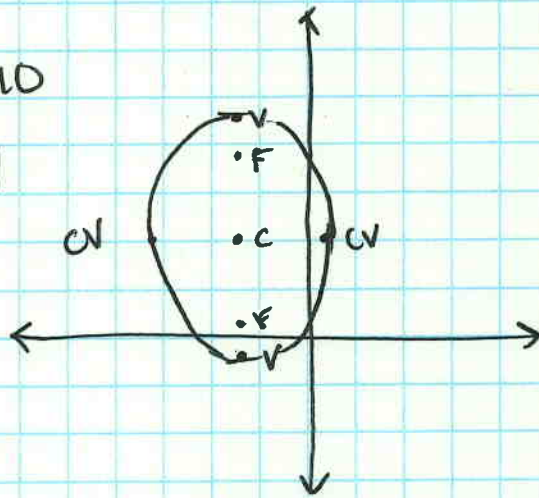
$$\frac{(x+3)^2}{10} + \frac{(y-4)^2}{25} = 1 \quad \begin{aligned} c^2 &= 25 - 10 \\ c^2 &= 15 \\ c &= 3.87 \end{aligned}$$

Center $(-3, 4)$

V $(-3, 9)$ $(-3, -1)$

CV $(-16, 4)$ $(6, 4)$

F $(-3, 7.87)$ $(-3, 0.13)$

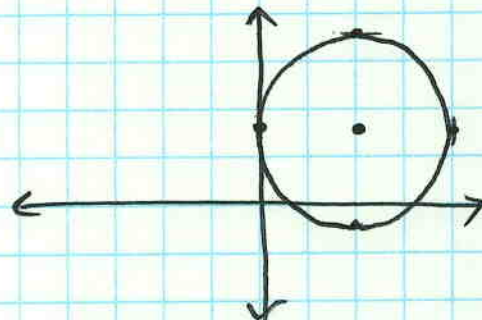


$$c. x^2 + y^2 - 8x - 6y - 39 = 0$$

$$x^2 - 8x + 16 - 16 + y^2 - 6y + 9 - 9 = +39$$

$$(x-4)^2 + (y-3)^2 = 64$$

center $(4, 3)$ $r=8$



$$7. \begin{aligned} W &= 48 \text{ cm} & 2a &= 48 & a &= 24 \\ H &= 30 \text{ cm} & 2b &= 30 & b &= 15 \end{aligned} \quad \frac{x^2}{24^2} + \frac{y^2}{15^2} = 1$$

Center $(0, 0)$

horiz

$$8. a. F(1, -5) (1, 1) \quad \begin{array}{c} \vdots \\ | \\ \text{horiz} \end{array}$$

$$TA L=4 \quad a=2$$

$$c=3$$

$$c^2 = a^2 + b^2$$

$$9 = 4 + b^2$$

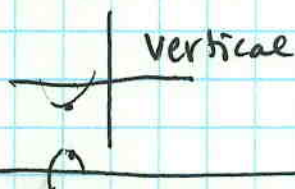
$$5 = b^2$$

$$b \approx 2.24$$

Center $(1, -2)$

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

8b. $V(-3, -12)$ $(-3, -4)$ $2a=8$ $a=4$ $c^2 = a^2 + b^2$
 $F(-3, -15)$ $(-3, 1)$ $2c=14$ $c=7$ $49 = 16 + b^2$
 center $(-3, -8)$ $33 = b^2$ $b=5.74$



$$\frac{(y+8)^2}{16} - \frac{(x+3)^2}{49} = 1$$

8c. $V(0, 3)$ $(-4, 3)$ $2a=4$ $a=2$ } $\left\{ \begin{array}{l} \text{horiz} \\ \text{CA } L=12 \end{array} \right.$
 $2b=12$ $b=6$ $\frac{(x+2)^2}{4} - \frac{(y-3)^2}{36} = 1$

9. $-x^2 + 3y^2 - 4x + 6y = 28$

$$3(y^2 + 2y + 1 - 1) - (x^2 + 4x + 4 - 4) = 28$$

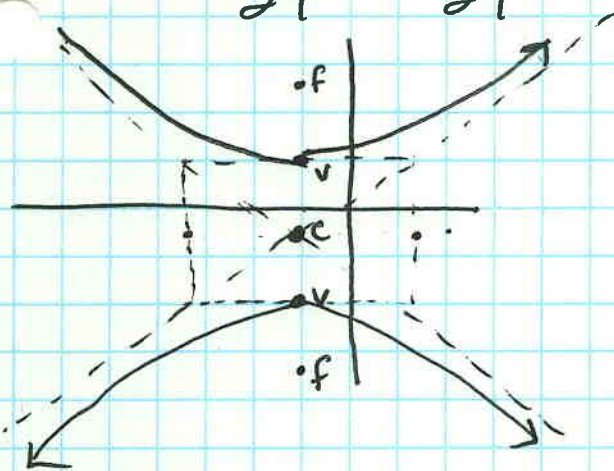
$$3(y+1)^2 - 3 - (x+2)^2 + 4 = 28$$

$$\frac{3(y+1)^2}{27} - \frac{(x+2)^2}{27} = 1$$

$$\frac{(y+1)^2}{9} - \frac{(x+2)^2}{27} = 1$$

$a^2 = 9$
 $c = 6$

$b = 5.2$



10a. $3x^2 + 12x - 2y^2 - 12y = 42$

$$3(x^2 + 4x + 4 - 4) - 2(y^2 + 6y + 9 - 9) = 42$$

$$3(x+2)^2 - 12 - 2(y+3)^2 + 18 = 42$$

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

$$\frac{(x+2)^2}{12} - \frac{(y+3)^2}{18} = 1$$

$$c^2 = 12 + 18 = 30 \quad e = \frac{\sqrt{30}}{\sqrt{12}} = 1.581$$

$$c = \sqrt{30}$$

b. $a^2 = 32$ $b^2 = 25$ $c^2 = 57$

$$e = \frac{\sqrt{57}}{\sqrt{32}} = 1.335$$

c. $a^2 = 64$ $b^2 = 36$ $c^2 = 28$

$$e = \frac{\sqrt{28}}{\sqrt{64}} = 0.661$$

11. a. $A=2$ $B=5$ $C=1$ $2x^2 + y^2 - 24x + 5xy + 13 = 0$
 $B^2 - 4AC = 25 - 4(2)(1) = 17$ $17 > 0$, hyperbola

b. $4x^2 + y^2 - 2y + 4xy + 12 = 0$ $A=4$, $B=4$, $C=1$
 $B^2 - 4AC = 16 - 4(4)(1) = 0$ parabola

c. $3x^2 + 13x + 3y^2 - 2y = 0$ $A=3$ $B=0$ $C=3$
 $B^2 - 4AC = 0 - 4(3)(3) = -36 < 0$ $A=C$ circle