

Math 131 / 4-19-17  
 homework questions

3) Vertex at  $(-1, -2)$ ; focus at  $(0, -2)$   
 We know it opens left or right since  $k$  didn't change. Since the shift was to the right (for the focus) it opens right which means  $a > 0$ .

upward or downward  
 $(x-h)^2 = 4a(y-k)$   
 Focus:  $(h, k \pm a)$   
 Directrix:  $y = k \pm a$   
 sideways  
 $(y-k)^2 = 4a(x-h)$   
 Focus:  $(h \pm a, k)$   
 Directrix:  $x = h \pm a$

$(y-k)^2 = 4a(x-h)$  and focus:  $(h+a, k)$   
 $[y-(-2)]^2 = 4a[x-(-1)]$   
 $(y+2)^2 = 4a(x+1)$  and  $(-1) + a = 0 \rightarrow a = 1$

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

4)  $x^2 + 8x = 4y - 8$   
 $x^2 + 8x + (4)^2 = 4y - 8 + (4)^2$   
 $(x+4)^2 = 4y - 8 + 16$   
 $(x+4)^2 = 4y + 8$   
 $(x+4)^2 = 4(y+2)$   
 $[x-(-4)]^2 = 4[y-(-2)]$

$h = -4, k = -2$   
 Vertex:  $(-4, -2)$

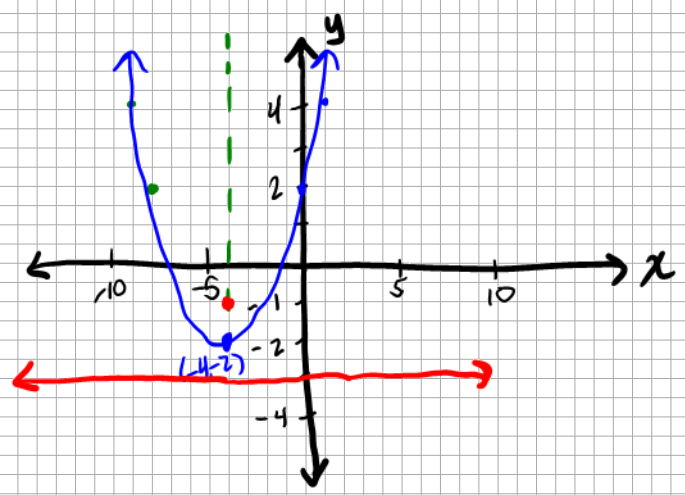
$4a = 4$   
 $a = 1$   
 focus:  $(h, k+a) = (-4, -2+1) = (-4, -1)$   
 directrix:  $y = k-a \rightarrow y = -2-1 \rightarrow y = -3$

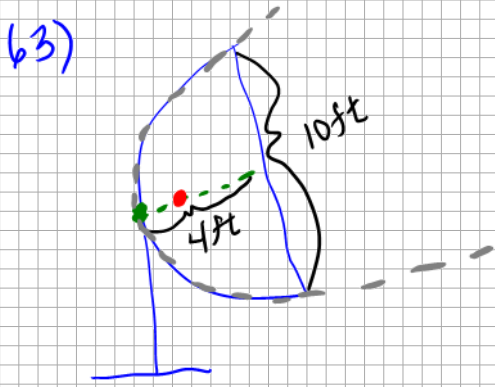
axis of symm:  $x = h \rightarrow x = -4$

Other points:  $(x+4)^2 = 4(y+2)$

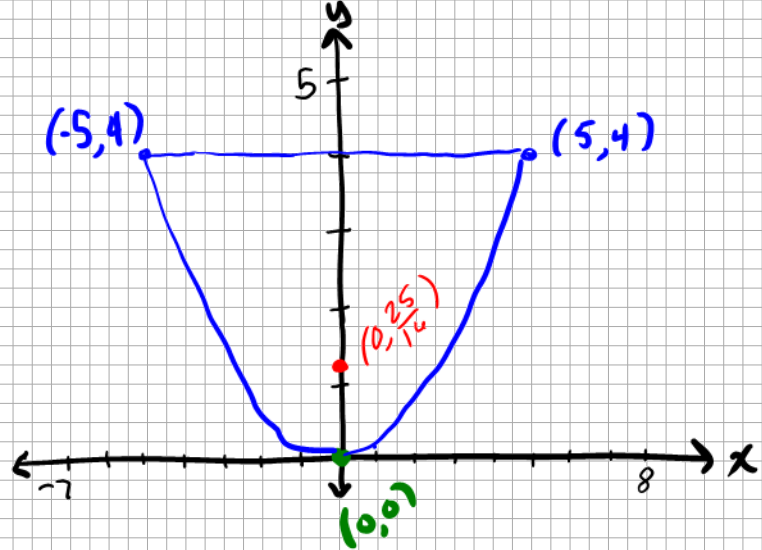
x	y
0	2
-8	2
1	4.25
-9	4.25

$25 = 4y + 8$   
 $17 = 4y$   
 $4.25 = y$





$$x^2 = 4ay$$



at  $x=5, y=4$   
 at  $x=-5, y=4$

use  $(5,4)$  to find  $a$ :

$$x^2 = 4ay$$

$$(5)^2 = 4a(4)$$

$$25 = 16a$$

$$\frac{25}{16} = a$$

$$x^2 = 4\left(\frac{25}{16}\right)y$$

$$x^2 = \frac{25}{4}y$$

The receiver should be placed  $1\frac{9}{16}$  ft from the base.