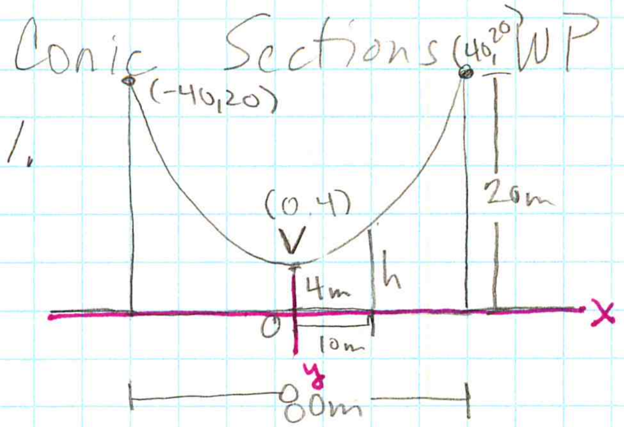
Conic Sections WP

1\.



Find h when $x = 10m$

Equation: $(x-0)^2 = 4p(y-4)$

to find p, use a point (40,20)

$(40)^2 = 4p(20-4)$

$\frac{1600}{16\cdot 4} = \frac{4p\cdot 16}{16\cdot 4}$

$p = 25$

$\boxed{x^2 = 100(y-4)^2}$

@ $x = 10$

$100 = 100(y-4)^2$

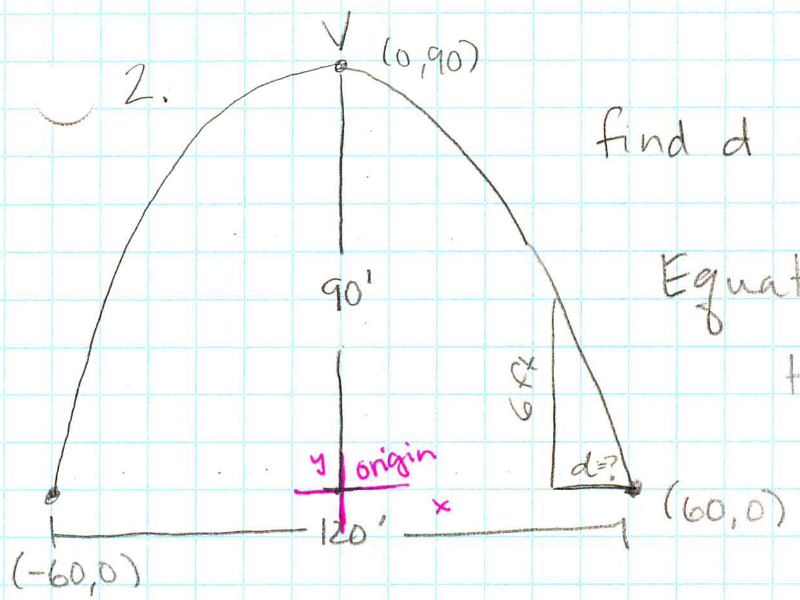
$1 = (y-4)^2$

$y - 4 = 1$

$y = 5m$

The main cable is 5 m high 10 m from the center.

2\.



find d when $y = 6$ ft

Equation: $(x-0)^2 = 4p(y-90)$

to find p, use a point (60,0)

$(60)^2 = 4p(0-90)$

$3600 = -360p$

$p = -10$

$\boxed{x^2 = -40(y-90)}$

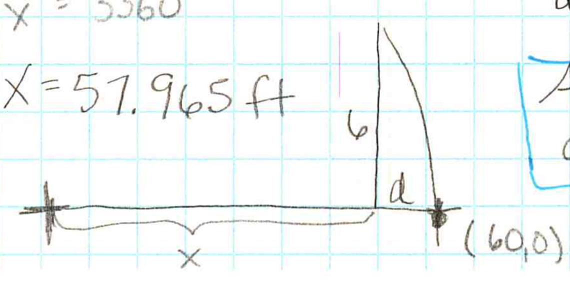
@ $y = 6$

$x^2 = -40(6-90)$

$x^2 = -40(-84)$

$x^2 = 3360$

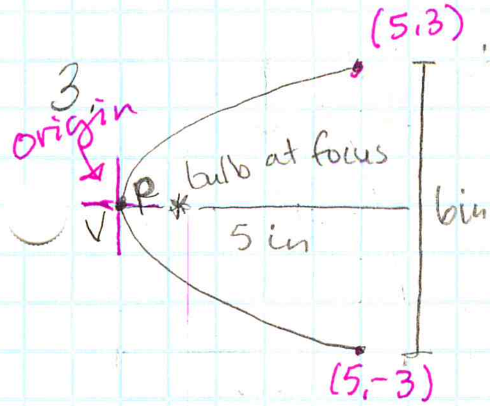
$x = 57.965$ ft



$d = 60 - x \approx 2.03$ ft

A 6-ft tall person must stand at least 2.03 ft from the door edge.

3.



find p.

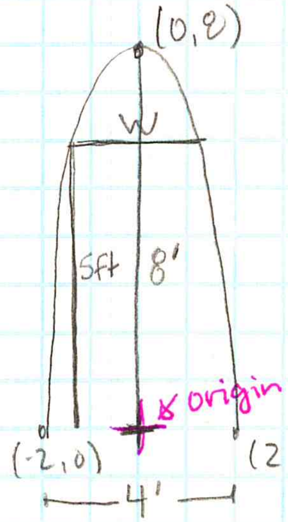
Equation: $y^2 = 4px$

use a pt to find p. (5,3)

$9 = 4p \cdot 5 \qquad p = \frac{9}{20}$ in

The bulb should be placed $\frac{9}{20}$ in (.45 in) from the vertex.

4.



Find width (w) when y=5'.

Equation: $(x-0)^2 = 4p(y-8)$

use a point to find p (2,0)

$(2)^2 = 4p(-8)$

$p = \frac{4}{-8 \cdot 4} = -\frac{1}{8}$

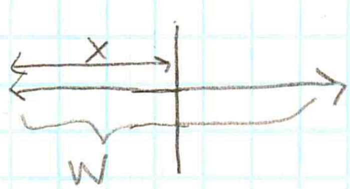
$$\boxed{x^2 = -\frac{1}{2}(y-8)}$$

@ y=5'

$x^2 = -\frac{1}{2}(5-8)$

$x^2 = \frac{3}{2}$ ft

$x = \sqrt{\frac{3}{2}}$ ft

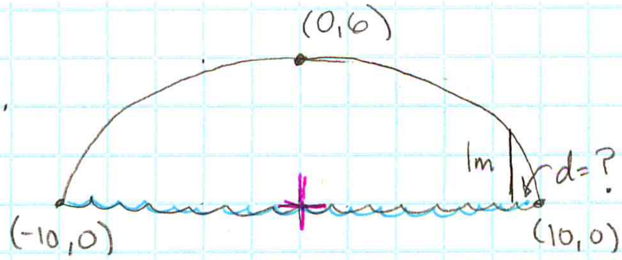


The door is about 2.449 ft wide when it is 5 ft high.

$W = 2x$

$W = 2\left(\sqrt{\frac{3}{2}}\right) \approx 2.449$ ft

5.



find d when y = 1m

Equation: $\frac{x^2}{100}+\frac{y^2}{36}=1$

@ y=1

$$\frac{x^2}{100}+\frac{1}{36}=1$$

$$\frac{x^2}{100}=\frac{35}{36}$$

$$x^2=\frac{3500}{36}\approx 97.\overline{2}$$

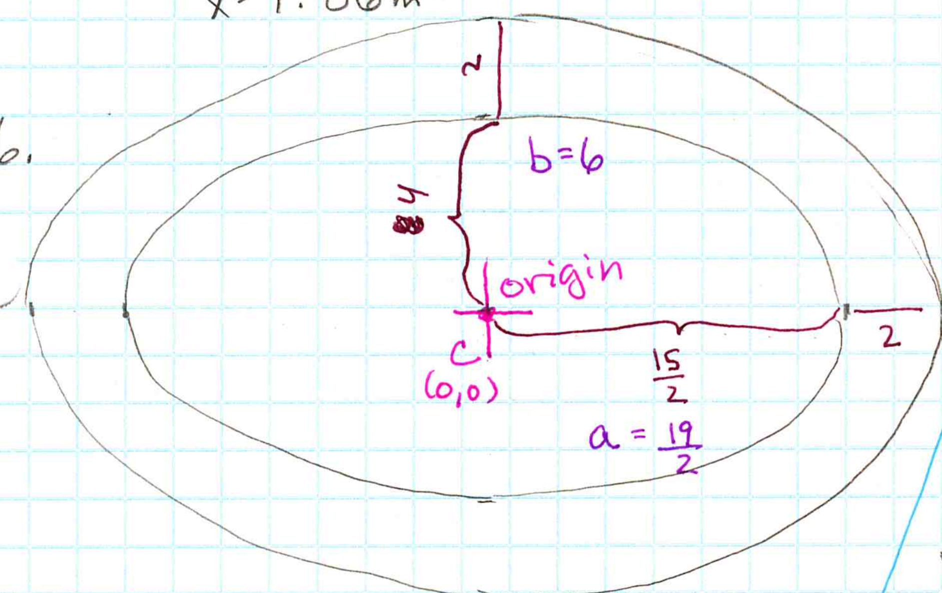
$$x=9.86\text{m}$$

$$d=10-x=10-9.86\text{m}$$

$$d=.14\text{m}$$

The boat needs to stay .14m from the bridge support.

6.



Find equation of outer ellipse

$$\frac{x^2}{\left(\frac{19}{2}\right)^2}+\frac{y^2}{6^2}=1$$

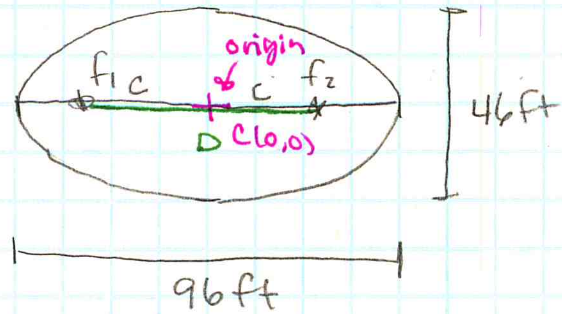
OR

$$\frac{x^2}{361/4}+\frac{y^2}{36}=1$$

OR

$$\frac{x^2}{90.25}+\frac{y^2}{36}=1$$

7.



Find d.

$b = 23\text{ft}$ $a = 43\text{ ft}$

$$\frac{x^2}{(43)^2} + \frac{y^2}{(23)^2} = 1$$

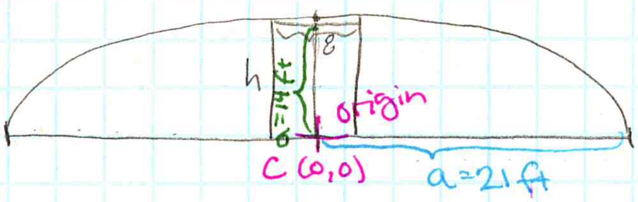
$c^2 = 43^2 - 23^2 = 1320$

$c = 36.33$ ft.

$d = 2c = 2(36.33)$ ft
$= 72.66$ ft

$\boxed{\text{The people are about 72.66ft apart.}}$

8.



a truck 8ft wide $\Rightarrow$ $x = 4\text{ft}$, Find h when $x = 4\text{ft}$.

Equation: $\frac{x^2}{21^2} + \frac{y^2}{14^2} = 1$

@ $x = 4$

$$\frac{16}{21^2} + \frac{y^2}{14^2} = 1$$

$$\frac{y^2}{14^2} = \frac{425}{441}$$

$$y^2 = \frac{1700}{9}$$

$y = 13.744$ ft.

$\boxed{\text{The truck can be about 13.74 ft high.}}$