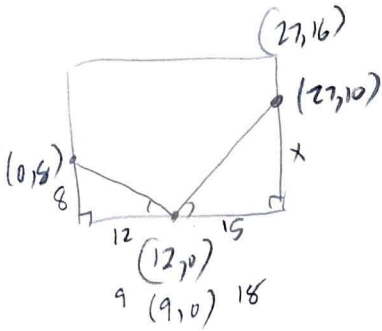


# Comfy Chair



$$\textcircled{1} \frac{8}{x} = \frac{12}{15} \frac{4}{5}$$

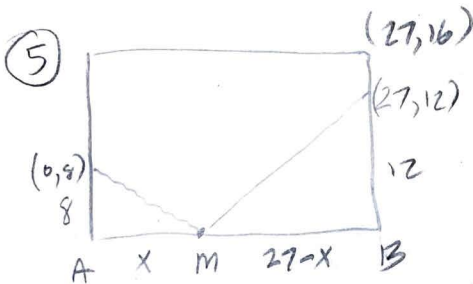
$$x = 10$$

$$\textcircled{2} \frac{8}{x} = \frac{9}{18} = \frac{1}{2}$$

$$x = 16$$

$\textcircled{3}$  As would be  $\cong$

so the mirror would be @  $(\frac{27}{2}, 0)$



$$MB = 27 - x$$

$$\textcircled{6} \frac{8}{12} = \frac{2}{3} = \frac{x}{27-x} \Rightarrow 54 - 2x = 3x$$

$$x = \frac{54}{5} = 10.8$$

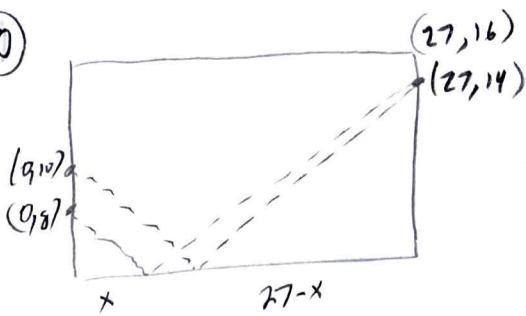
$\textcircled{7}$  The mirror would move right. As the window gets closer to  $(0, 12)$ , the  $\Delta$ s would get closer to  $\cong$ , so AM would be getting larger

$$\textcircled{8} \frac{9}{12} = \frac{3}{4} = \frac{x}{27-x} \Rightarrow 81 - 3x = 4x$$

$$\frac{81}{7} = x$$

$$10.8 + \frac{81}{7} = \frac{27}{35} \approx .77 \text{ ft right!}$$

10



$$\frac{8}{14} = \frac{4}{7} = \frac{x}{27-x}$$

$$\frac{10}{14} = \frac{5}{7} = \frac{x}{27-x}$$

$$108 - 4x = 7x$$

$$135 - 5x = 7x$$

$$\frac{108}{11} = x$$

$$\frac{45}{4} = x$$

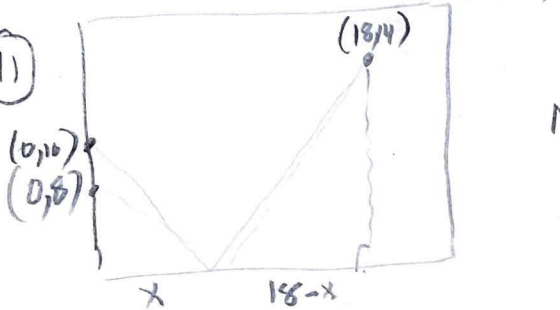
$$x = 9.82$$

$$x = 11.25$$

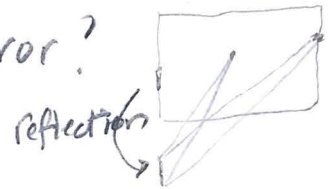
width of mirror

$$= 11.25 - 9.82 = 1.43 \text{ ft}$$

11



Narrower mirror?



12

$$\frac{8}{14} = \frac{4}{7} = \frac{x}{18-x}$$

$$\frac{10}{14} = \frac{5}{7} = \frac{x}{18-x}$$

$$72 - 4x = 7x$$

$$90 - 5x = 7x$$

$$x = \frac{72}{11} = 6.55$$

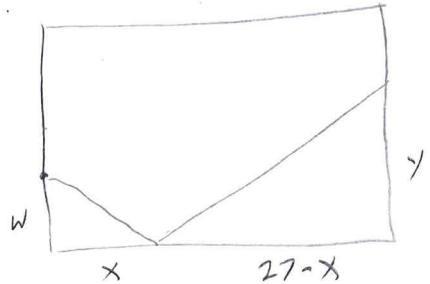
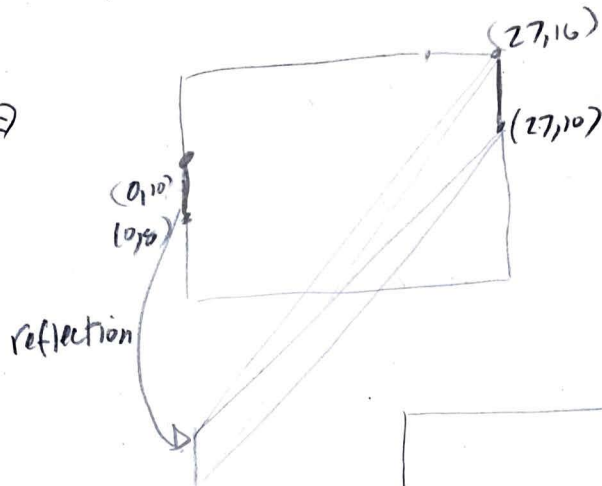
$$x = \frac{90}{12} = \frac{45}{6} = \frac{15}{2} = 7.5$$

$$\text{width} = 7.5 - 6.55 = .95 \text{ ft}$$

(rounding!!)

# Comfy chair (cont'd)

(14) wider!  $\Rightarrow$



(15) Develop a formula for  $x$ !

$$\frac{w}{y} = \frac{x}{27-x}$$

$$27w - xw = yx$$

$$27w = xw + yx = x(w+y)$$

$$x = \frac{27w}{w+y}$$

The mirror must have max width,

$$\text{so } 13.5 - 9 = \boxed{4.5 \text{ ft}}$$

now, when  $w=8$  &  $y=10$

$$x = \frac{27(8)}{8+10} = 12$$

$$w=10 \text{ & } y=10$$

$$x = \frac{27(10)}{20} = \frac{27}{2} = 13.5$$

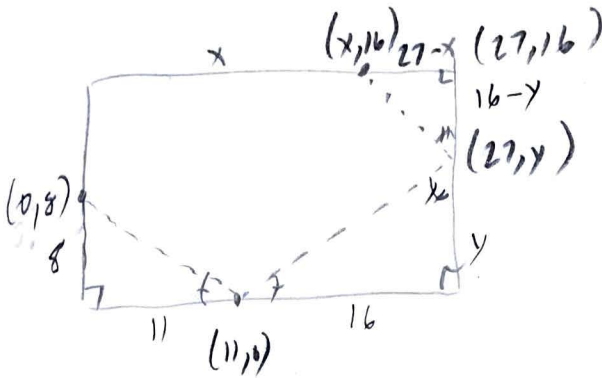
$$w=8, y=16$$

$$x = \frac{27(8)}{24} = 9$$

$$w=10, y=16$$

$$x = \frac{27(10)}{26} = \frac{135}{13} = 10.4$$

17



18

$$\frac{8}{y} = \frac{11}{16}$$

2nd mirror is @  $(27, \frac{128}{11})$

$$y = \frac{128}{11} \approx 11.636$$

$$\frac{\frac{128}{11}}{\frac{48}{11}} = \frac{11.636}{16 - 11.636} = \frac{16}{27 - x} \Rightarrow \frac{128}{48} = \frac{8}{3} = \frac{16}{27 - x}$$

$$216 - 8x = 48$$

$$168 = 8x$$

$$21 = x$$

Comfy chair at  $(21, 16)$