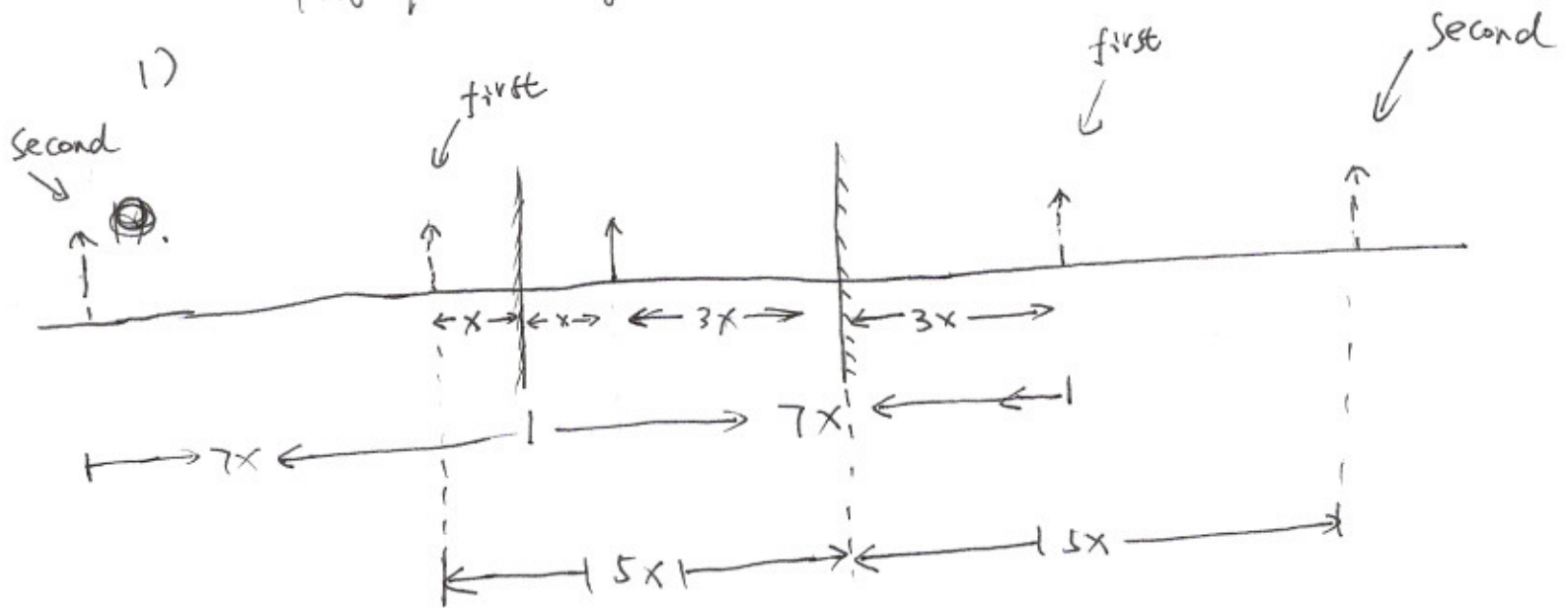


HW 9 Key.



$$\text{distance} = 5x + 3x \quad \text{or} \quad 7x + x = \boxed{8x}$$

2) $r = 36.0 \text{ cm}$, $f = -18 \text{ cm}$

(a) height = $5.60 \times 0.250 = \boxed{1.4 \text{ (cm)}}$

(b) from $-\frac{d_o}{d_i} = \frac{1}{0.25}$, $\Rightarrow d_o = -4d_i$

and $-\frac{1}{18} = \frac{1}{f} = \frac{1}{d_o} + \frac{1}{d_i} = \left(\frac{1}{-4} + 1\right) \left(\frac{1}{d_i}\right) = \frac{3}{4}d_i$

$\Rightarrow d_i = -13.5$, $d_o = -4d_i = \boxed{54 \text{ cm}}$

$$3) \quad f = 2.25 \text{ m}, \quad d_o = 2 - (-7) = 9 \text{ (m)}$$

$$\frac{1}{2.25} = \frac{1}{f} = \frac{1}{d_o} + \frac{1}{d_i} = \frac{1}{9} + \frac{1}{d_i}$$

$$\Rightarrow d_i = \frac{1}{\frac{1}{2.25} - \frac{1}{9}} = \frac{1}{\frac{3}{9}} = 3 \text{ (m)}$$

\Rightarrow image is placed at (-4, 2)