Warm-Up:

Time Will Tell

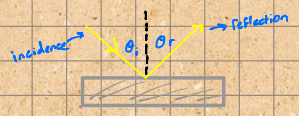
The atomic clock at the National Institute of Standards and Technology in Colorado sends out signals every second, giving the official time. Clocks and wristwatches are now being made that receive the signal and are, therefore, always accurate to the exact second!

Consider someone on the East Coast who buys one of these watches. He or she would be about 3,200 kilometers from Colorado. Will the fact that the radio signals (moving at 3×10^5 kilometers per second) have to travel that distance affect the one-second accuracy of the watch? Defend your answer with a calculation of the time delay between Colorado and the person wearing the watch.

$V = \frac{d}{t} \rightarrow 3 \cdot 10^8 \, m/s = \frac{3{,}200{,}000 \, m}{t} \rightarrow \frac{3{,}200{,}000}{3 \cdot 10^8} = \boxed{0.0107 \, s}$

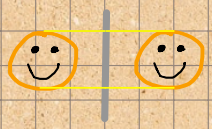
- When light reflects on a plane mirror it follows the Law of Reflection
  - ↳ Angle of Incidence = Angle of Reflection

$$\theta_i = \theta_r$$



Ray Diagrams:

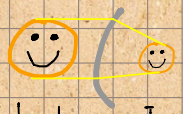
- Plane mirrors have an image with the same size and distance as the object



☆ Plane Mirrors provide a virtual image

- Curved Mirrors:
  - ↳ Convex [curved outward]: image is smaller and closer to the mirror than the object
  - ↳ Concave [curved inward]: image is larger and farther from the mirror than the object

Convex



object Image

Concave

object Image

- Mirror Equation: $\frac{1}{f} = \frac{1}{d_o} + \frac{1}{d_i}$
- Magnification: $M = \frac{h_i}{h_o} = \frac{-d_i}{d_o}$

f = Focal point
d_o = object distance
d_i = image distance
h_i = image height
h_o = object height