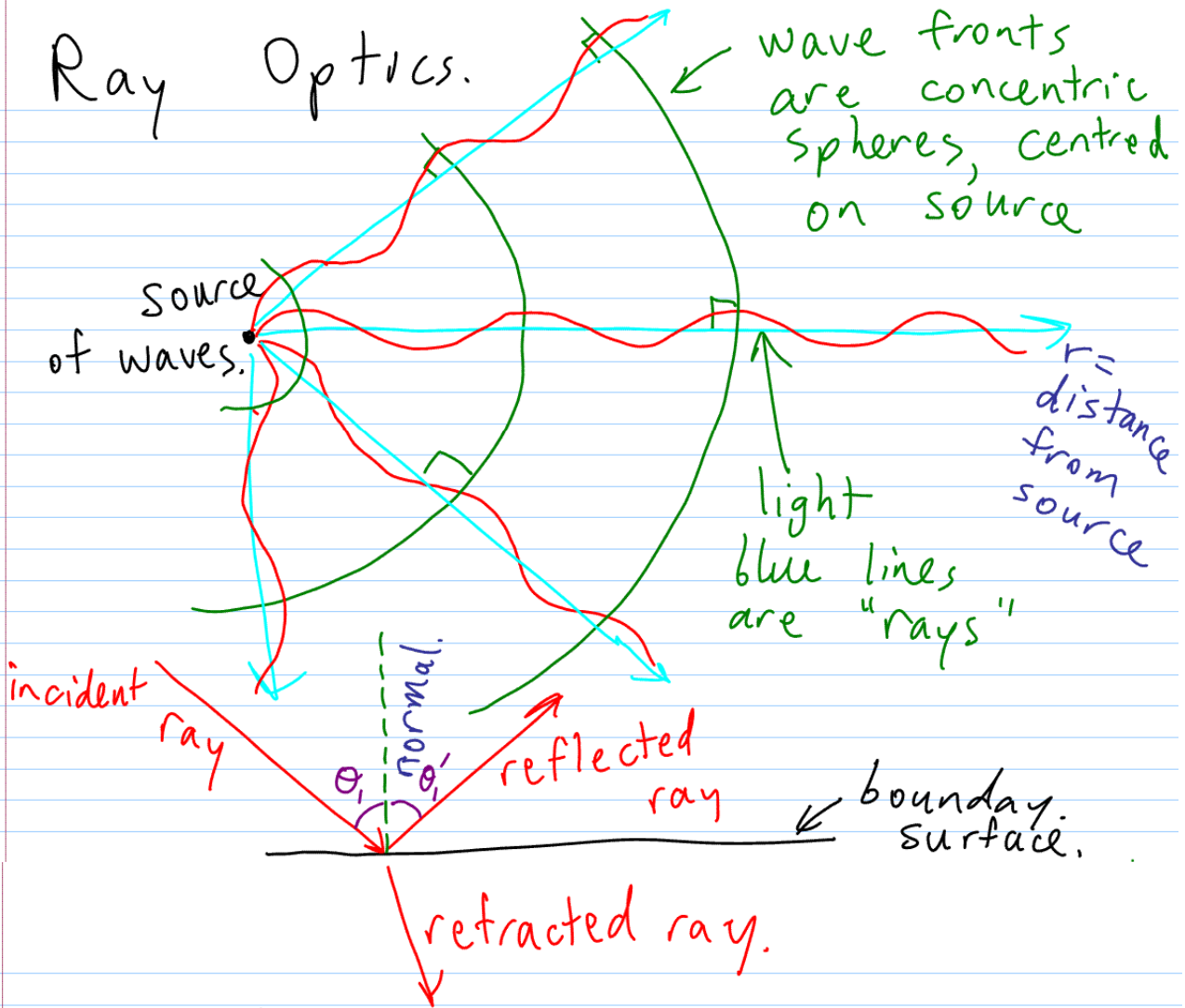


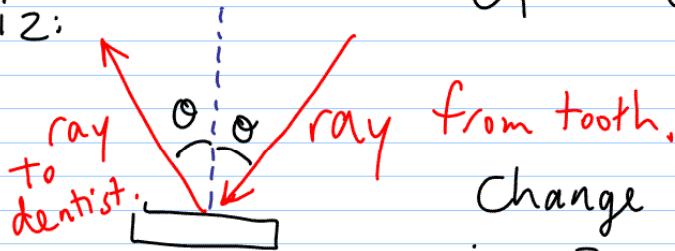
# Ray Optics.



Law of Specular Reflection:

$$\theta_i = \theta_r'$$

Quiz:

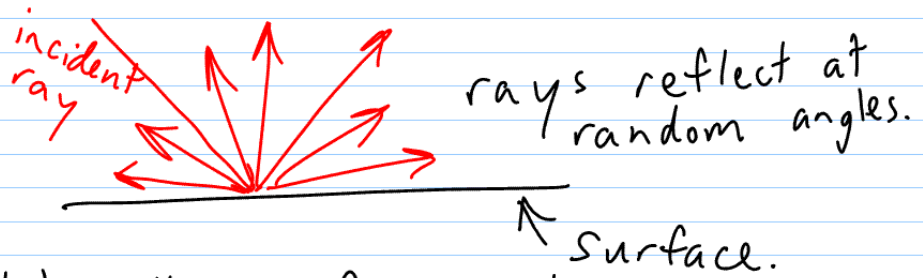


Change in angle of ray is  $2\theta$  away from complete reversal

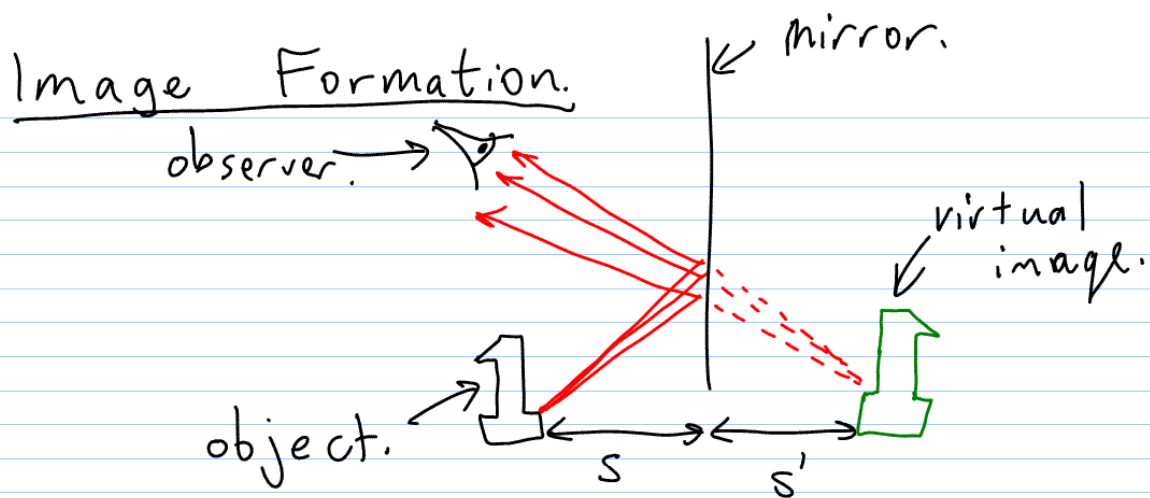
→ Rotating mirror by  $\Delta\theta$  will change ray direction by  $(2\Delta\theta)$

Note: Skin, paper, paint, brick

all reflect light, but do not obey the law of reflection!! → These are all diffuse reflectors:



- Only "shiny" surfaces obey law of reflection.



Law of image formation in a plane mirror:  $s = s'$

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Index of refraction ← describes how much a refracted ray bends:  
Snell's Law:

$$n_1 \sin \theta_1 = n_2 \sin \theta_2$$

$\theta_1$  is usually given  $\rightarrow$  solve for  $\theta_2$ :

$$\theta_2 = \sin^{-1} \left( \frac{n_1}{n_2} \sin \theta_1 \right)$$

solution always exists if  $n_2 > n_1$   
if  $n_2 < n_1$ , sometimes no solution exists.  
 $\sin^{-1}(x)$  can only be found if  $-1 < x < 1$

- then there is no refracted ray.

- 100% of the light is reflected.

- Total Internal Reflection (T.I.R)

Optical Fibre:

