On Reflexion

A.C. Norman
anorman@bishopheber.cheshire.sch.uk

Warm-up problems

1. Copy out and complete:

   "Light travels in ... lines, which are drawn as lines called ...."

2. The angle between an incident ray and a plane mirror is 30 degrees.

   (a) What line do physicists measure the angles of incidence and reflexion from?

   (b) What is the angle of incidence in this case?

   (c) What will the angle of reflexion be?

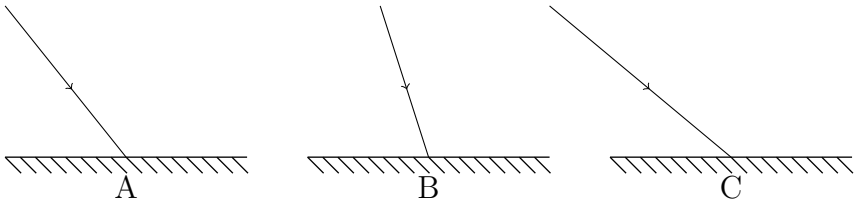
3. Copy out and complete the following:

   The law of reflexion says

   "The angle of ... equals the angle of ...."

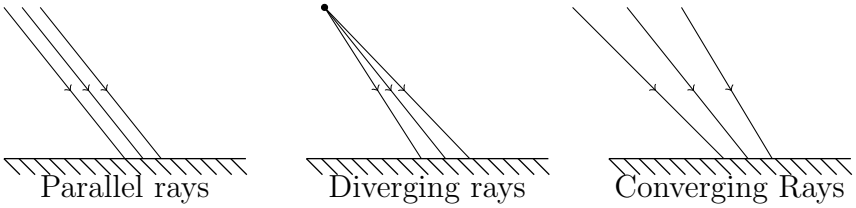
Regular problems

4. Copy out and complete the following diagrams, showing the reflected ray. Don't forget to include the direction (arrow) on the reflected ray.



5. A laser beam can be bounced off the Moon (from a retro-reflector left by astronauts). The light travels there and back in 2.6 s. If light travels at 300 000 000 m/s, calculate the distance to the moon.

6. (a) Copy out and complete the following diagrams, showing the reflected rays.



(b) Label your diagrams to show which diagram has

i. converging rays after reflexion,

ii. parallel rays after reflexion,

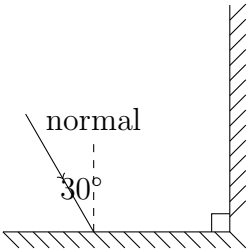
iii. diverging rays after reflexion.

7. Where would you see the sign below, and why is it written that way?

AMBULANCE

Extension problems

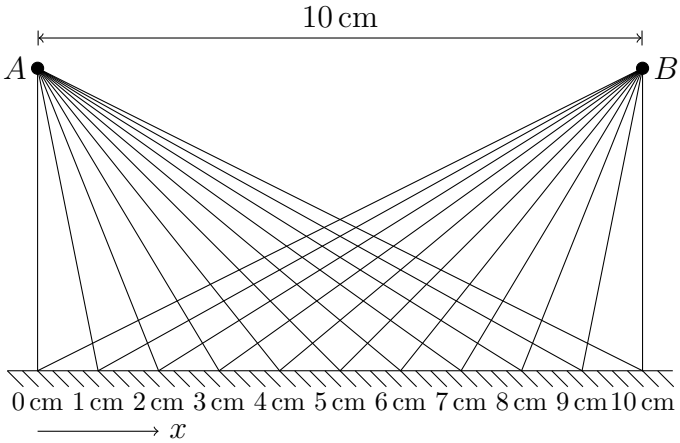
8. (a) Copy the diagram below, and complete the path of the ray



(b) Prove that, for any incoming angle, light will reflect back on itself.

(c) Such a setup is known as a *retroreflector*. Where do you think such a system might be useful, and why do you think that the Apollo astronauts left a retroreflector on the moon?

9. The diagram below shows various paths, all of which travel from A to B via a mirror.



(a) Copy the diagram out full size, and measure the path lengths A–B for the various paths from A to B in the diagram below, as the position x along the mirror is varied, and record your results in a table.

(b) Plot a graph of the length A–B on the y-axis and the position x on the x-axis.

(c) What can you say about the path that light would follow, according to the law of reflexion?