Name:_____

The Law of Reflection

The law of reflection works perfectly with light and the smooth surface of a mirror. However, you can apply this law to other situations. It can help you win a game of pool or pass a basketball to a friend on the court.

In this skill sheet you will review the law of reflection and perform practice problems that utilize this law. Use a protractor to make your angles correct in your diagrams.

The law of reflection states that when an object hits a surface, its angle of incidence will equal the angle of reflection. This is true when the object is light and the surface is a flat, smooth mirror. When the object and the surface are larger and lack smooth surfaces (like a basketball and a gym floor), the angles of incidence and reflection are nearly but not always exactly equal. The angles are close enough that understanding the law of reflection can help you improve your game.
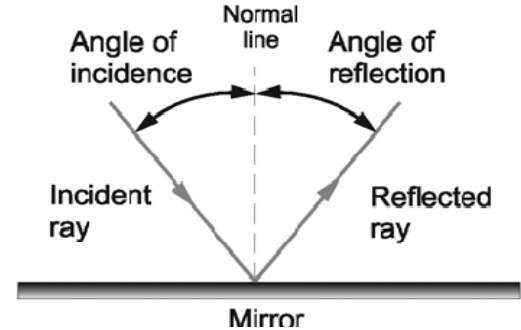
Example:
A light ray strikes a flat mirror with a 30-degree angle of incidence. Draw a ray diagram to show how the light ray interacts with the mirror. Label the normal line, the incident ray, and the reflected ray.

Solution:
1. When we talk about angles of incidence and reflection, we often talk about the normal. The normal to a surface is an imaginary line that is perpendicular to the surface. The normal line starts where the incident ray strikes the mirror. A normal line is drawn for you in the sample problem →.
a. Draw a diagram that shows a mirror with a normal line and a ray of light hitting the mirror at an angle of incidence of 60 degrees.
b. In the diagram, label the angle of reflection. How many degrees is this angle of reflection?
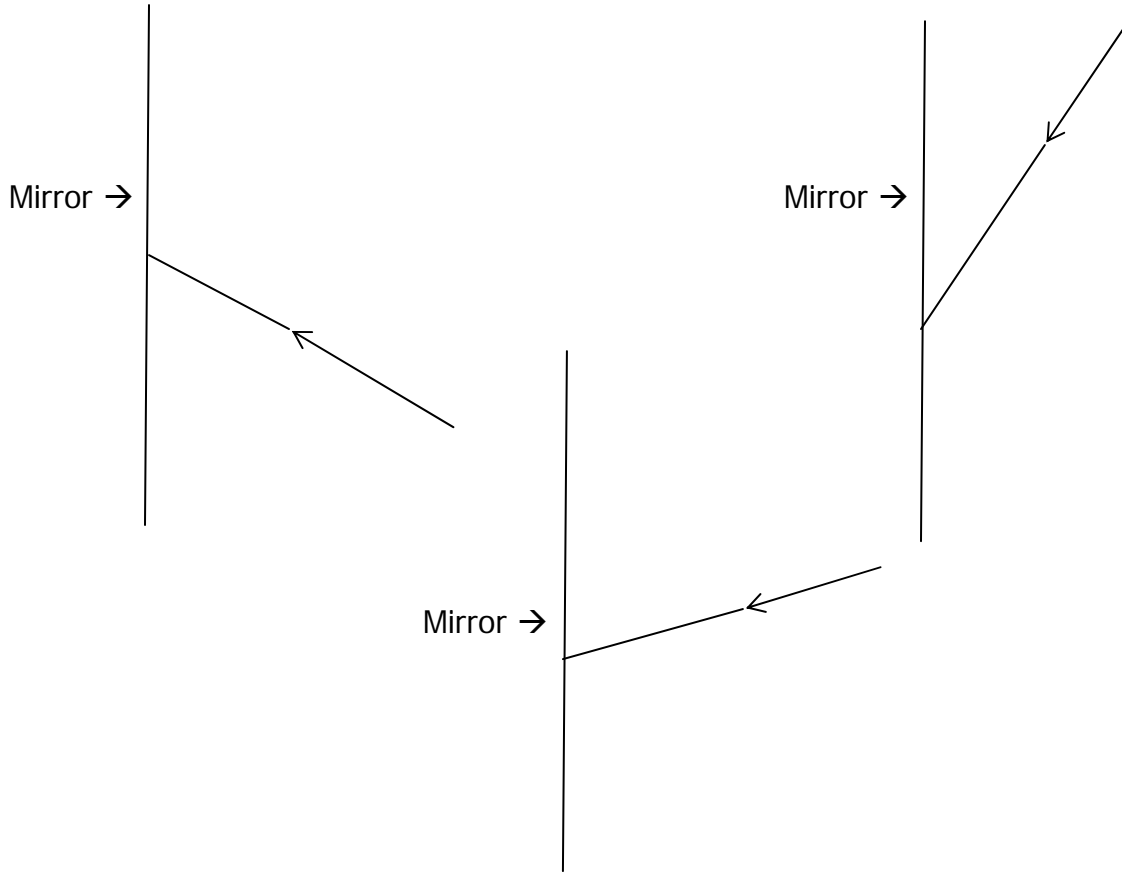
Ray Diagrams
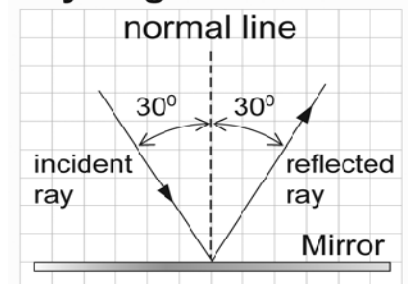
1. (a) Label the diagram below using the following terms: reflected ray, angle of reflection, angle of incidence, incident ray, normal line, reflecting surface.
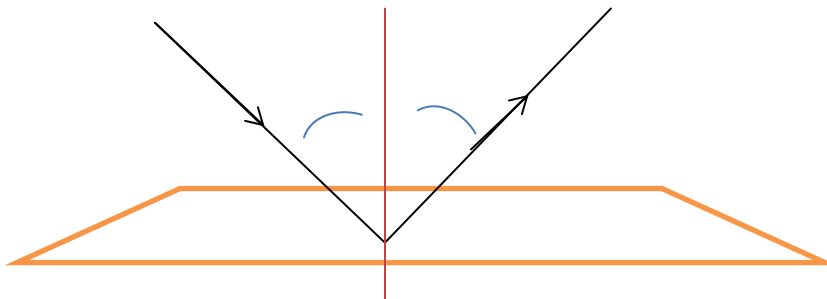
(b) Measure the angle of incidence with your protractor and record. _____
(c) Measure the angle of reflection with your protractor and record. _____
(d) Compare the sizes of the angles of incidence and reflection. Explain how they relate to each other.

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2. Use the law of reflection to draw the path of the reflected ray from the mirror in the diagram below.

Mirror →

Mirror →

Mirror →

3. The following diagram shows a light ray coming through an opening. It is directed at two mirrors and three flowers. Use the law of reflection, your ruler, and your protractor to draw the light ray as it bounces from one mirror to the next. Which of the three flowers will be hit by the light?

Flower 1

Flower 3

Flower 2
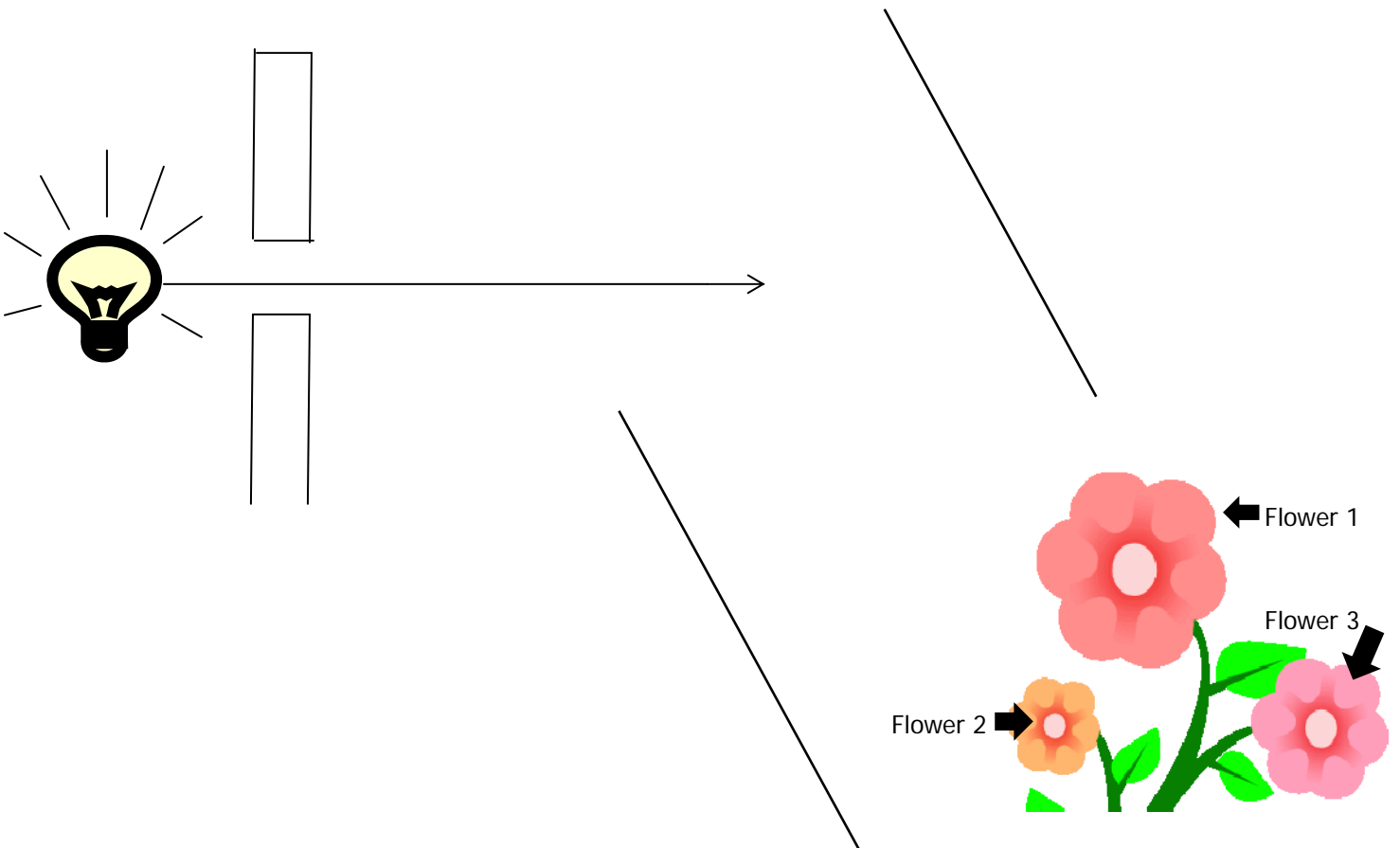
4. For each of the following incident rays, measure the angles from the normal, and draw the reflected rays.
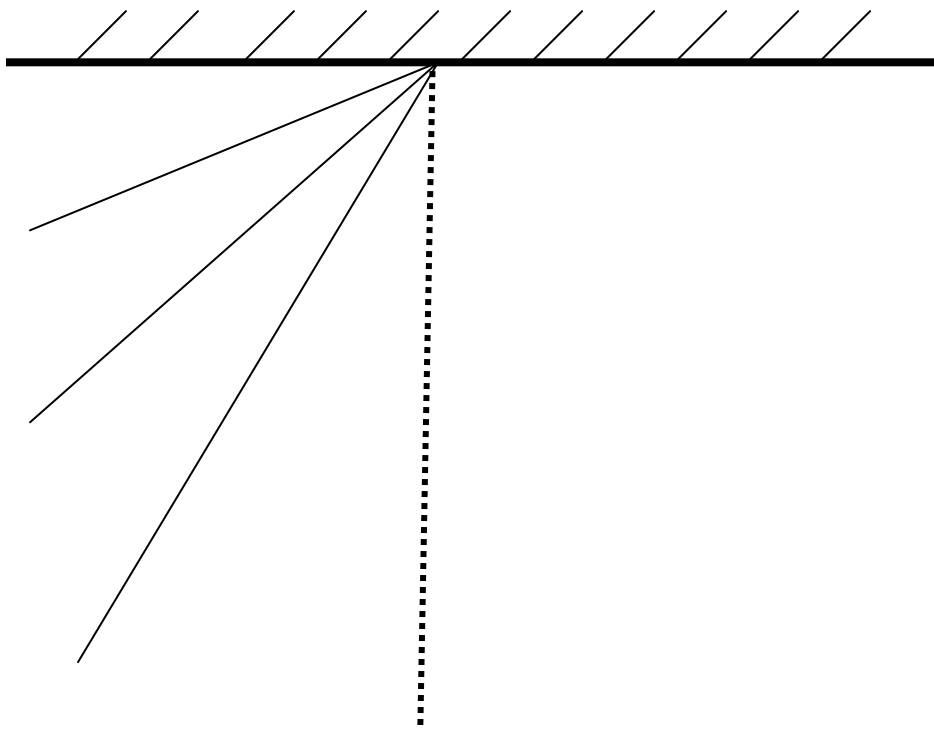
5. Draw the normal for each ray.   Find the corresponding reflected ray and incident ray.
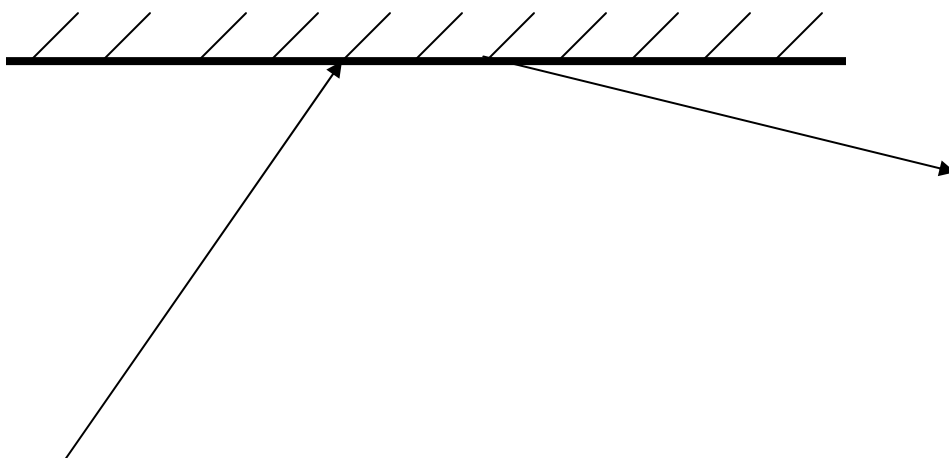
6. Classify each of these materials as transparent, translucent, or opaque: a textbook, frosted glass, a single sheet of glass, a rock, clean air, apple juice, sunglasses.

Transparent:

Translucent:

Opaque:

7. In your own words, clearly distinguish between the terms: normal, angle of incidence and angle of reflection.

Normal:

Angle of incidence:

Angle of reflection:

8. Draw a diagram that shows a mirror with a normal line and a ray of light hitting the mirror at an angle of incidence of 60° degrees.

9. A ray of light strikes a mirror. The angle formed by the incident ray and the reflected ray measures 90° degrees. What are the measurements of the angle of incidence and the angle of reflection?