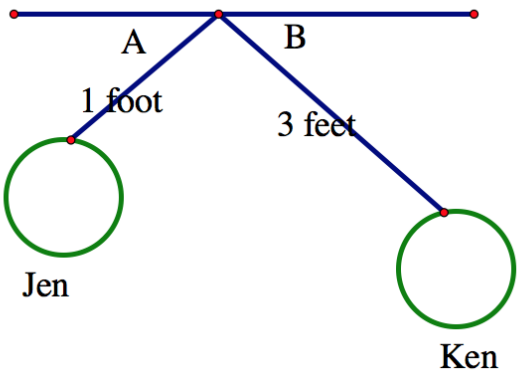
# Reflection

January 27, 2018

## Warm-up

Jen and Ken are looking at each other in the mirror.

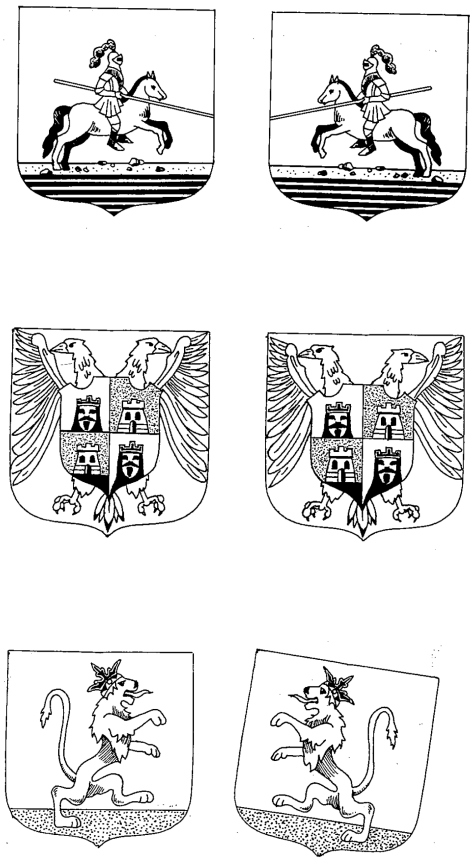



Which angle is bigger, angle A or angle B?

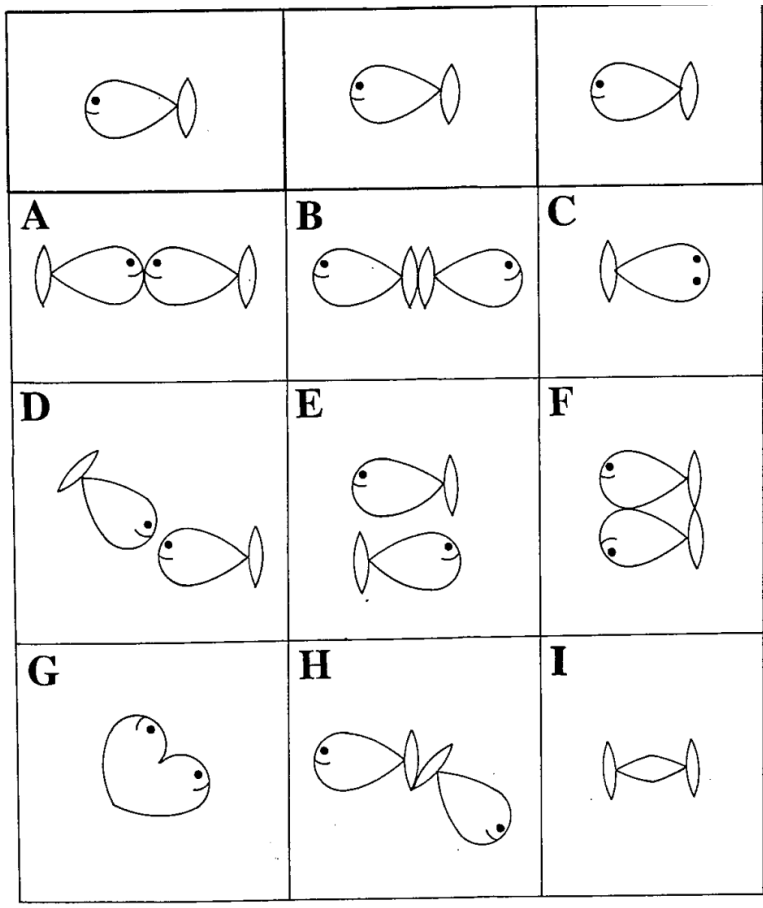
How far away does Ken's image in the mirror look to Jen?

# 1 Mirrors

1. Which pairs of pictures are reflections of each other?

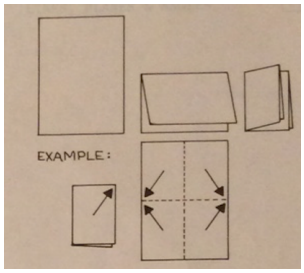


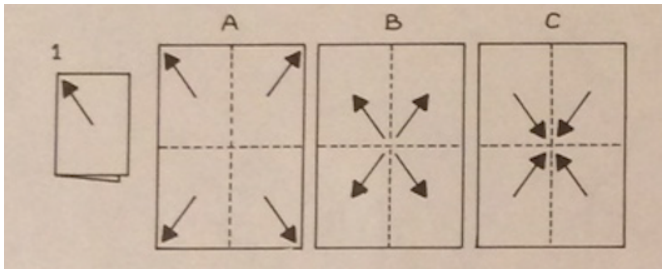
2. Is it possible to get the lettered pictures by placing a mirror on the fish above it? If so, draw the mirror line.

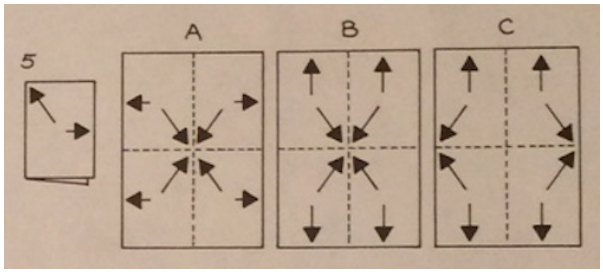


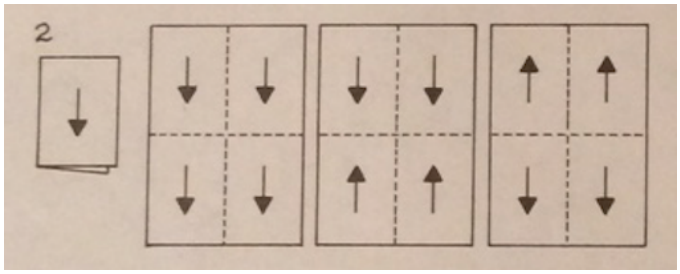

3. A kaleidoscope produces an image like this one, using mirrors. How many mirrors were used to make this image?

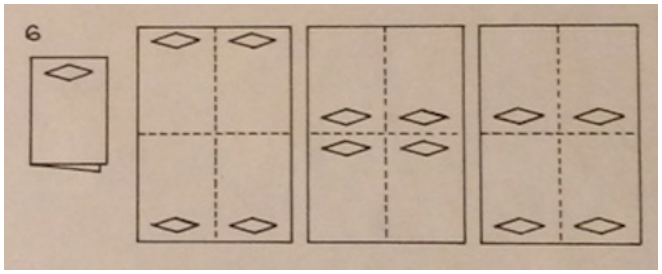
4. You fold a piece of paper in half, then in half again as shown in the example. Then you draw an arrow with a marker so strong that it goes through all the sheets. What will you see when you unfold the paper?

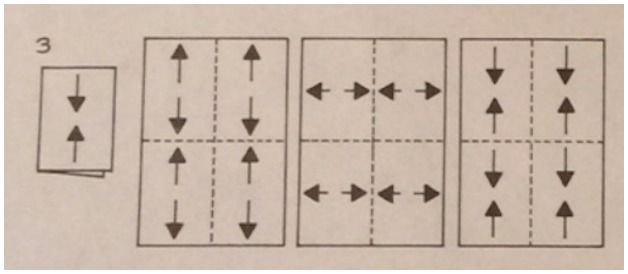


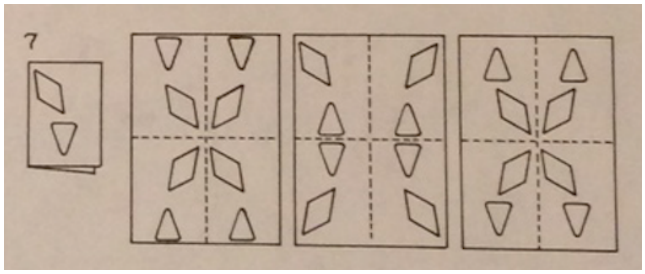



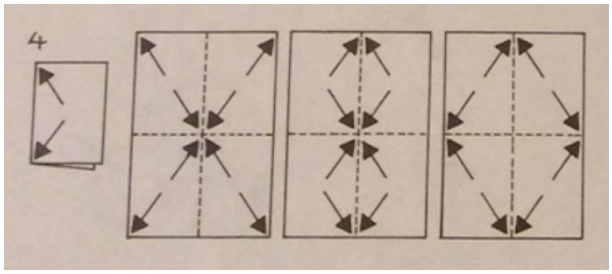



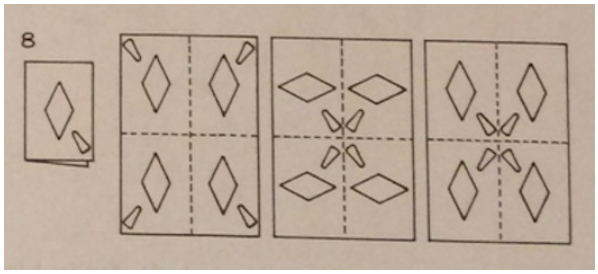



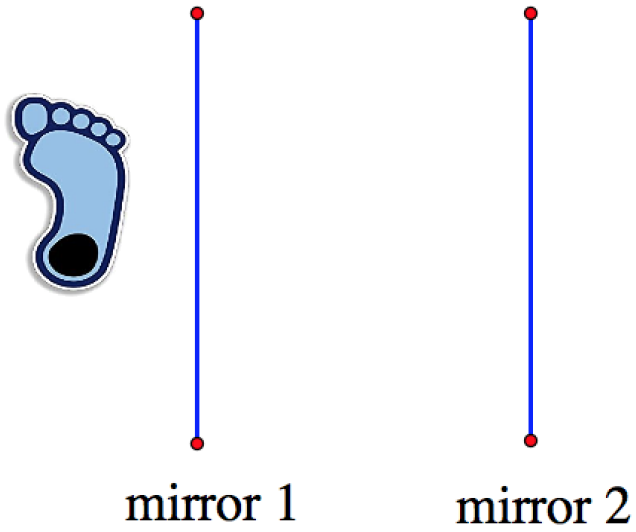



5. Draw the reflection of the tarheel using mirror 1. Then draw the reflection of the tarheel you drew using mirror 2.




(a) The original tarheel is a right foot. Is the reflected foot a left or right foot? What about the reflection of the reflection?

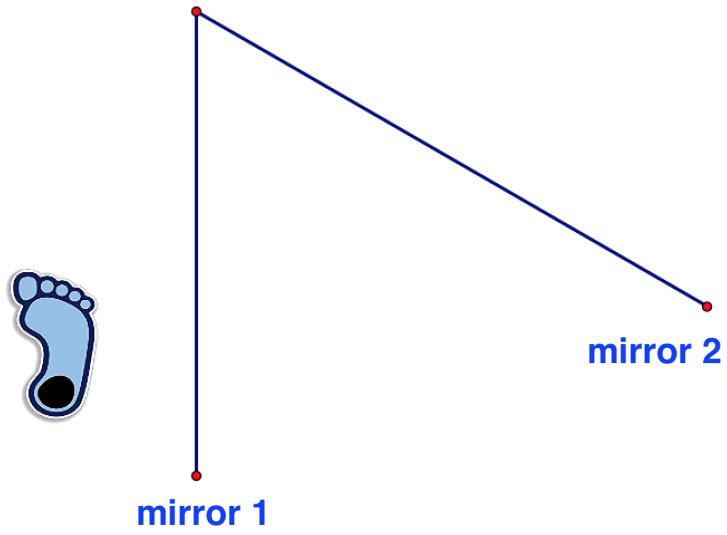
(b) Measure or estimate the distance between the mirrors.

(c) Now measure or estimate the distance between the big toe of the original foot and the big toe of the twice reflected foot.

(d) What is the relationship between these two distances?

(e) If you put the mirrors 3 inches apart, how far apart woutd the original and final big toes be?

6. Draw the reflection of the tarheel using mirror 1. Then draw the reflection of the tarheel you drew using mirror 2.




(a) The original tarheel is a right foot. Is the reflected foot a left or right foot? What about the reflection of the reflection?

(b) Measure or estimate the angle between the mirrrors.

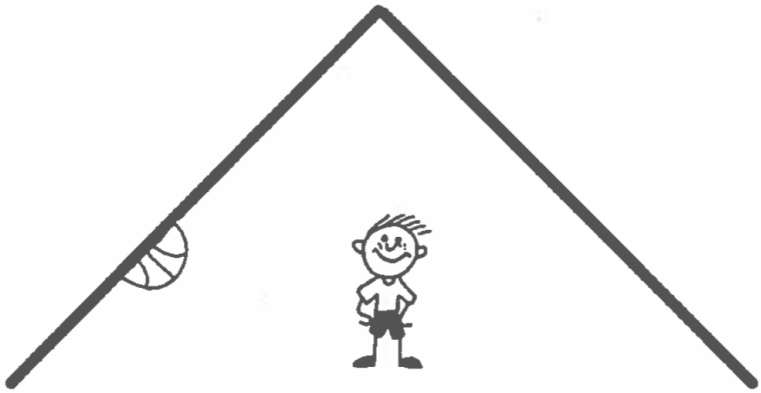
(c) Now draw a line from the big toe of the original foot to the point of intersection between the mirrors, and another line from the point of intersection of the mirrors to the big toe of the twice reflected foot. Measure or estimate the angle made by these two lines (orig big toe to intersection point to final big toe.

(d) What is the relationship between the angle of the mirrors and the angle of the toes?

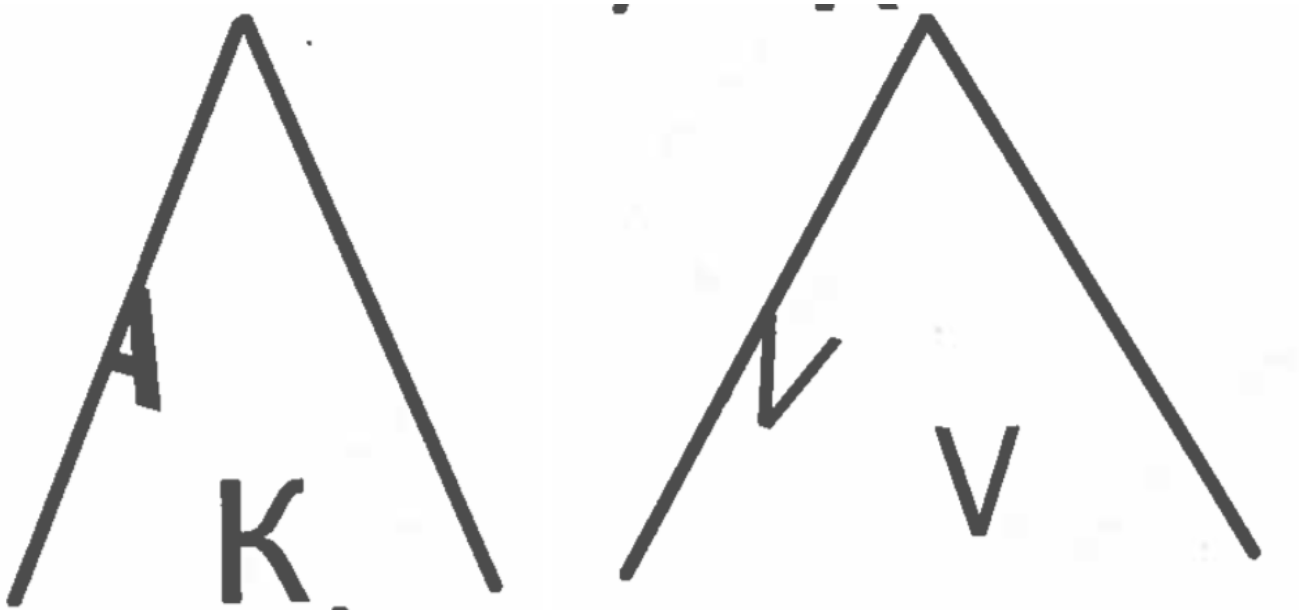
(e) If you put the mirrors at a 45 degree angle, at what angle would the original and final big toes be?

## 2 Hinged Mirrors

7. Put your mirrors on the sides of the angle and look into the corner of the mirrors. How many kids do you see? How many balls do you see?



8. What letters and how many of each do you see in the mirrors in this picture?

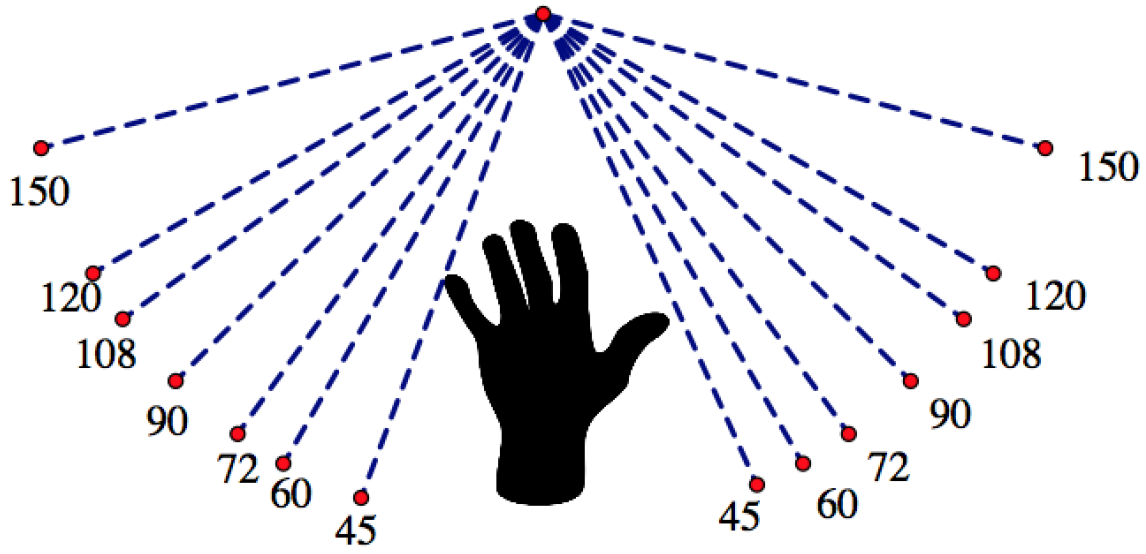


9. (a) Make a corner with your mirrors so that you can see six letter W's.
   (b) Make a corner with your mirrors so that you can see eight letter W's.

W

(c) How many mirrors were used for this photo? What was the angle between the mirrors? Which lady is the real one?

10. Below is a hand with lines forming various angles. For each angle, place your hinged mirrors so that the edges lie along the relevant dotted lines and the hinge is at the dot. Describe what you see.




| Angle measure measure | Number of hands including the original | Number of right hands | Number of left hands |
|---|---|---|---|
| 45° | | | |
| 60° | | | |
| 72° | | | |
| 90° | | | |
| 108° | | | |
| 120° | | | |
| 150° | | | |
| $n°$ | | | |

(a) Explain the relationship between the angle and the number of hands.

(b) When is there an equal number of right hands and left hands?

(c) Can you predict the number of right and left hands for a 30° angle? For a 40° angle?