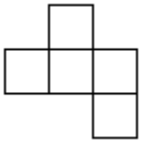
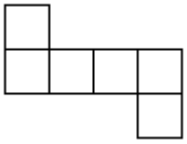
1.2.1 How do you see it?

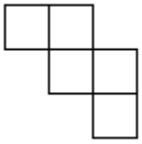
Spatial Visualization and Reflections

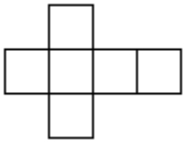
1-47. BUILDING BOXES

Which of the nets (diagrams) below would form a box with a lid if folded along the interior lines? Be prepared to defend your answer.

a. 

b. 

c. 

d. 

1-48. Have you ever noticed what happens when you look in a mirror? Have you ever tried to read words while looking in a mirror? What happens? Discuss this with your team. Then re-write the following words as they would look if you held this book up to a mirror.

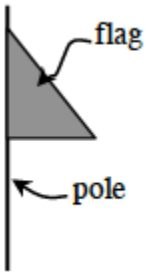
GEO ⟶

STAR ⟶

WOW ⟶

Do you notice anything interesting?

1-49. When Kenji spun the flag shown to the right very quickly about its pole, he noticed a three-dimensional shape emerge.

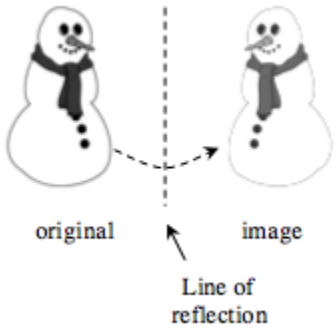


What shape did he see? Draw a picture of the three-dimensional shape on your paper and be prepared to defend your answer.

What would the flag need to look like so that a **sphere** (the shape of a basketball) is formed when the flag is rotated about its pole? Draw an example.

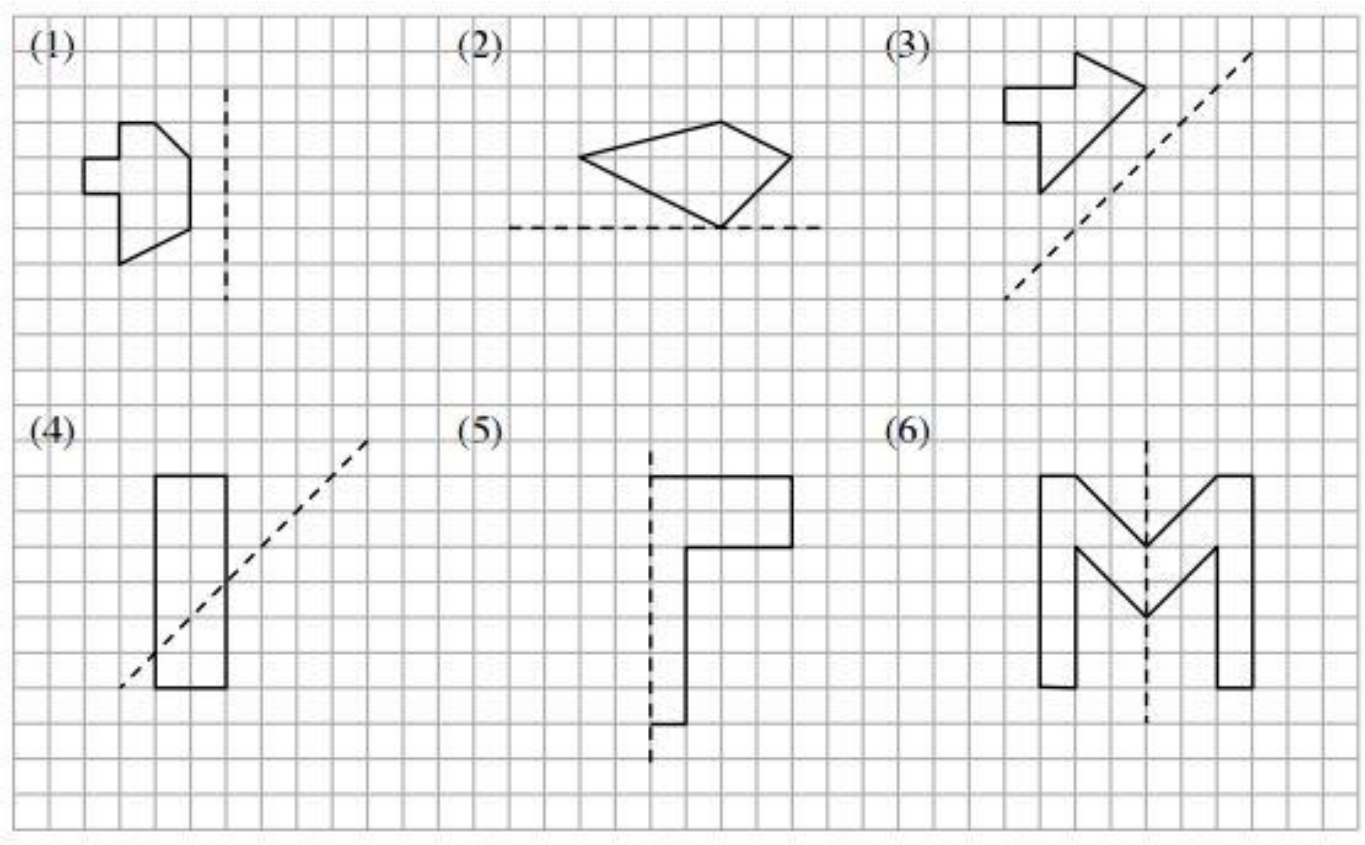
1-50. REFLECTIONS

The shapes created in the Kaleidoscope Investigation in Lesson 1.1.5 were the result of reflecting a triangle several times in a hinged mirror. However, other shapes can also be created by a reflection. For example, the diagram at right shows the result of reflecting a snowman across a line.



Why do you think the image is called a reflection? How is the image different from the original?

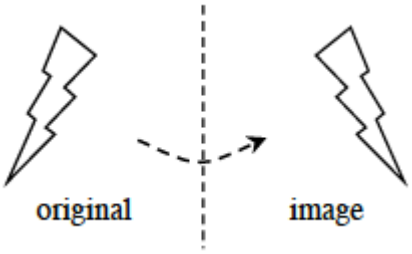
Use your visualization skills to predict the reflection of each figure below across the given line of reflection. Then draw the reflection.



Check your work by folding the paper along the line of reflection.

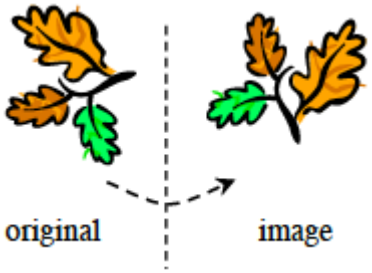
1-51. Sometimes, a motion appears to be a reflection when it really isn't. How can you tell if a motion is a reflection? Consider each pair of objects below. Which diagrams represent reflections across the given lines of reflection? Study each situation carefully and be ready to explain your thinking.

(1)



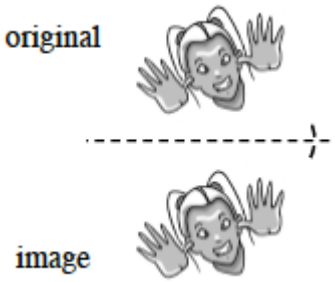
Yes -- No -- Reason:

(2)



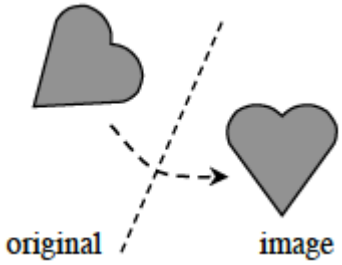
Yes -- No -- Reason:

(3)



Yes -- No -- Reason:

(4)



Yes -- No -- Reason:

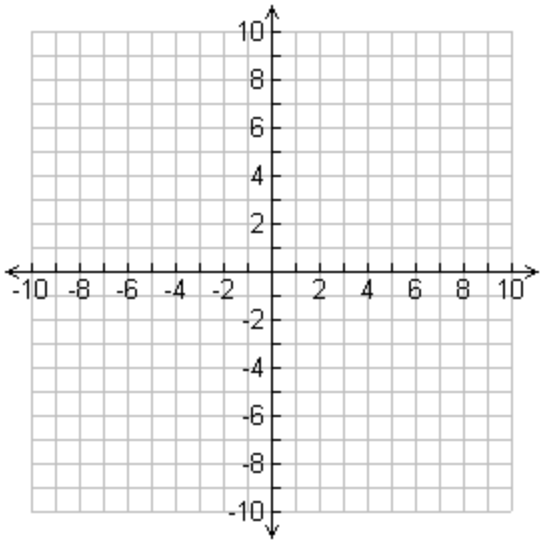
1-52. CONNECTIONS WITH ALGEBRA

What other ways can you use reflections? Consider how to reflect a graph as you answer the questions below.

Graph the **parabola** $y = x^2 + 3$ and the line $y = x$ on the same graph below. Use the table if needed.

x	$y = x$
−3	
−2	
−1	
0	
1	
2	
3	

x	$y = x^2 + 3$
−3	
−2	
−1	
0	
1	
2	
3	



Now reflect the parabola over the line $y = x$ using a different color. What do you observe?

What happens to the x- and y-values of the original parabola?