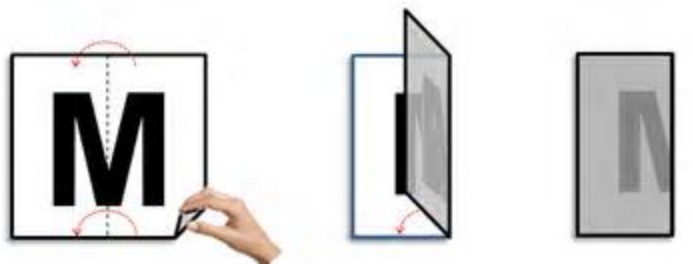
Sec 1.5 Transformations in the Coordinate Plane

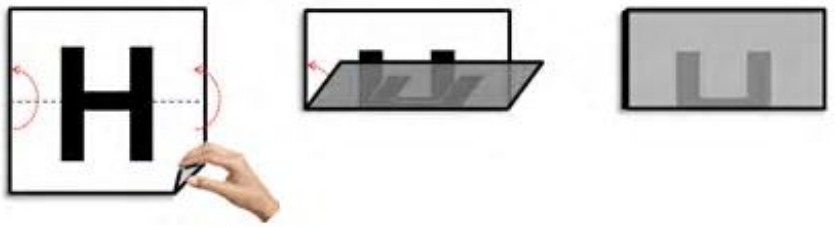
Symmetry Name:

Symmetries

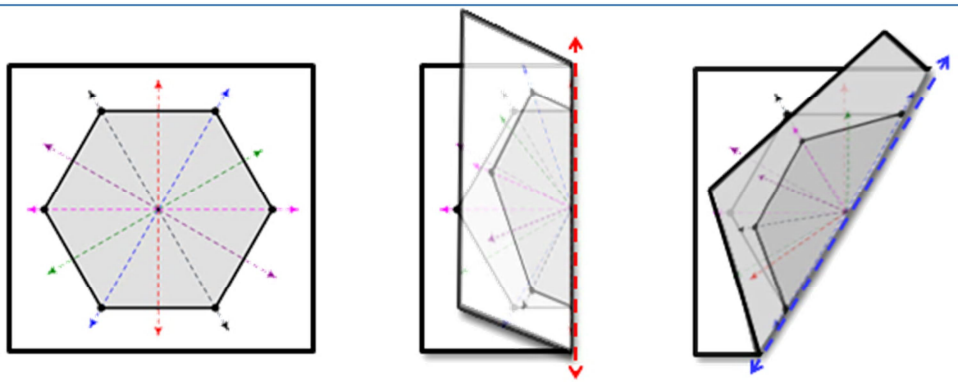
A shape has a **vertical line of symmetry** if you can fold it in half vertically and have the halves match up. On a scrap sheet of paper try folding the letter "M" in half.



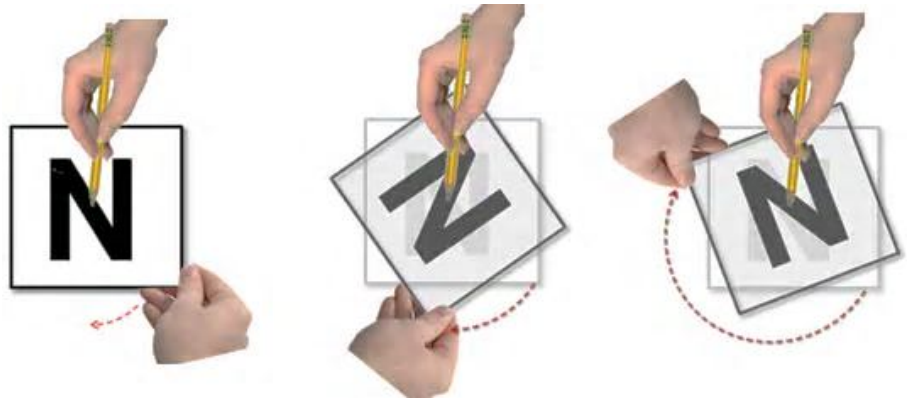
A shape has a **horizontal line of symmetry** if you can fold it in half horizontally and have the halves match up. On a scrap sheet of paper try folding the letter "H" in half.



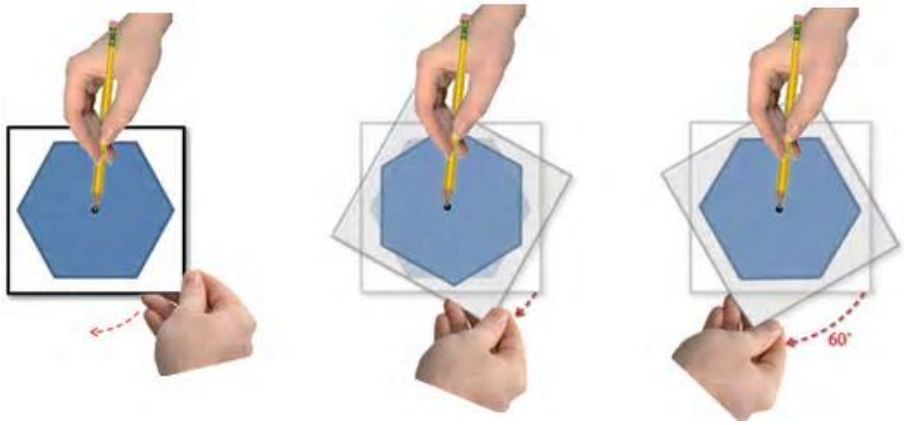
A general **line of symmetry** is any line in which you can fold the shape in half and it maps onto itself. Consider the hexagon at the right has 6 lines of symmetry.



A shape has **point symmetry** if you can rotate the shape 180° from a center point and have it look the same as it did before you rotated it. On a scrap sheet of paper try rotating a letter "N" as shown a the right.



A shape has **rotational symmetry** if you can rotate the shape by a set degree from a center point and have it look the same as it did before you rotated it. On a scrap sheet of paper try rotating a hexagon (which has 60° rotational symmetry.)



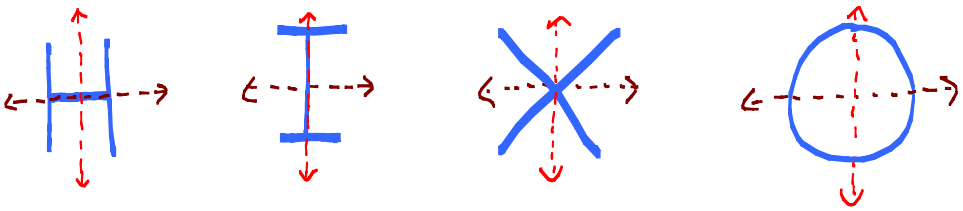
1. Provide 2 Letters of the Alphabet that have a **vertical line of symmetry**.

A H I M O T U V W X Y

2. Provide 2 Letters of the Alphabet that have a **horizontal line of symmetry**.

B C D E H K O X

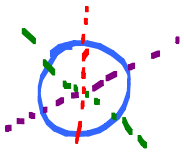
3. Provide 2 Letters of the Alphabet that have both a **horizontal line of symmetry** and **vertical line of symmetry**.



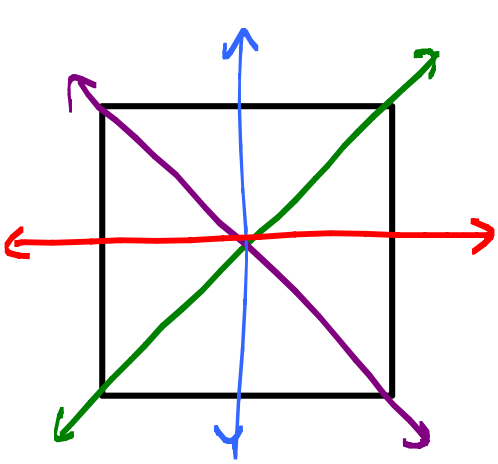
4. Provide a letter of the Alphabet that has **point symmetry** but **NOT** a **vertical line of symmetry.**

N Z S

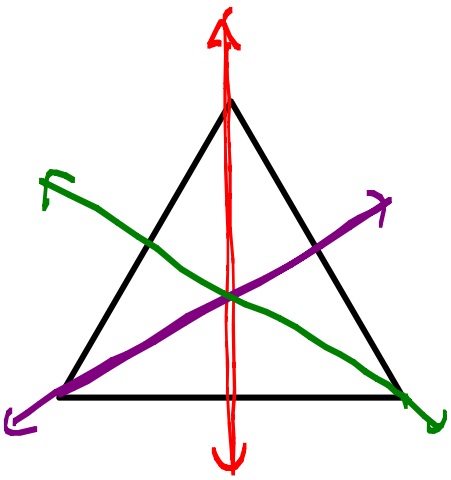
5. Which letter depending on how it's written could have **infinite lines of symmetry**?



6. Draw all the lines of symmetry for the following regular shapes.

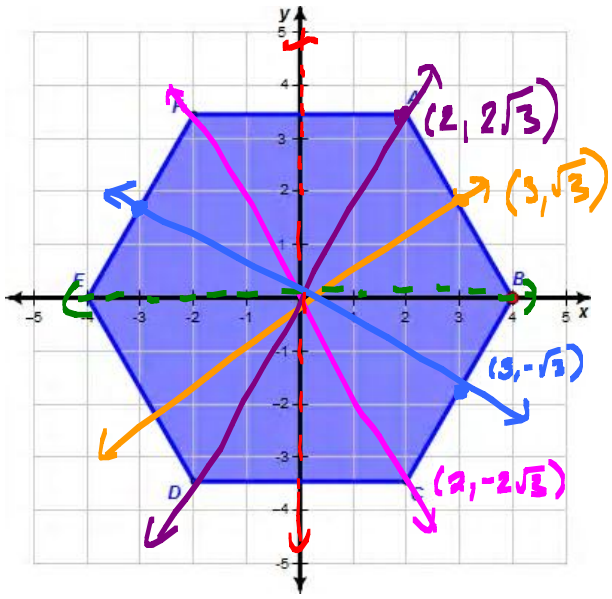


4 LINES OF SYMMETRY



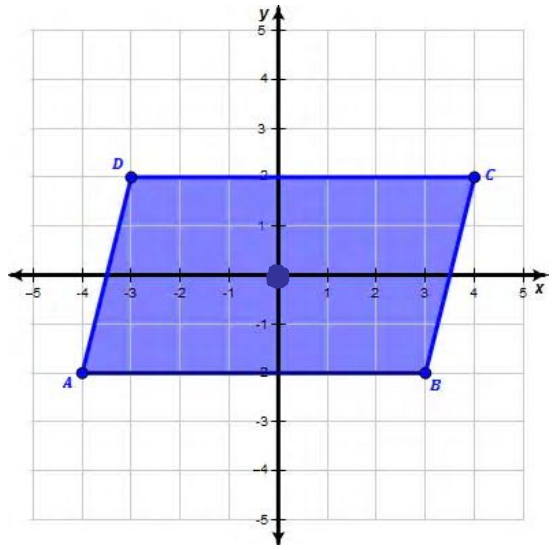
3 LINES OF SYMMETRY

7. Describe in detail at least three transformations that would map hexagon ABCDEF onto itself.



- REFLECT OVER Y-AXIS
- REFLECT OVER X-AXIS
- (BONUS) REFLECT OVER $y = \sqrt{3}x$
- (BONUS) REFLECT OVER $y = \frac{\sqrt{3}}{3}x$
- (BONUS) REFLECT OVER $y = -\frac{\sqrt{3}}{3}x$
- (BONUS) REFLECT OVER $y = -\sqrt{3}/3\,x$
- ROTATE ANY MULTIPLE OF 60° ABOUT THE ORIGIN

8. Describe any symmetries that parallelogram ABCD might have.



- POINT SYMMETRY

(ROTATE 180° ABOUT THE ORIGIN TO MAP THE PARALLELOGRAM ONTO ITSELF)

9. Ambigrams are usually words created with point symmetry.