Modified and Animated By Chris Headlee
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CHAPTER 4 SOL PROBLEMS

SSM: Super Second-grader Methods

SOL Problems; not Dynamic Variable Problems

40 Which line of reflection maps point K at $(-2, 2)$ to point K' at $(2, -2)$?

F $y = 2$

G $y = x$

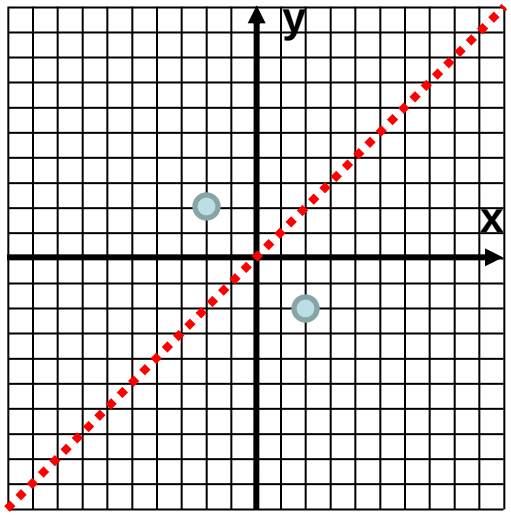
H x-axis

J y-axis

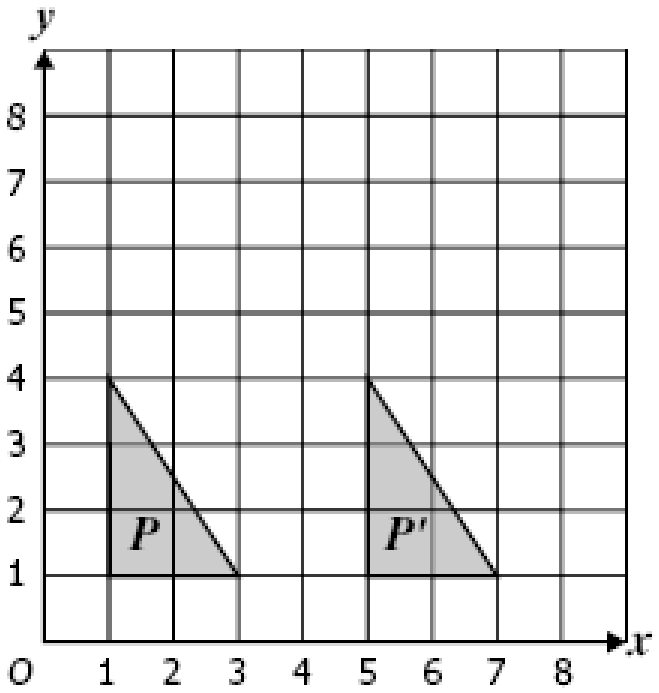
SSM:

- **plot the points and the lines of reflection**
- **see which is equal distant**

plot points and then the lines of reflection



42 **Which transformation could move the triangle P to triangle P' in a single step?**



SSM:
- **slide**

F Reflection over $x = 4$

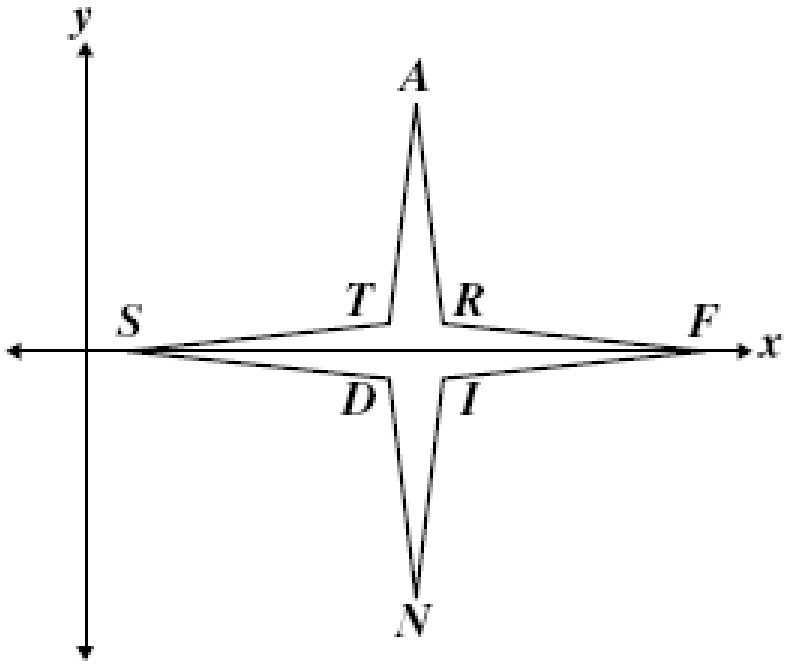
G Rotation about $(2, 3)$

H Reflection over $y = 4$

J Translation

Triangle slid over → Translation

43 Figure $STARFIND$ is symmetric with respect to the x-axis. The coordinates of point A are (8, 6). What are the coordinates of point N ?



SSM:
- fold over x-axis
- y value switches sign

A $(8, -6)$
B $(6, -8)$
C $(-6, 8)$
D $(-8, 6)$

symmetric to x-axis is (-1) × y-value

45 A regular quadrilateral has what type of symmetry?

A Line symmetry only
B Point symmetry only
C Both point and line symmetry
D Neither point nor line symmetry

SSM:
- **draw figure**
- **draw lines of symmetry**

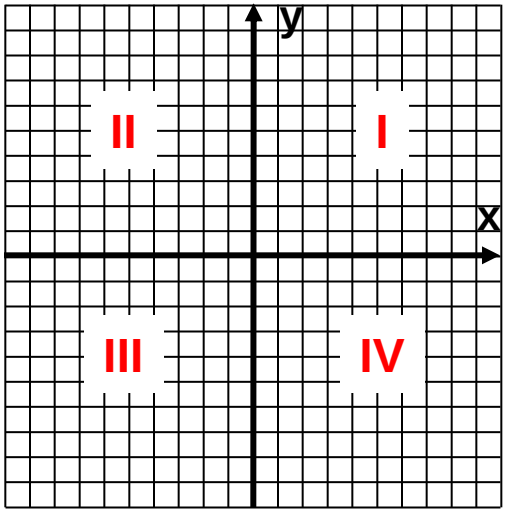
Regular quadrilateral is a square and has four lines of symmetry
Even numbered regular polygons have a point of symmetry

40 A trapezoid is located entirely in quadrant II. If this trapezoid is reflected across the x-axis, in which quadrant will the new trapezoid be located?

F I
G II
H III
J IV

SSM:
- **plot an example**
- **flip**

flip it over the x axis and it goes to the 3 quadrant



42 Which of the following letters has both line symmetry and point symmetry?

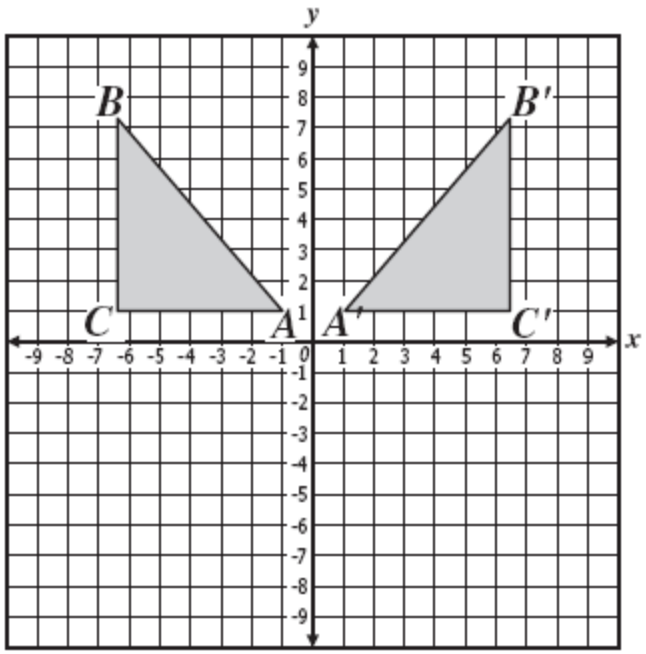
S D M H

F S
G D
H M
J H

SSM:
- no help

M has a line of symmetry
S and D do not have a line of symmetry
H has two lines of symmetry and a point of symmetry
(at the intersection of the two lines)

43 Triangle ABC was transformed into triangle $A'B'C'$. Which term most accurately describes this transformation?



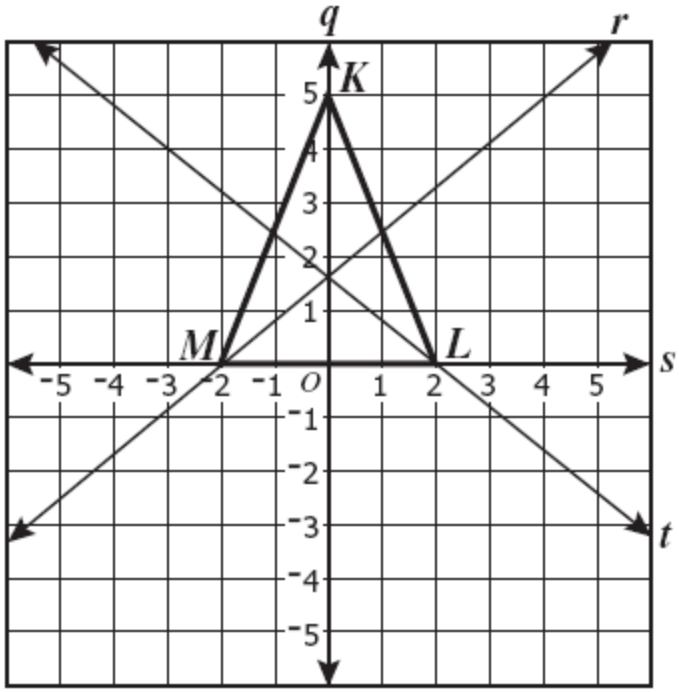
SSM:

- **orientation changed**
  flip or turn
  folded over y-axis

A Tessellation
B Reflection
C Rotation
D Translation

Since A was closest to y-axis and A' is closest to y-axis, a reflection or flip occurred

39



SSM:

- which line can the triangle be folded in half over

Which is most likely a line of symmetry for triangle KLM ?

A q
B r
C s
D t

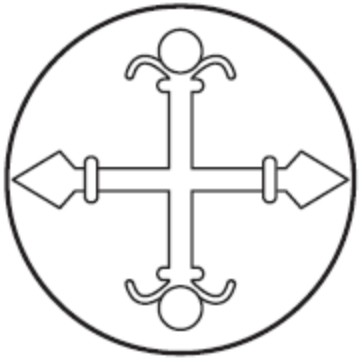
Only line q allows the figure to be folded in half perfectly

41 Janelle is looking at plate designs. Which design has exactly 4 lines of symmetry?

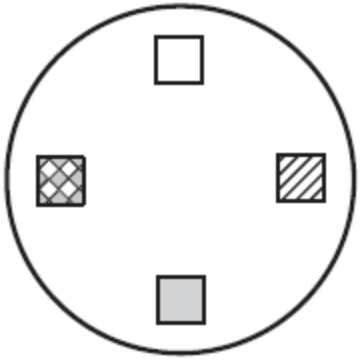
SSM:

- look for pattern that repeats 4 times

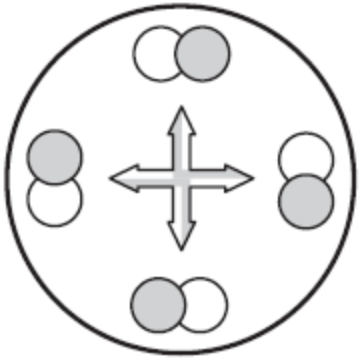
A



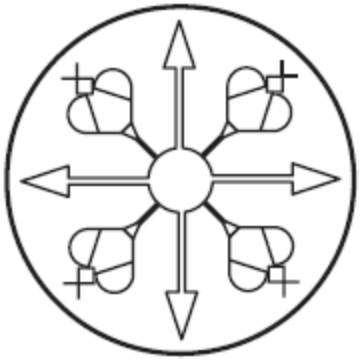
C



B



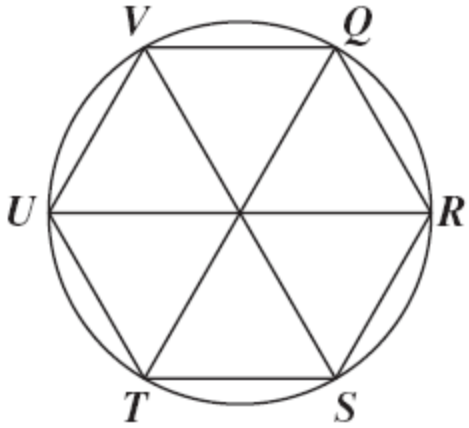
D



Eliminate answers:

A. only 2 lines of symmetry (pattern repeats twice)
B. no lines of symmetry (no pattern)
C. shaded circles mess up repeating patterns
D. pattern repeats in all four quadrants

42 In the design, a hexagon is inscribed in a circle.



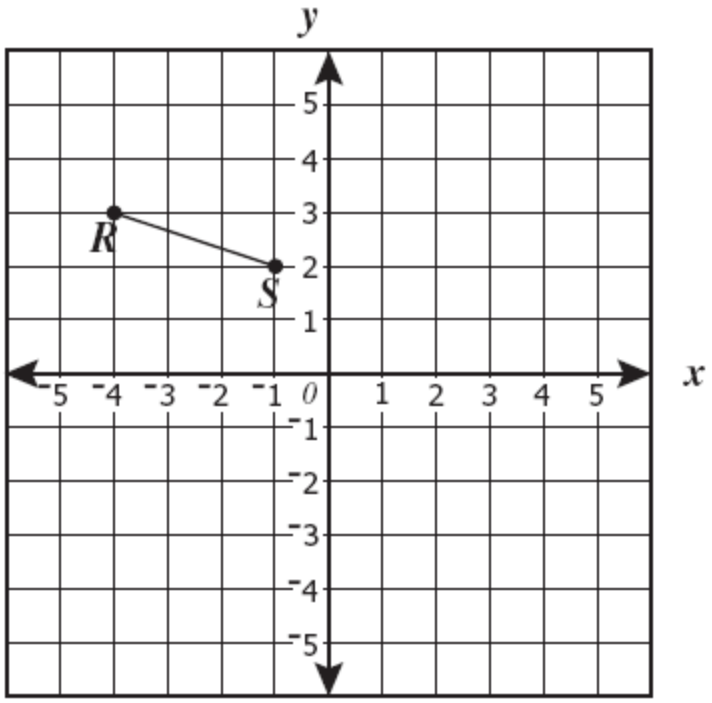
SSM:
- draw a compass with Q as North
- answer between South (T) and West (between U & V)

Which point shows the location of Point Q after a 240° clockwise rotation around the center?

F S
G T
H U
J V

Clockwise rotation is in the RS direction from Q
180 is at point T
270 is between U&V

43



SSM:

- **fold RS over y-axis in your mind**
- **plot answer points on graph**

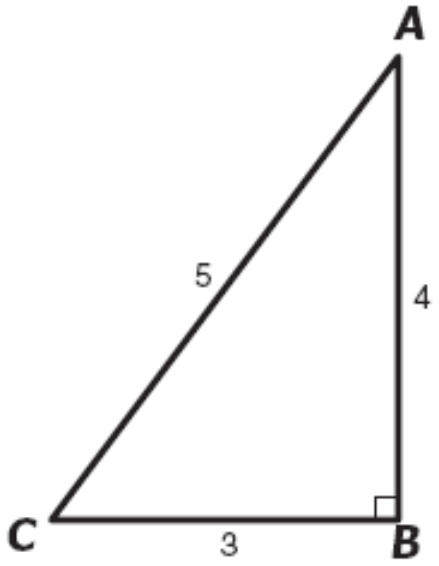
What are the *most* likely coordinates of R' if $\overline{R'S'}$ is a reflection of $\overline{RS}$ across the y-axis?

A (4, 3)
B $(^-4, ^-3)$
C $(4, ^-3)$
D (3, 4)

Equal distant from y-axis or (x, y) → (-x, y)

(-4, 3) → (4, 3)

40 Right triangle *ABC* has the measures shown.



SSM:
- How can the triangle be folded in half?
- It can't!

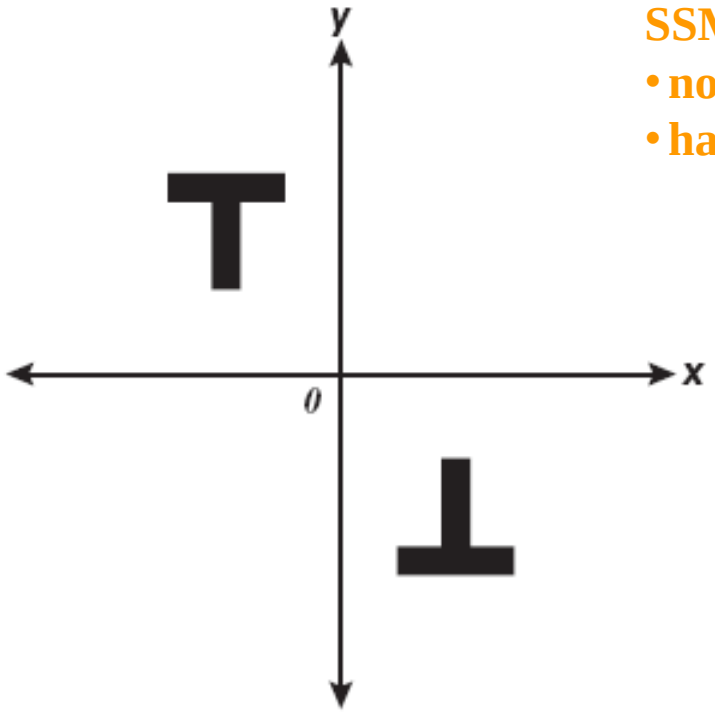
What is the *maximum* number of different lines of symmetry that can be drawn through △*ABC*?

F 0
G 1
H 2
J 3

line of symmetry means to be able to fold in half

scalene triangles can not be folded in half
so no lines of symmetry

42



SSM:

- not a reflection across a line!
- half way around the origin

In relation to one figure, the other figure is apparently a —

F reflection across the line $y = 1$

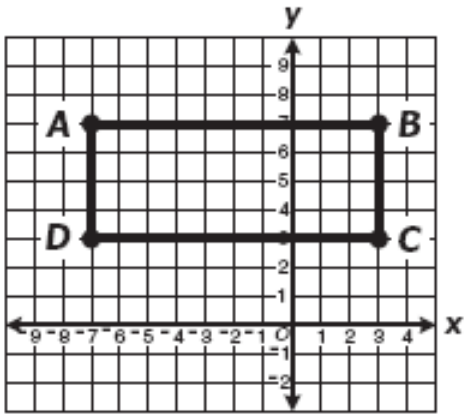
G reflection across the line $y = x$

H 90° rotation about the origin

J 180° rotation about the origin

reflection across the origin is the same as a 180° rotation about the origin

44 Rectangle *ABCD* is placed in a coordinate plane as shown.



SSM:
- graph each answer
- which cuts rectangle in half?

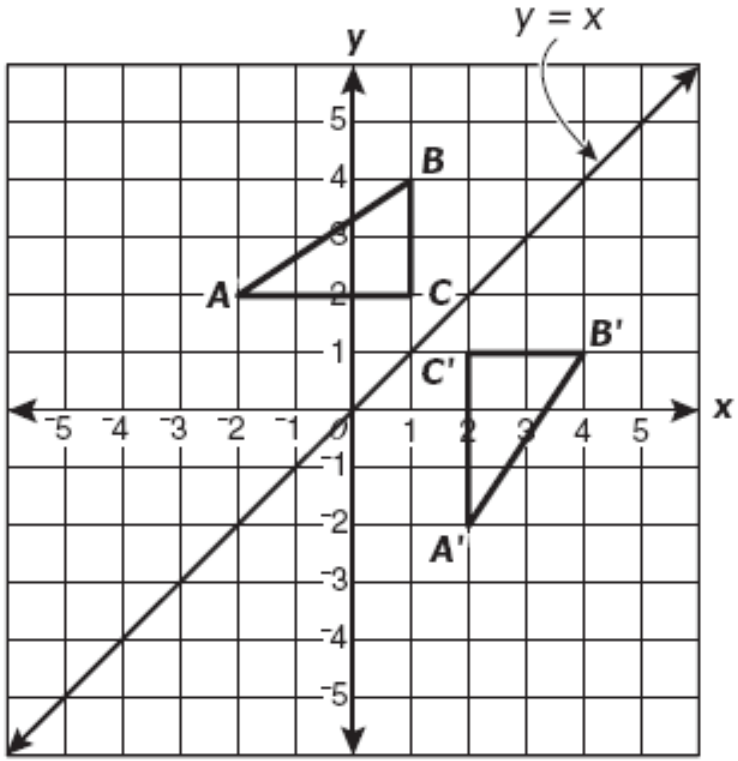
Which equation describes a line of symmetry for rectangle *ABCD*?

F $x = 2$
G $x = 5$
H $y = 5$
J $y = x$

Line y = 5 cuts the rectangle into two halves

so it is a line of symmetry

45



SSM:
- reflections → equal distance
- folded over line y = x

$\triangle A'B'C'$ is apparently the result of —

A reflecting $\triangle ABC$ across the y-axis

B reflecting $\triangle ABC$ across the x-axis

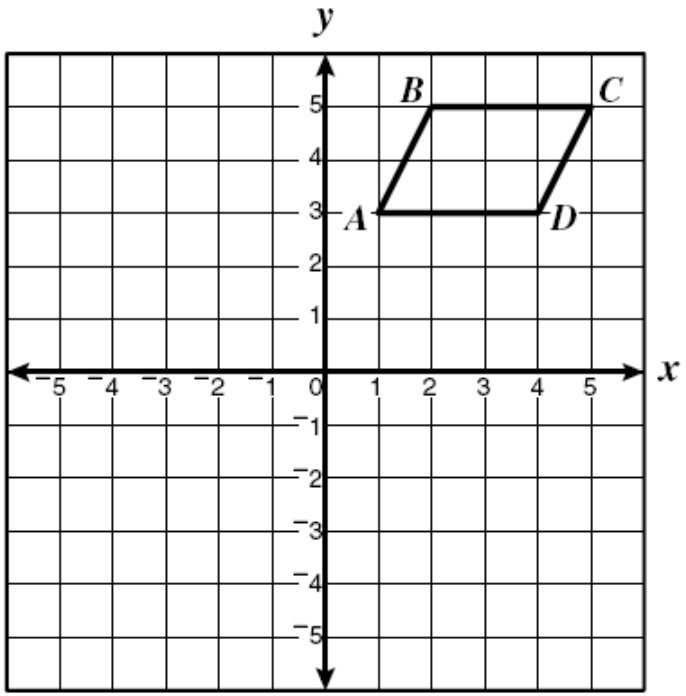
C rotating $\triangle ABC$ about the point (1, 2)

D reflecting $\triangle ABC$ across the line $y = x$

reflection across line y = x

points and their reflections are equal distance from line of reflection

40



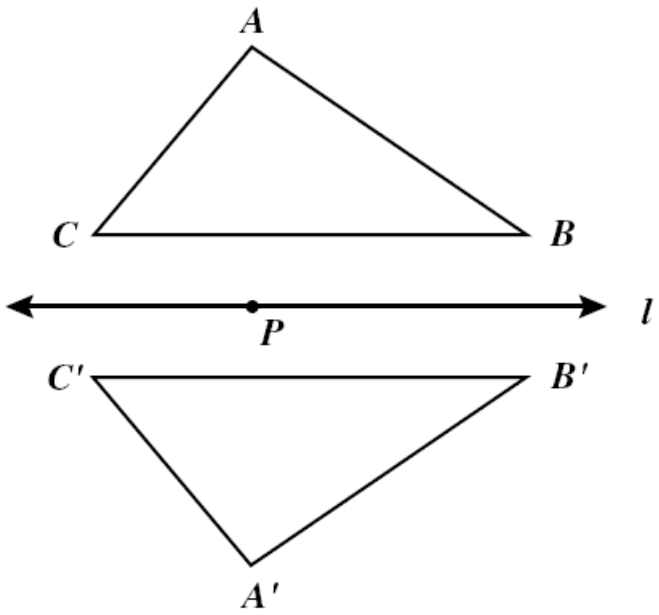
If parallelogram *ABCD* is translated so that the new location of point *D* is (⁻1, 2), what would be the new location of point *B*?

F (⁻5, 0)
G (⁻3, 4)
H (⁻2, 5)
J (1, 4)

SSM:
- **copy figure on graph paper**
- **use scrap paper and copy figure and move D to new location**

- **from D to B is left 2 and up 2**
- **from (-1,2) do the same**

41 **Triangle $A'B'C'$ is a transformation of triangle ABC.**



If $A \rightarrow A'$, $B \rightarrow B'$, and $C \rightarrow C'$, $A'B'C'$ is a —

A reflection of triangle ABC across line l

B 180° rotation of triangle ABC about Point P

C translation of triangle ABC across the line l

D 90° rotation of triangle ABC across the line l

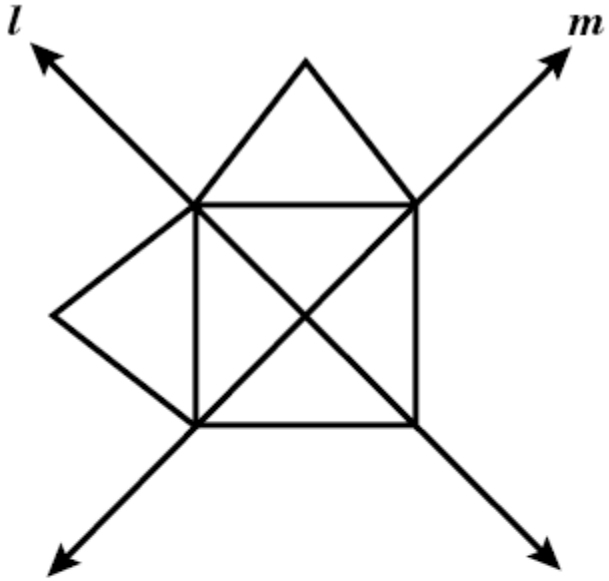
SSM:

- **orientation changed for A , but not for C or B → reflection**

- **Have to check each answer to see which is correct**

- **Answer A**

44



The figure shown is apparently symmetric with respect to —

F line l only

G line m only

H both lines l and m

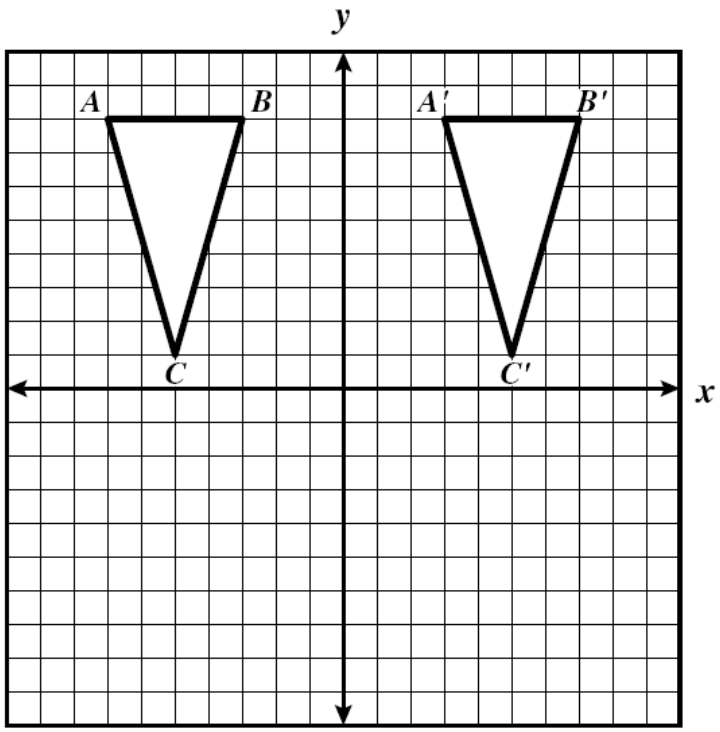
J neither line l nor line m

SSM:

- **copy figure on graph paper**
- **fold over the lines**

- **line of symmetry must have the same things on both sides**

42



Triangle $A'B'C'$ is —

F a translation of triangle ABC across the y-axis

G a 90° clockwise rotation of triangle ABC about the origin

H a reflection of triangle ABC across the y-axis

J a reflection of triangle ABC across the x-axis

SSM:
- **slide**

check each answer:
A – correct
B – same orientation, so no rotation
C – A and A' still on left → no reflection
D – same side of x-axis

43 How many different lines of symmetry does a square have?

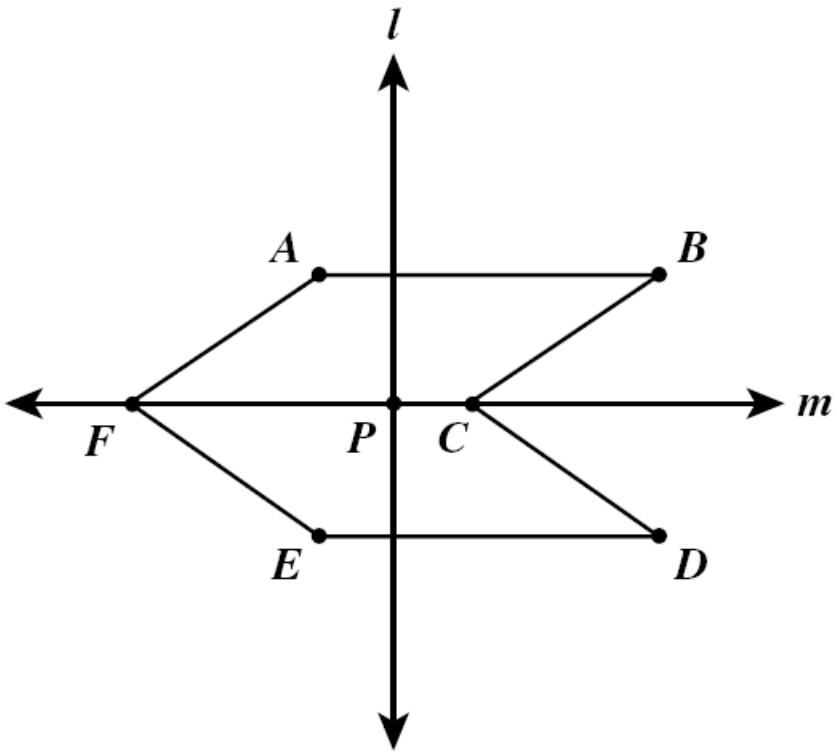
A 1
B 2
C 3
D 4

SSM:
- draw a square and its lines of symmetry

Regular polygons have the same number of sides as lines of symmetry

so n = 4

45



Hexagon *ABCDEF* is apparently symmetric with respect to —

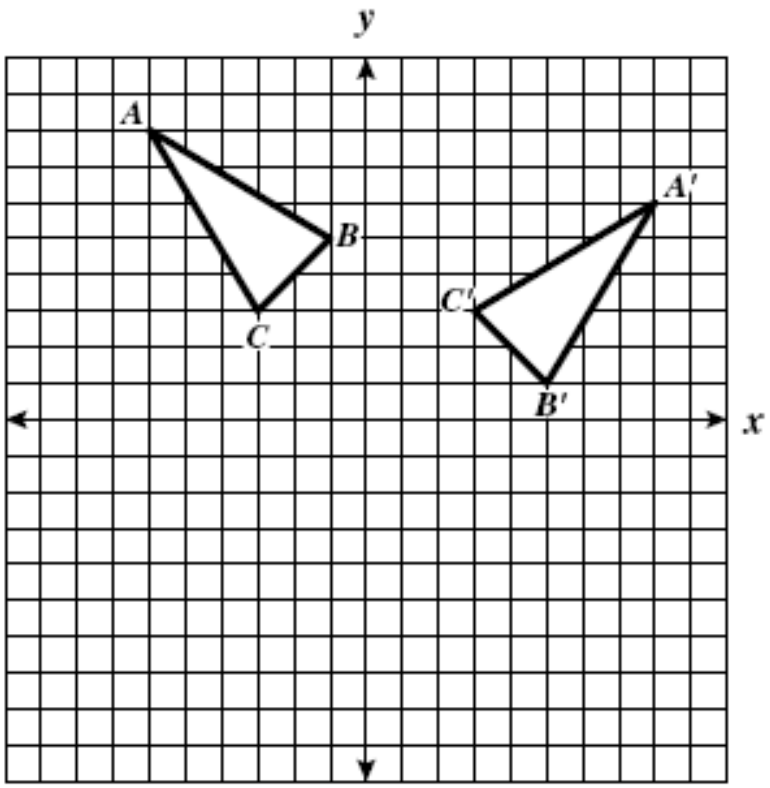
A point P only
B line m only
C line l only
D both lines l and m only

SSM:
- **fold figure in half over lines**
- **draw lines connecting corners through P**

Line m is the only symmetric item in picture

you can fold the figure in half over it and get the match ups

41



Triangle $A'B'C'$ is apparently —

A a translation of triangle ABC across the x-axis

B a 90° clockwise rotation of triangle ABC about the origin

C a reflection of triangle ABC across the y-axis

D a reflection of triangle ABC across the x-axis

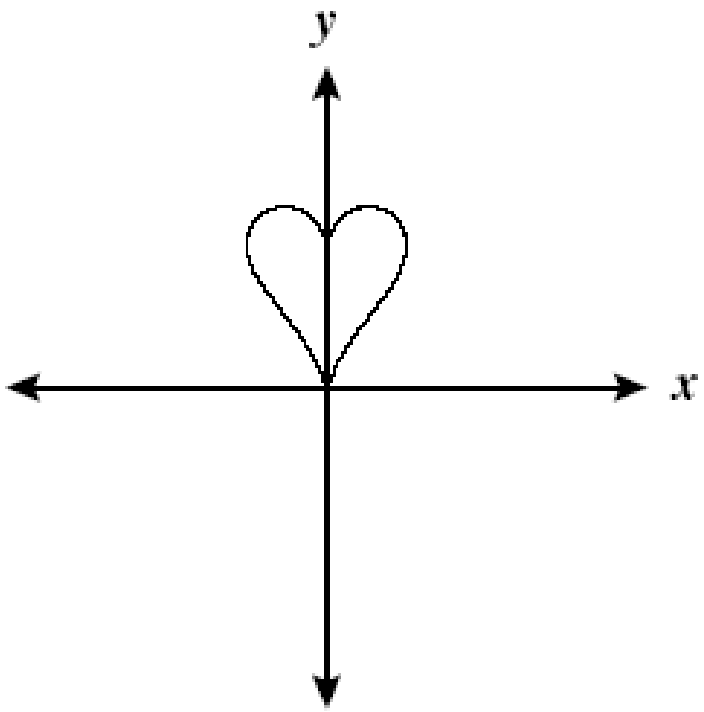
SSM:

- **no much help**

not a reflection or a translation → orientation of the figure changes

clockwise rotation

43



This figure is apparently symmetric with respect to —

A the x-axis only

B the y-axis only

C both the x-axis and the y-axis

D neither the x-axis nor the y-axis

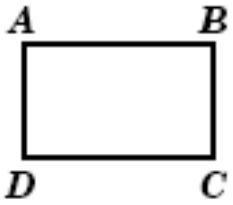
SSM:

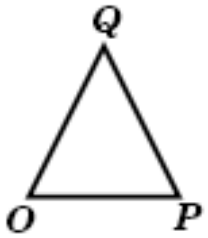
- **fold figure in half**
- **which line does it fold over?**

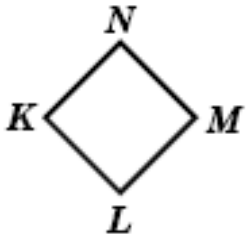
Line x = 0, y-axis, cuts the heart into two halves

so it is a line of symmetry

40







Which polygon shown above has only one line of symmetry?

F Rectangle *ABCD*

G Hexagon *EFGHIJ*

H Square *KLMN*

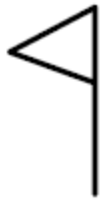
J Triangle *OPQ*

SSM:

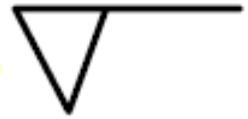
- **copy figures and draw in lines of symmetry**

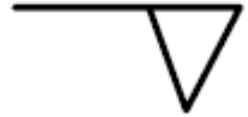
Rectangles have two
Hexagons have at least two (regular ones have 6)
Squares have four
Triangle have at most three (isosceles have 1!)

41 Consider this figure.



Which of the following is a rotation in the plane of the given figure?

A 

B 

C 

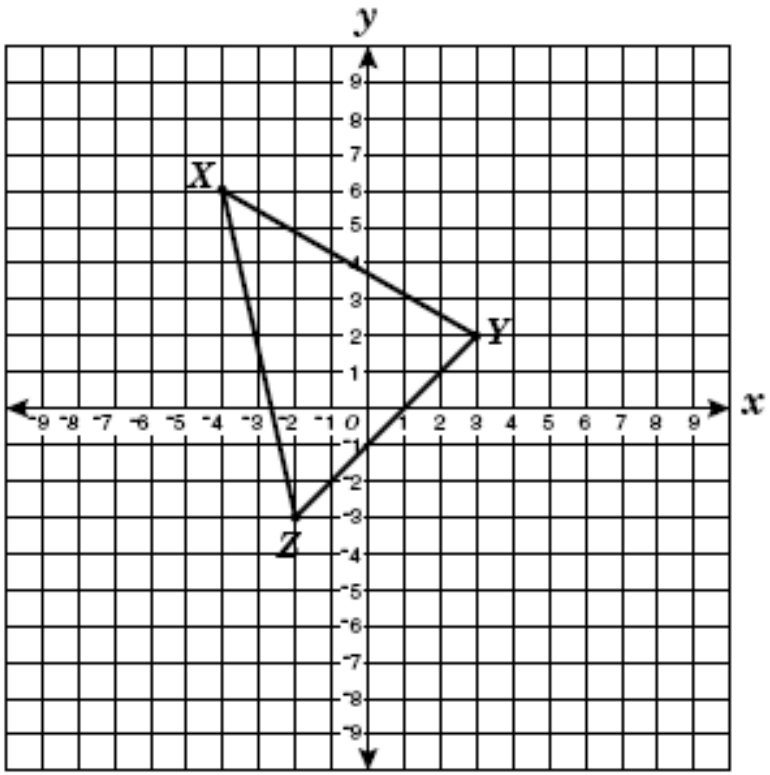
D 

SSM:

- draw figure on scrap paper and rotate the paper
- see which answer fits

Rotations keep orientation within figure same
The point of the flag is to the left of the stick as it rotates it either trails (clockwise) or leads (counterclockwise)

42



If triangle XYZ is reflected across the y-axis to form triangle $X'Y'Z'$, what is the coordinate of Y'?

F $(-3, 2)$
G $(4, 6)$
H $(2, -3)$
J $(3, -2)$

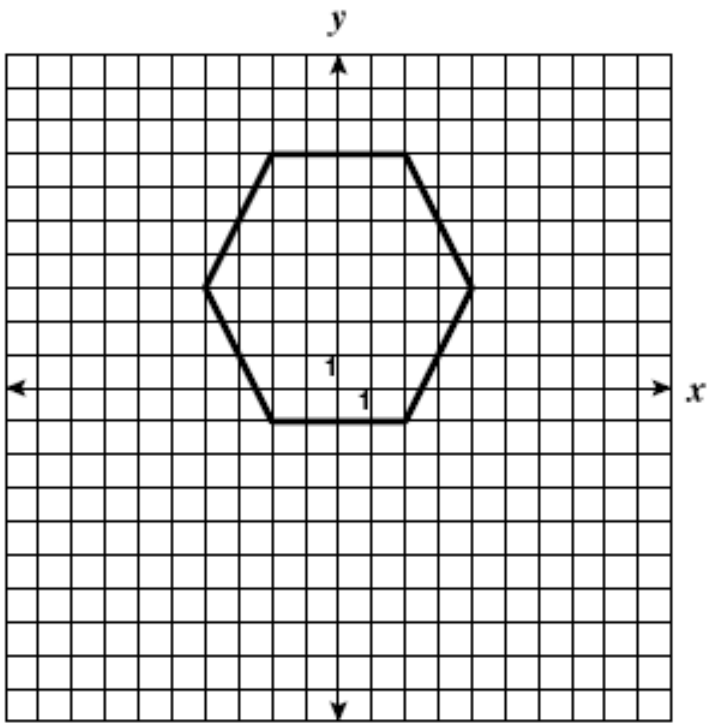
SSM:

- **Plot points at see which is Y reflected across y-axis**

reflections are equal distant from reflection line

Y was 3 away from y-axis, (y-value stays at 2)
Y' is -3 away from y-axis

40 All the vertices of the hexagon have integral coordinates.



One of the lines of symmetry for the hexagon goes through —

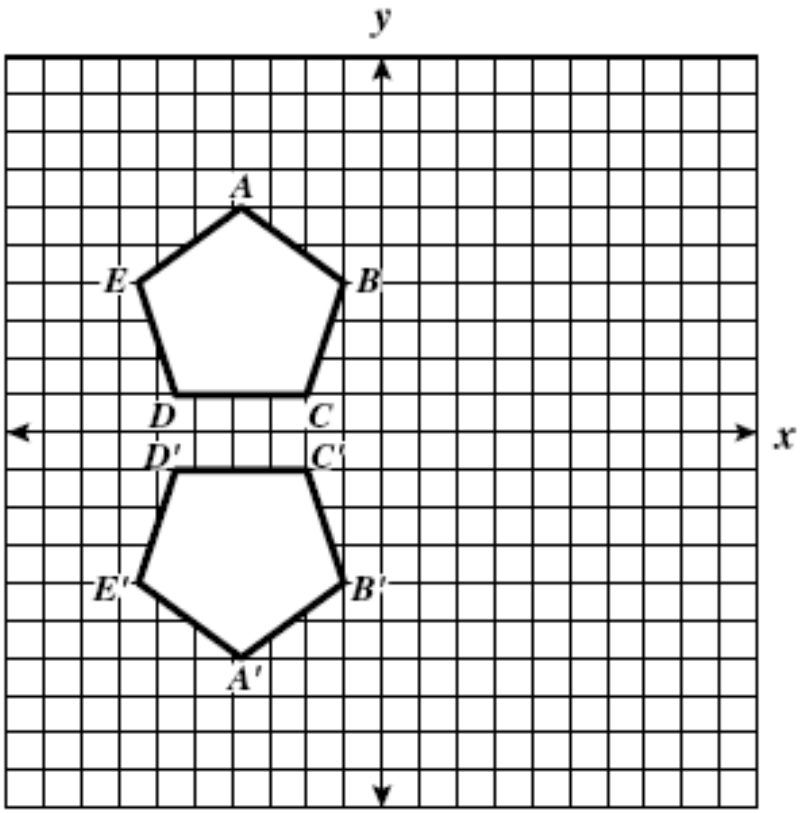
F $(-4, 3)$ and $(4, 3)$
G $(-2, -2)$ and $(2, 7)$
H $(-2, 7)$ and $(2, -2)$
J $(2, -2)$ and $(-2, -7)$

SSM:

- graph each line from pair of points
- see which is a line of symmetry

Answer F is a horizontal line of symmetry

41



The polygon $A'B'C'D'E'$ is —

A a translation of $ABCDE$ across the x-axis

B a 180° clockwise rotation of $ABCDE$ about the origin

C a reflection of $ABCDE$ across the y-axis

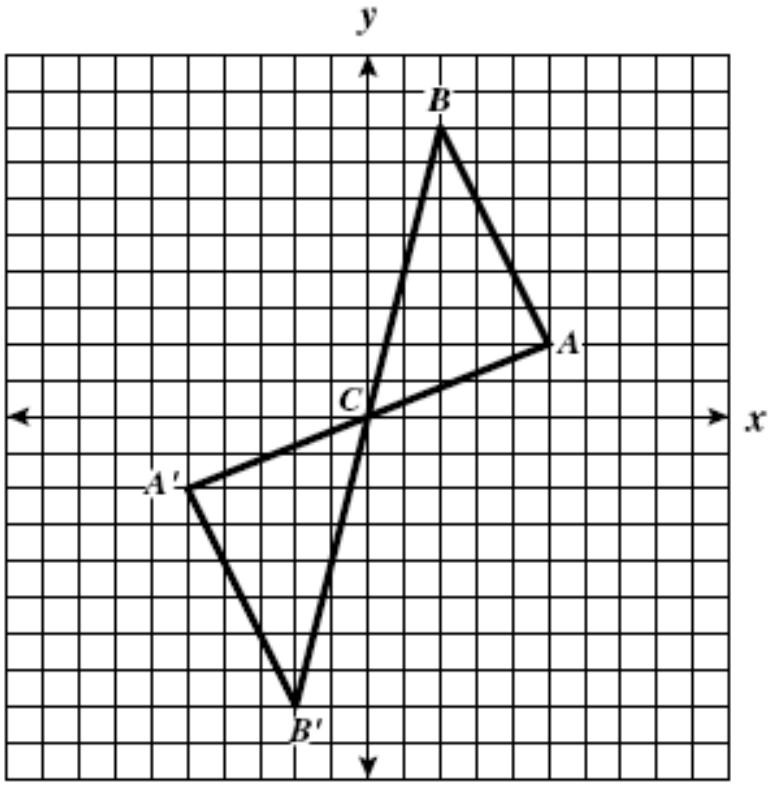
D a reflection of $ABCDE$ across the x-axis

SSM:

- **no help**

the pentagon has been reflected across the x-axis

42



Triangle $A'B'C$ is —

F a translation of triangle ABC across the y-axis

G a 180° rotation of triangle ABC about the origin

H a reflection of triangle ABC across the y-axis only

J a reflection of triangle ABC across the x-axis only

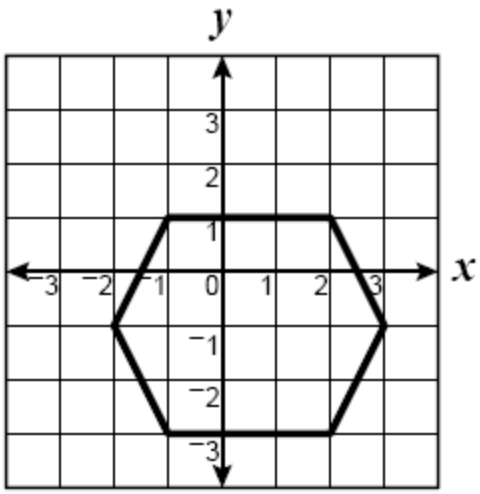
SSM:

- **translation → no**
- **reflection across axis → no**
- **must be rotation**

The figure is a reflection across the origin

Reflections across the origin are the same as 180° rotations about the origin

41



The hexagon in the drawing has a line of symmetry through —

A $(-1, -3)$ and $(2, 1)$

B $(1, 1)$ and $(1, -3)$

C $(2, 3)$ and $(2, -3)$

D $(-2, -1)$ and $(3, -1)$

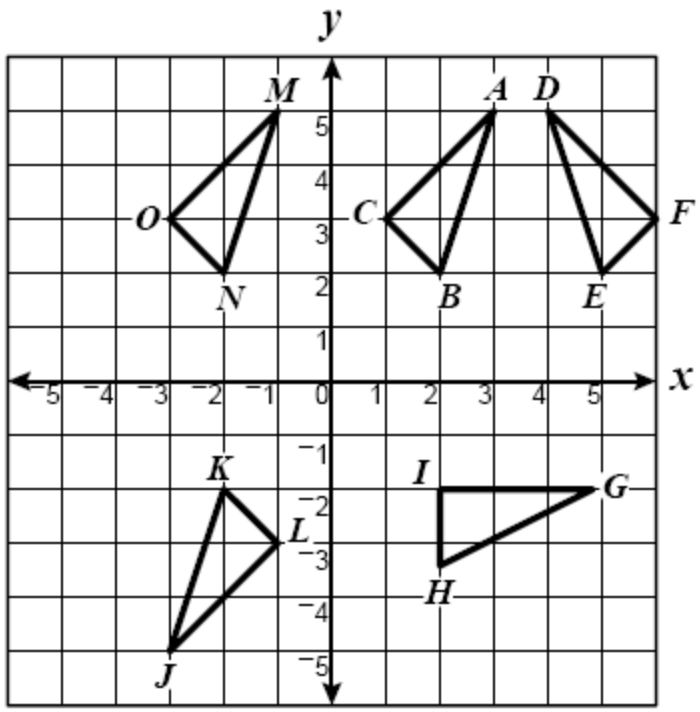
SSM:

- **draw picture on graph paper**
- **draw lines of symmetry (splitting figure in half)**
- **see which answer fits**

lines of symmetry cut figure in half
since it is not a regular hexagon (all sides not equal), it will have less than 6 lines of symmetry

y = -1 is a horizontal line of symmetry and
x = ½ is a vertical line of symmetry

42



SSM:

- **180 is halfway of 360**

Which triangle is a 180° rotation about the origin of triangle *ABC*?

F Δ *DEF*

G Δ *GHI*

H Δ *JKL*

J Δ *MNO*

180 ° rotation is same as a flip across origin going from QI to QIII