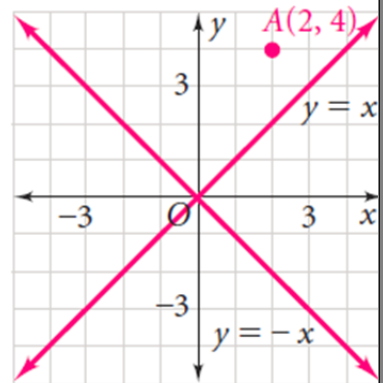


12.1 Reflections Challenge

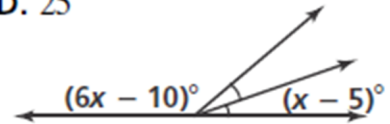
55. Use the diagram at the right. Find the coordinates of the given point in the given line.

- a. A' , the reflection image of A in the line $y = x$
- b. A'' , the reflection image of A' in the line $y = -x$
- c. A''' , the reflection image of A'' in the line $y = x$
- d. A'''' , the reflection image of A''' in the line $y = -x$
- e. How are A and A'''' related?



6. Find the value of x in the figure at the right.

- A. 10
- B. 12.5
- C. 20
- D. 25

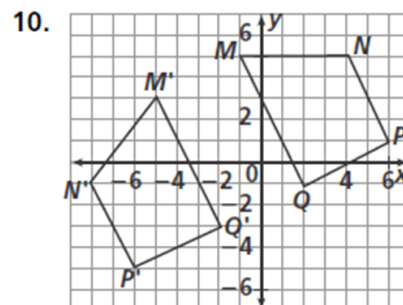
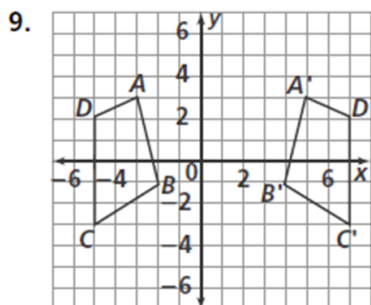
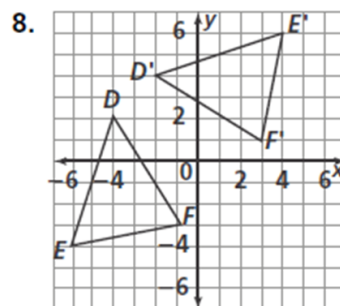
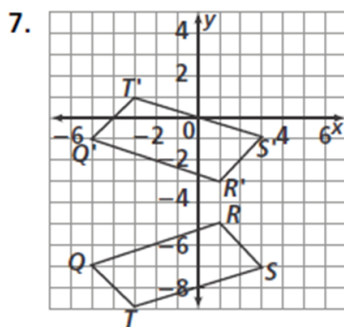


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Feb 23-12:22 PM

12.1 Reflections Challenge (continued)

Draw the line of reflection on each grid. Then give the equation of the line of reflection.



Feb 23-12:29 PM

12.2 Translations Challenge

39. **Coordinate Geometry** $\triangle MUG$ has coordinates $M(2, -4)$, $U(6, 6)$, and $G(7, 2)$. A translation maps point M to $M'(-3, 6)$. Find the coordinates of U' and G' under this translation.

Find a single translation that has the same effect as each composition of translations.

42. $\langle 2, 5 \rangle$ followed by $\langle -4, 9 \rangle$

43. $\langle -3, 7 \rangle$ followed by $\langle 3, -7 \rangle$

44. $\langle 1, -3 \rangle$ followed by $\langle 5, 2 \rangle$

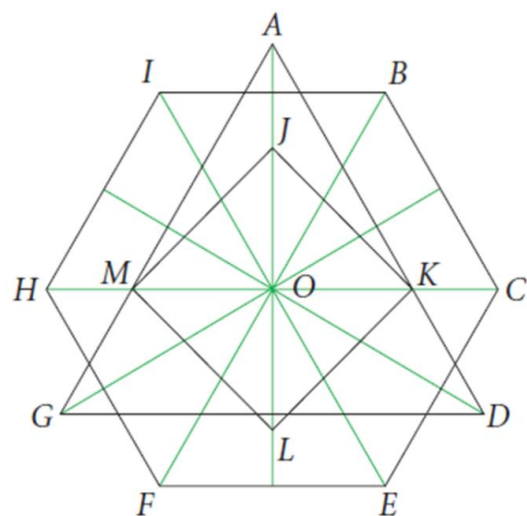
51. a. $\triangle ABC$ has vertices $A(-2, 5)$, $B(-4, -1)$, and $C(2, -3)$. Find the image of $\triangle ABC$ under the translation $\langle 4, 2 \rangle$.
 b. Show that the images of the midpoints of the sides of $\triangle ABC$ are the midpoints of $\triangle A'B'C'$.

Feb 23-2:43 PM

12.3 Rotations Challenge

The large triangle, quadrilateral, and hexagon are regular. Find the image of each point or segment for the given rotation.
 (Hint: Green segments form 30° angles.)

- | | |
|---|---|
| 10. 120° rotation of B about O | 11. 270° rotation of L about O |
| 12. 60° rotation of E about O | 13. 300° rotation of \overline{IB} about O |
| 14. 240° rotation of G about O | 15. 180° rotation of \overline{JK} about O |
| 16. 120° rotation of F about H | 17. 270° rotation of M about L |



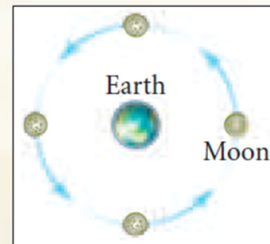
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Feb 23-3:08 PM

12.3 Rotations Challenge (continued)

27. **Language Arts** The symbol ə is called a *schwa*. It is used in dictionaries to represent neutral vowel sounds such as *a* in *ago*, *i* in *sanity*, and *u* in *focus*. What transformation maps a ə to a lowercase e?

The same hemisphere of the moon always faces Earth. Thus, the motion of the moon about Earth for a given time interval can be modeled by a rotation. The center of the rotation is the center of Earth. The angle of rotation is determined by the time interval, given that one journey of the moon around Earth takes about $27\frac{1}{3}$ days.



37. What rotation is modeled by the motion of the moon?
A. a circle rotating about its center B. a circle rotating about a point
C. 2 circles rotating around each other D. a circle rotating around a circle
38. In how many days does the moon complete a 90° angle of rotation?
F. about 4 G. about 7 H. about 14 I. about 27

Feb 23-3:10 PM

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