Graph each figure and its image along the given vector.
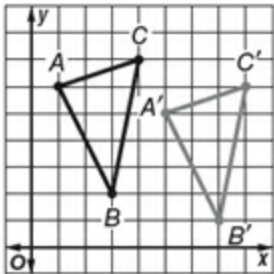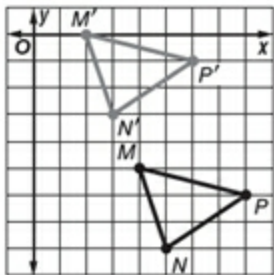
14. $\triangle ABC$ with vertices $A(1, 6)$, $B(3, 2)$, and $C(4, 7)$; $\langle 4, -1 \rangle$
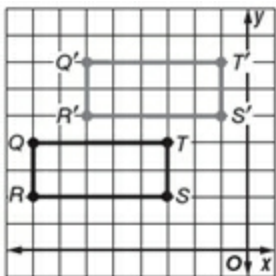
ANSWER:

15. $\triangle MNP$ with vertices $M(4, -5)$, $N(5, -8)$, and $P(8, -6)$; $\langle -2, 5 \rangle$
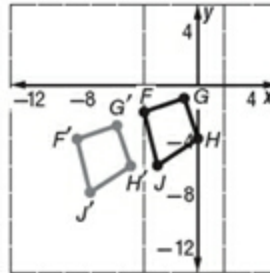
ANSWER:

16. rectangle $QRST$ with vertices $Q(-8, 4)$, $R(-8, 2)$, $S(-3, 2)$, and $T(-3, 4)$; $\langle 2, 3 \rangle$
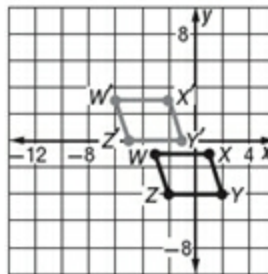
ANSWER:

17. quadrilateral $FGHJ$ with vertices $F(-4, -2)$, $G(-1, -1)$, $H(0, -4)$, and $J(-3, -6)$; $\langle -5, -2 \rangle$
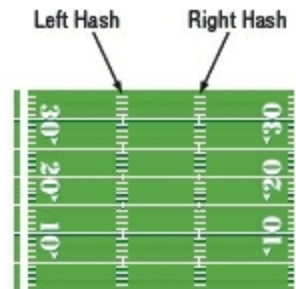
ANSWER:

18. $\square WXYZ$ with vertices $W(-3, -1)$, $X(1, -1)$, $Y(2, -4)$, and $Z(-2, -4)$; $\langle -3, 4 \rangle$

ANSWER:

21. **FOOTBALL** A wide receiver starts from his 15-yard line on the right hash mark and runs a route that takes him 12 yards to the left and down field for a gain of 17 yards. Write a translation vector to describe the receiver's route.
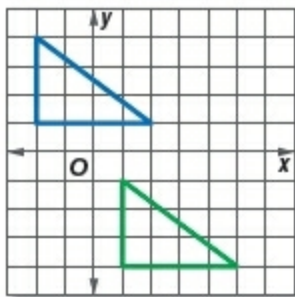
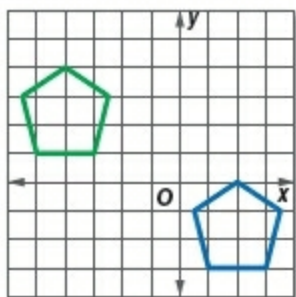

ANSWER:
$\langle -12, 17 \rangle$

Write each translation vector that maps the blue preimage to the green image.

23.

ANSWER:

$\langle 3, -5 \rangle$.

24.

ANSWER:

$\langle -6, 4 \rangle$.

30. **REASONING** Determine a rule to find the final image of a point that is translated along $\langle x+a, y+b \rangle$ and then $\langle x+c, y+d \rangle$.

ANSWER:

$\langle x+a+c, y+b+d \rangle$.

37. Which of the following vectors will translate a point with the coordinates $(3, -5)$ up and to the left on a coordinate plane?

A $\langle -3, 0 \rangle$
B $\langle 3, 3 \rangle$
C $\langle -3, 3 \rangle$
D $\langle 0, 3 \rangle$

ANSWER:

C

38. Given a triangle with vertices $A(-7, -1)$, $B(-2, -3)$ and $C(2, 4)$, which of the following represents the coordinates of the vertices of the image after a translation of the triangle 5 units right and 3 units up?

A $A(-4, 4)$, $B(1, 2)$ and $C(5, 9)$
B $A(-2, 2)$, $B(3, 0)$ and $C(7, 7)$
C $A(-12, 2)$, $B(-7, 0)$ and $C(-3, 7)$
D $A(-2, -4)$, $B(3, -6)$ and $C(7, 1)$

ANSWER:

B

40. What is the distance between any point and its image under the translation $(x, y) \rightarrow (x+4, y-6)$? Round to the nearest tenth.

ANSWER:

7.2