Name_____   Date _____
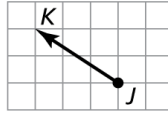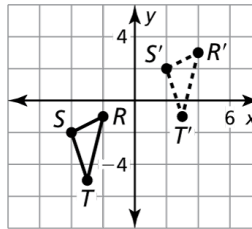
4.1 Practice A

1. Name the vector and write its component form.

2. The vertices of $\triangle ABC$ are $A(2, 3)$, $B(-1, 2)$, and $C(0, 1)$. Translate $\triangle ABC$ using the vector $\langle 1, -4 \rangle$. Graph $\triangle ABC$ and its image.

3. Find the component form of the vector that translates $A(3, -2)$ to $A'(-1, 4)$.

4. Write a rule for the translation of $\triangle RST$ to $\triangle R'S'T'$.

In Exercises 5 and 6, use the translation $(x, y) \to (x + 1, y - 3)$ to find the image of the given point.

5. $Q(5, 9)$

6. $M(-3, -8)$

In Exercises 7 and 8, graph $\triangle CDE$ with vertices $C(-1, 3)$, $D(0, -2)$, and $E(1, 1)$ and its image after the given translation or composition.
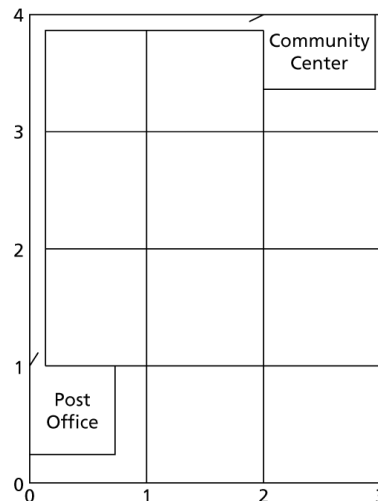
7. **Translation:** $(x, y) \to (x - 3, y + 1)$

8. **Translation:** $(x, y) \to (x + 10, y - 8)$
   Translation: $(x, y) \to (x - 7, y + 15)$

9. You want to plot the collinear points $A(-2, 3)$, $A'(x, y)$, and $A''(3, 7)$ on the same coordinate plane. Do you have enough information to find the values of x and y? Explain your reasoning.
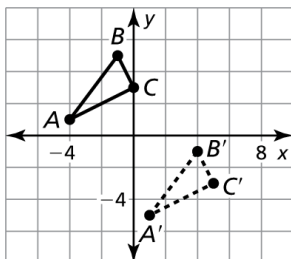
10. You are using the map shown to navigate through the city. You decide to walk to the Post Office from your current location at the Community Center. Describe the translation that you will follow. If each grid on the map is 0.05 mile, how far will you travel?

Name _____ Date _____

4.1 Practice B

1. The vertices of $\triangle FGH$ are $F(-2, -6)$, $G(3, 0)$, and $H(1, -4)$. Translate $\triangle FGH$ using the vector $\langle -2, 7\rangle$. Graph $\triangle FGH$ and its image.

2. Find the component form of the vector that translates $A(-4, 8)$ to $A'(7, -9)$.

3. Write a rule for the translation of $\triangle ABC$ to $\triangle A'B'C'$.

In Exercises 4 and 5, use the translation $(x, y) \to (x - 4, y + 3)$ to find the image of the given point.

4. $G(-2, 4)$

5. $H(-10, 5)$

6. Graph $\triangle JKL$ with vertices $J(-2, 8)$, $K(1, -3)$, and $L(5, 4)$ and its image after the composition.

Translation: $(x, y) \to (x + 6, y - 1)$
Translation: $(x, y) \to (x - 1, y - 7)$

7. Is the transformation given by $(x, y) \to (2x + 2, y + 1)$ a translation? Explain your reasoning.

8. A popular kid's game has 15 tiles and 1 open space. The goal of the game is to rearrange the tiles to put them in order (from least to greatest, starting at the upper left-hand corner and going across each row). Use the figure to write the transformation(s) that describe the path of where the 8 tile is currently, and where it must be by the end of the game. Can this same translation be used to describe the path of all the tiles?

8	2	3	7
5	6	4	14
1	9	■	13
11	15	10	12

9. Graph any triangle and translate it in any direction. Draw translation vectors for each vertex of the triangle. Is there a geometric relationship between all the translation vectors? Explain why this makes sense in terms of the slope of the line.

10. Point $P(4, -2)$ undergoes a translation given by $(x, y) \to (x + 3, x - a)$, followed by another translation $(x, y) \to (x - b, x + 7)$ to produce the image of $P''(-5, 8)$. Find the values of a and b and point P'.