

UNIT 5 • TRANSFORMATIONS IN THE COORDINATE PLANE**Lesson 1: Introducing Transformations****Problem-Based Task 5.1.2: In the Mail Room**

The mail room at a growing retail company stuffs, addresses, weighs, and stamps hundreds of envelopes to be mailed each day. The mail clerks used to do this by hand, but because the company has grown, the process will now be automated. After an open envelope is placed face down on a moving rack, the automated process is as follows:

1. The envelope is stuffed by pushing the open envelope onto the mailer.
2. The envelope is then retracted.
3. The envelope is then moved to where it will be sealed.
4. Once the envelope is sealed it must be flipped face-up to be addressed.
5. The envelope is moved to where it is addressed.
6. The envelope is then rotated 90° and placed on a scale where it is weighed and stamped.
7. Finally, the envelope is pushed off the rack and into a bin to be mailed.

The transformation functions for each step are as follows:

- | | |
|-----------------------------|--|
| 1. $S_1(x, y) = (x, y + 3)$ | Stuffing the envelope. |
| 2. $S_2(x, y) = (x, y - 3)$ | Retracting the stuffed envelope. |
| 3. $T(x, y) = (x + 4, y)$ | Moving the envelope down the rack. |
| 4. $F(x, y) = (x, -y)$ | Flipping the envelope over. |
| 5. $T(x, y) = (x + 4, y)$ | Moving the envelope down the rack. |
| 6. $R(x, y) = (y, -x)$ | Rotating the envelope clockwise 90° . |
| 7. $T(x, y) = (x + 4, y)$ | Moving the envelope down the rack. |

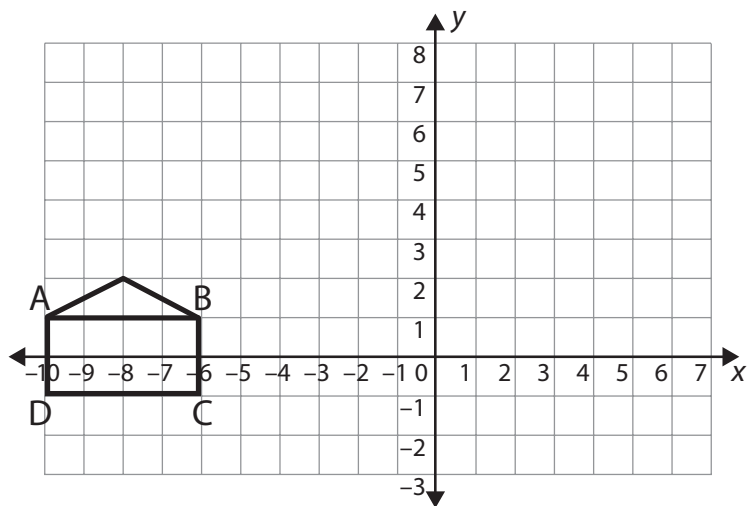
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Lesson 1: Introducing Transformations

Each envelope has a width of 4 units and a height of 2 units. Envelopes start at the location shown in the graph below, with the initial coordinates of A $(-10, 1)$, B $(-6, 1)$, C $(-6, -1)$, and D $(-10, -1)$.



Use the functions provided to determine the coordinates of A , B , C , and D during the process.