Addition Functions

1. Find the following four vectors:

\[ A_{(3,1)}(2,2) \]

\[ A_{(3,1)}(-2,2) \]

\[ A_{(3,1)}(2,-2) \]

\[ A_{(3,1)}(-2,-2) \]

2. Draw the four vectors above as points in the plane.

3. Let \( S \subseteq \mathbb{R}^2 \) be the set of points that make up the square below. For example, \((2,2), (2,-2), (-2,2), \text{ and } (-2,-2)\) are all points in \( S \).

4. \( A_{(3,1)}(S) \) is the set of all points of the form \( A_{(3,1)}(a,b) \) where \((a,b) \in S\.

List at least four points in \( A_{(3,1)}(S) \).

5. In the planes above, first on the left and then on the right, draw the set \( A_{(3,1)}(S) \).

6. \( A_{(3,1)}(S) \) is called the image of \( S \) under \( A_{(3,1)} \).
Scaling

① Find the following four vectors:

$$\frac{5}{2} (2,2)$$

$$\frac{5}{2} (2,-2)$$

$$\frac{5}{2} (-2,2)$$

$$\frac{5}{2} (-2,-2)$$

② Let $S \subseteq \mathbb{R}^2$ be the square below

③ On the plane to the left, draw the result of scaling every point in $S$ by $\frac{5}{2}$. 