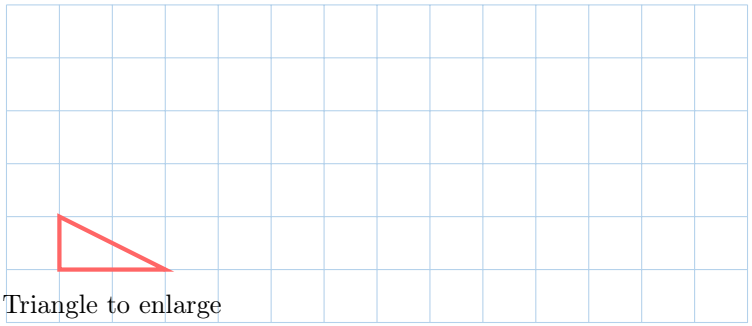
ENLARGEMENT AND REDUCTION

A WHAT ARE ENLARGEMENT AND REDUCTION?

A.1 ENLARGING SHAPES

Ex 1: Enlarge the triangle shown below by a scale factor of 2.

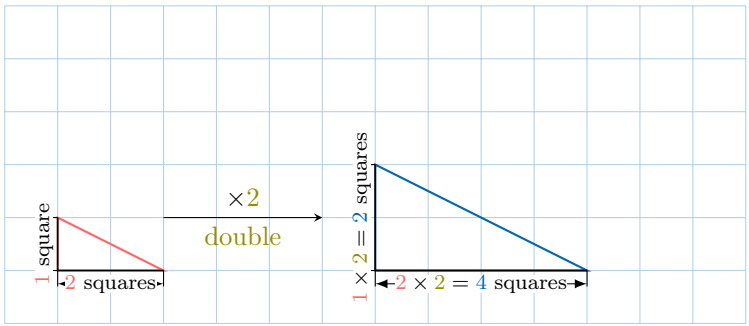


Triangle to enlarge

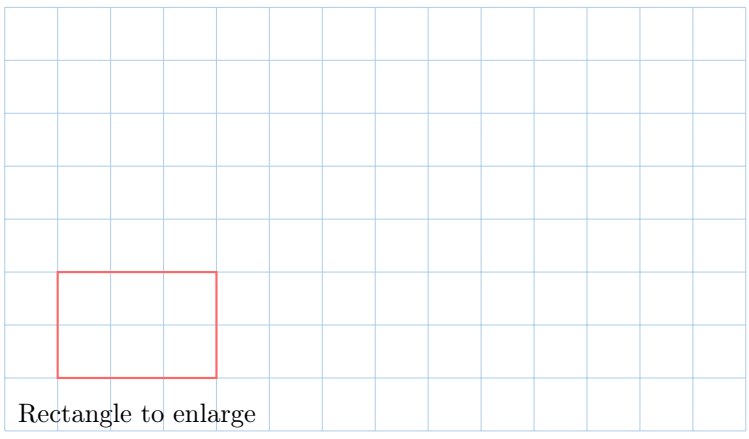
Answer: To enlarge the triangle by a scale factor of 2, follow these steps:

1. Measure the side lengths of the original triangle in squares. The base is 2 squares, and the height is 1 square.
2. Multiply each side length by 2. The new base will be $2 \times 2 = 4$ squares, and the new height will be $1 \times 2 = 2$ squares.
3. Choose a starting point on the graph paper. Plot the new vertices by counting the doubled distances (e.g., 4 squares right for the base, 2 squares up for the height).
4. Connect the vertices with straight lines using a ruler to form the enlarged triangle, ensuring the shape is closed with no crossing lines.

For example:



Ex 2: Enlarge the rectangle shown below by a scale factor of 2.

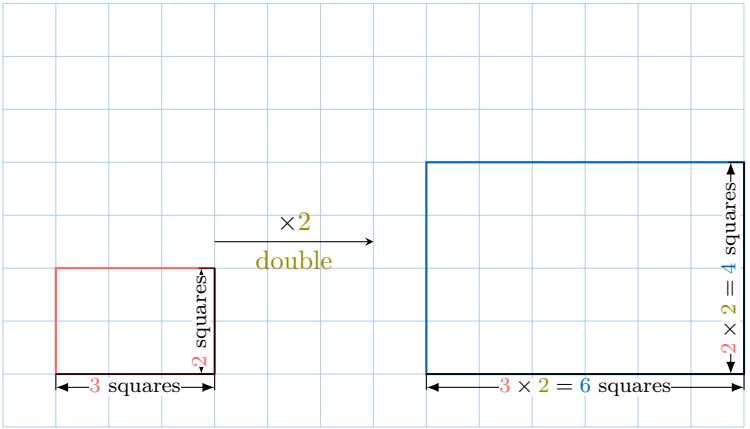


Rectangle to enlarge

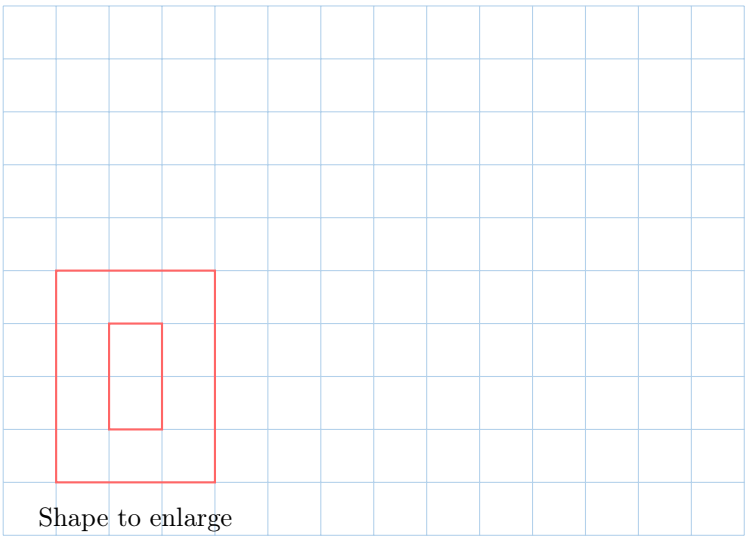
Answer: To enlarge the rectangle by a scale factor of 2, follow these steps:

1. Measure the side lengths of the original rectangle in squares. The width is 3 squares, and the height is 2 squares.
2. Multiply each side length by 2. The new width will be $3 \times 2 = 6$ squares, and the new height will be $2 \times 2 = 4$ squares.
3. Choose a starting point on the graph paper. Plot the new vertices by counting the doubled distances (e.g., 6 squares right for the width, 4 squares up for the height).
4. Connect the vertices with straight lines using a ruler to form the enlarged rectangle, ensuring the shape is closed with no crossing lines.

For example:



Ex 3: Enlarge the shape shown below by a scale factor of 2.



Shape to enlarge

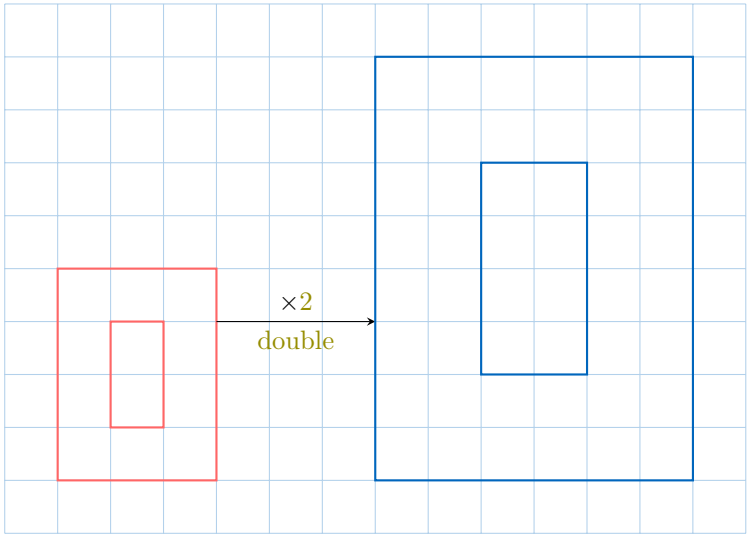
Answer: To enlarge the shape by a scale factor of 2, follow these steps:

1. Measure the side lengths of both rectangles in the original shape in squares. The larger rectangle has a width of 3 squares and a height of 4 squares. The smaller rectangle has a width of 1 square and a height of 2 squares.
2. Multiply each side length by 2. For the larger rectangle, the new width will be $3 \times 2 = 6$ squares, and the new height will be $4 \times 2 = 8$ squares. For the smaller rectangle, the new width will be $1 \times 2 = 2$ squares, and the new height will be $2 \times 2 = 4$ squares.

3. Choose a starting point on the graph paper. Plot the new vertices for both rectangles by counting the doubled distances, ensuring the smaller rectangle's position relative to the larger one is maintained (e.g., its bottom-left vertex shifts from 1 square right and 1 square up to 2 squares right and 2 squares up).

4. Connect the vertices of each rectangle with straight lines using a ruler to form the enlarged shape, ensuring both rectangles are closed with no crossing lines.

For example:



Ex 4: Enlarge the rectangle shown below by a scale factor of 3.

Rectangle to enlarge

Answer: To enlarge the rectangle by a scale factor of 3, follow these steps:

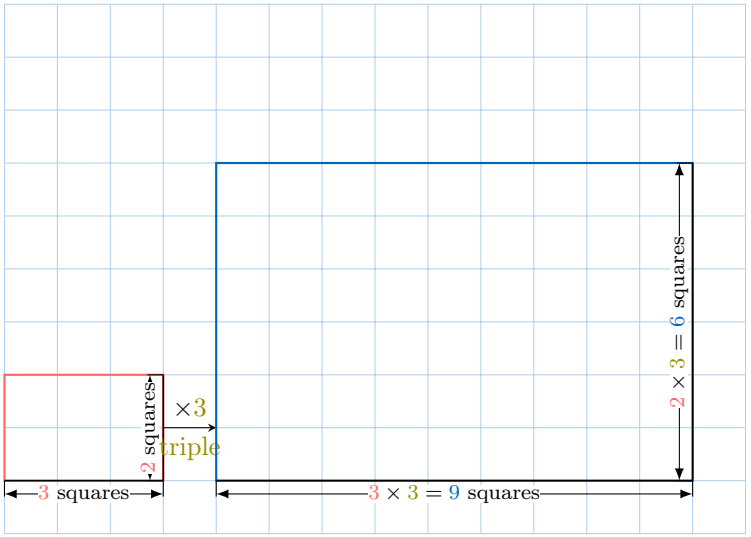
1. Measure the side lengths of the original rectangle in squares. The width is 3 squares, and the height is 2 squares.

2. Multiply each side length by 3. The new width will be $3 \times 3 = 9$ squares, and the new height will be $2 \times 3 = 6$ squares.

3. Choose a starting point on the graph paper. Plot the new vertices by counting the tripled distances (e.g., 9 squares right for the width, 6 squares up for the height).

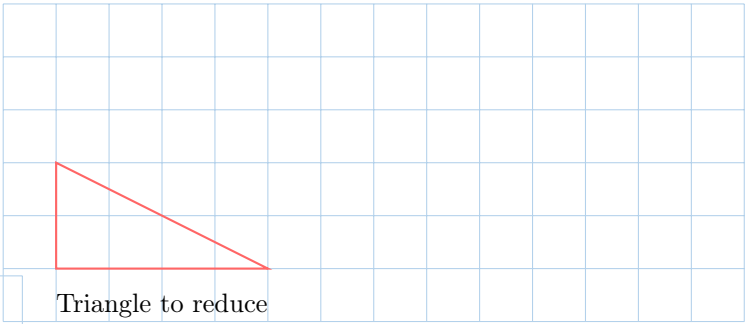
4. Connect the vertices with straight lines using a ruler to form the enlarged rectangle, ensuring the shape is closed with no crossing lines.

For example:



A.2 REDUCING SHAPES

Ex 5: Reduce the triangle shown below by a scale factor of 2.



Triangle to reduce

Answer: To reduce the triangle by a scale factor of 2, follow these steps:

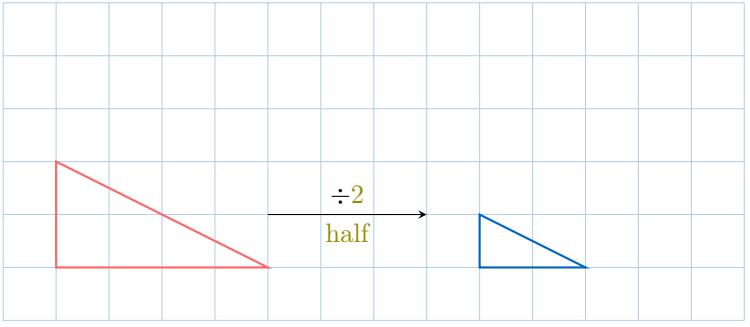
1. Measure the side lengths of the original triangle in squares. The base is 4 squares, and the height is 2 squares.

2. Divide each side length by 2. The new base will be $4 \div 2 = 2$ squares, and the new height will be $2 \div 2 = 1$ square.

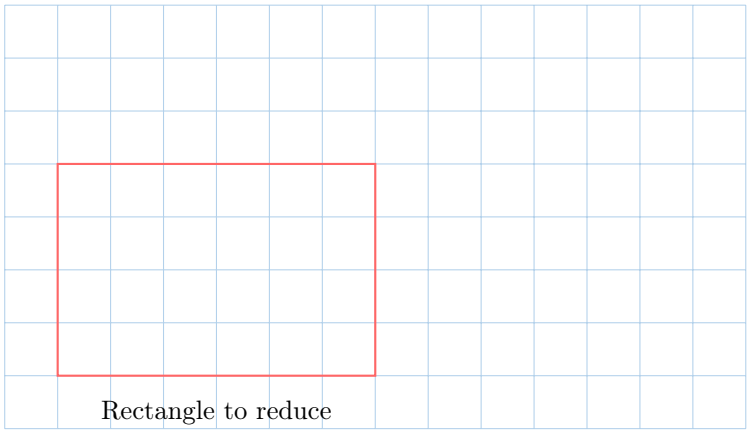
3. Choose a starting point on the graph paper. Plot the new vertices by counting the halved distances (e.g., 2 squares right for the base, 1 square up for the height).

4. Connect the vertices with straight lines using a ruler to form the reduced triangle, ensuring the shape is closed with no crossing lines.

For example:



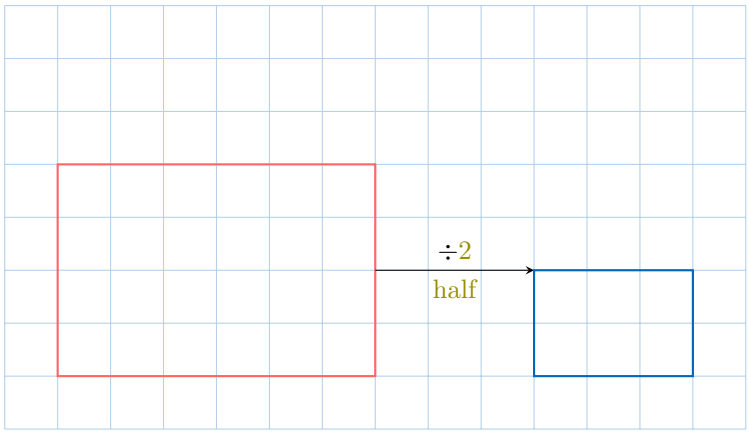
Ex 6: Reduce the rectangle shown below by a scale factor of 2.



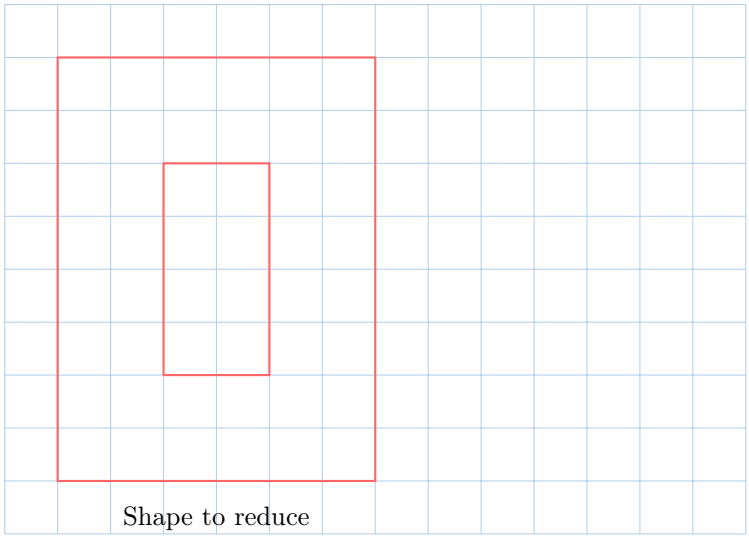
Answer: To reduce the rectangle by a scale factor of 2, follow these steps:

1. Measure the side lengths of the original rectangle in squares. The width is 6 squares, and the height is 4 squares.
2. Divide each side length by 2. The new width will be $6 \div 2 = 3$ squares, and the new height will be $4 \div 2 = 2$ squares.
3. Choose a starting point on the graph paper. Plot the new vertices by counting the halved distances (e.g., 3 squares right for the width, 2 squares up for the height).
4. Connect the vertices with straight lines using a ruler to form the reduced rectangle, ensuring the shape is closed with no crossing lines.

For example:



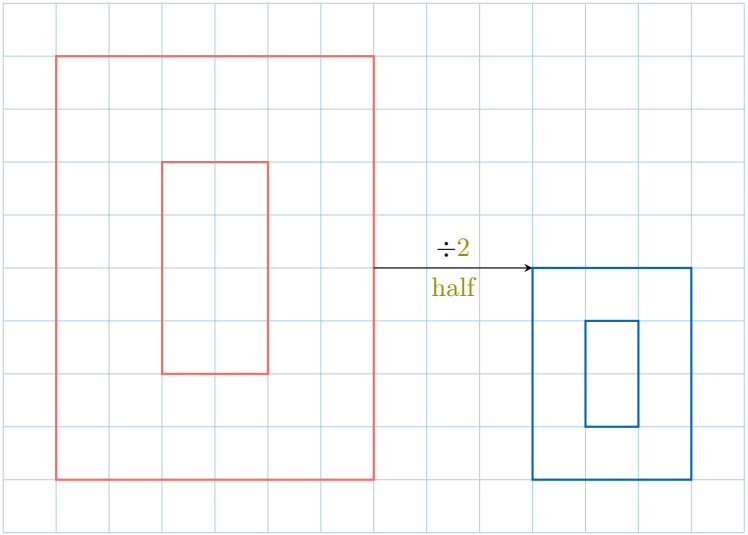
Ex 7: Reduce the shape shown below by a scale factor of 2.



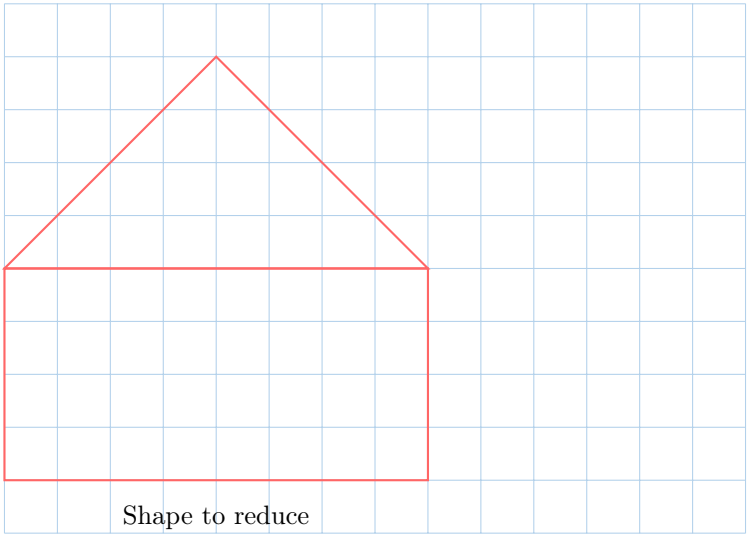
Answer: To reduce the shape by a scale factor of 2, follow these steps:

1. Measure the side lengths of both rectangles in the original shape in squares. The larger rectangle has a width of 6 squares and a height of 8 squares. The smaller rectangle has a width of 2 squares and a height of 4 squares.
2. Divide each side length by 2. For the larger rectangle, the new width will be $6 \div 2 = 3$ squares, and the new height will be $8 \div 2 = 4$ squares. For the smaller rectangle, the new width will be $2 \div 2 = 1$ square, and the new height will be $4 \div 2 = 2$ squares.
3. Choose a starting point on the graph paper. Plot the new vertices for both rectangles by counting the halved distances, ensuring the smaller rectangle's position relative to the larger one is maintained (e.g., its bottom-left vertex shifts from 2 squares right and 2 squares up to 1 square right and 1 square up).
4. Connect the vertices of each rectangle with straight lines using a ruler to form the reduced shape, ensuring both rectangles are closed with no crossing lines.

For example:



Ex 8: Reduce the shape shown below by a scale factor of 2.



Answer: To reduce the shape by a scale factor of 2, follow these steps:

1. Measure the side lengths of the rectangle and triangle in the original shape in squares. The rectangle has a width of 8 squares and a height of 4 squares. The triangle has a base of 8 squares and a height of 4 squares.

2. Divide each side length by 2. For the rectangle, the new width will be $8 \div 2 = 4$ squares, and the new height will be $4 \div 2 = 2$ squares. For the triangle, the new base will be $8 \div 2 = 4$ squares, and the new height will be $4 \div 2 = 2$ squares.

3. Choose a starting point on the graph paper. Plot the new vertices for both the rectangle and triangle by counting the halved distances, ensuring the triangle's base remains aligned with the rectangle's top side (e.g., the triangle's apex shifts from 4 squares above the base to 2 squares above).

4. Connect the vertices of the rectangle and triangle with straight lines using a ruler to form the reduced shape, ensuring both shapes are closed with no crossing lines.

For example: