Name: _____ Date: _____

Reflections, Translations, and Dilations

Step 1: **Graph** and **label** the following points on your coordinate plane.

A (2,2) **B** (2,8) **C** (8,8) **D** (8,2)

Step 2: **Connect** the dots in alphabetical order to make a square.

Step 3: **Multiply** each x-coordinate by -1, and each y-coordinate by 1. This means the x-coordinate will change to its opposite, and the y-coordinate will stay the same.

What are the coordinates of your new points?

A' _____ **B'** _____ **C'** _____ **D'** _____

Step 4: **Graph**, **label**, and **connect** your points from step 3. This <u>reflects</u> your shape over the y-axis.

Step 5: **Multiply** each ORIGINAL (from step 1) x-coordinate by 1, and each y-coordinate by -1.

What are the coordinates of your new points?

A'' _____ **B''** _____ **C''** _____ **D''** _____

Step 6: **Graph**, **label**, and **connect** your points from step 5. This <u>reflects</u> your shape over the x-axis.

Step 7: **Multiply** each ORIGINAL (from step 1) x-coordinate by 2, and each y-coordinate by 2.

What are the coordinates of your new points?

A''' _____ **B'''** _____ **C'''** _____ **D'''** _____

Step 8: **Graph**, **label**, and **connect** your points from step 9. This <u>dilates</u> your shape (enlarges it).

Name: _____ Date: _____

Question 1: Which kind of transformations changed the size of your square?

Question 2: Which kind of transformations did NOT change the size of your square?

Question 3: Did any of the transformations change your square into a different shape?

Question 4: Measure the sides of your squares with a ruler. Use the measurements to prove that your square from step 1 is similar to your square from step 7.

Name: _____ Date: _____

Step 9: **Graph** and **label** the following points on your coordinate plane.

E (13, -5) **F** (13, -14) **G** (5, -14)

Step 10: **Connect** the dots in alphabetical order to make a right triangle.

Step 11: What will you need to do to reflect your triangle over the y-axis (look at step 4 if you aren't sure).

Step 12: **Reflect** your triangle over the y-axis.

What are the coordinates of your new points?

E' _____ **F'** _____ **G'** _____

Step 13: Move your triangle from step 12 up 15 spaces. This means you will need to add 15 to each y-coordinate. This is called a translation.

What are the coordinates of your new points?

E'' _____ **F''** _____ **G''** _____

Step 14: **Color** your shapes.

Name: _____ Date: _____

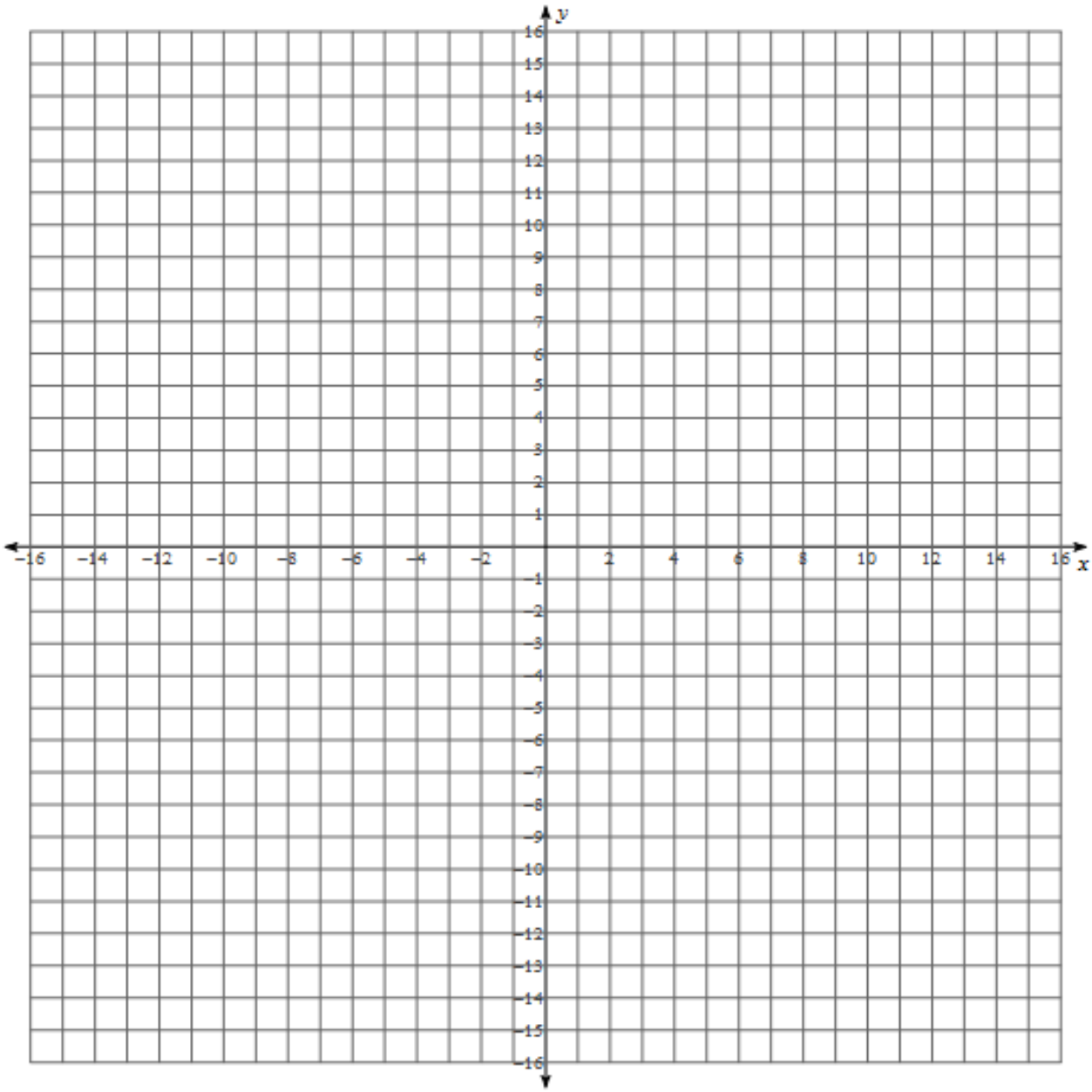
Question 5: How do you think you would move your original square (from step 1) to Quadrant III? What would you need to do to the x and y coordinates?

Question 6: Use a ruler and a protractor to measure the side lengths and angle measures of your 3 triangles. Did any of these transformations change the triangle measurements?

Challenge: Draw the line y=x on your graph. What would you need to do to the coordinates of ΔEFG to reflect it over the line y=x?

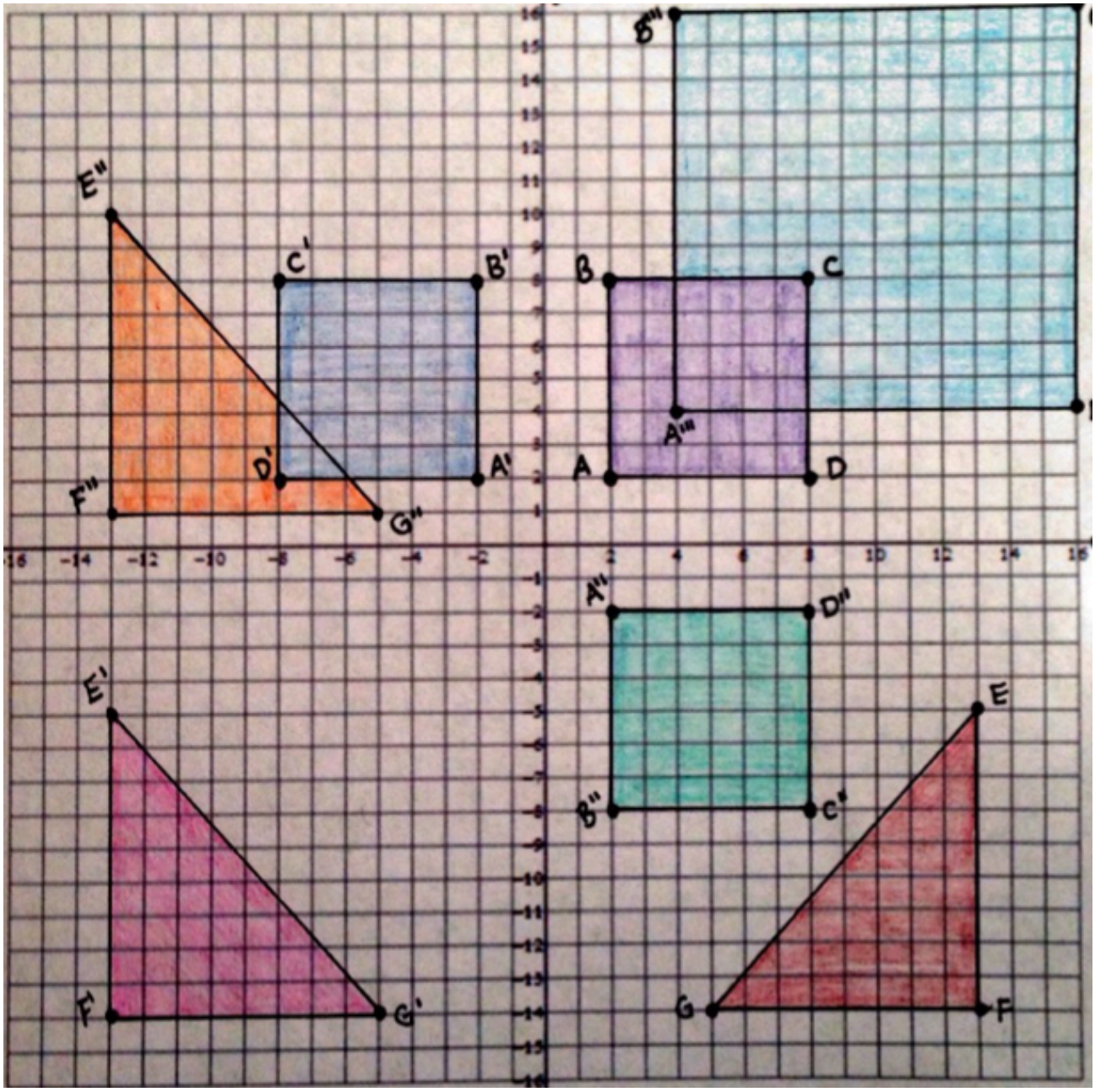
Name: _____ Date: _____

Reflections, Translations, and Dilations



Name: _____ Date: _____

Reflections, Translations, and Dilations – Example & Answers



Name: _____ Date: _____

Reflections, Translations, and Dilations

Step 1: **Graph** and **label** the following points on your coordinate plane.

A (2,2) **B** (2,8) **C** (8,8) **D** (8,2)

Step 2: **Connect** the dots in alphabetical order to make a square.

Step 3: **Multiply** each x-coordinate by -1, and each y-coordinate by 1. This means the x-coordinate will change to its opposite, and the y-coordinate will stay the same.

What are the coordinates of your new points?

A' (-2,2) **B'** (-2,8) **C'** (-8,8) **D'** (-8.2)

Step 4: **Graph**, **label**, and **connect** your points from step 3. This reflects your shape over the y-axis.

Step 5: **Multiply** each ORIGINAL (from step 1) x-coordinate by 1, and each y-coordinate by -1.

What are the coordinates of your new points?

A'' (2,-2) **B''** (2,-8) **C''** (8,-8) **D''** (8,-2)

Step 6: **Graph**, **label**, and **connect** your points from step 5. This reflects your shape over the x-axis.

Step 7: **Multiply** each ORIGINAL (from step 1) x-coordinate by 2, and each y-coordinate by 2.

What are the coordinates of your new points?

A''' (4,4) **B'''** (4,16) **C'''** (16,16) **D'''** (16,4)

Step 8: **Graph**, **label**, and **connect** your points from step 7. This dilates your shape (enlarges it).

Name: _____ Date: _____

Question 1: Which kind of transformations changed the size of your square?

Dilations (multiplying the coordinates by 2 in this case) changed the size of the square.

Question 2: Which kind of transformations did NOT change the size of your square?

Reflecting the square over the x and y axes did not change the size of the square.

Question 3: Did any of the transformations change your square into a different shape?

No. All of the transformations resulted in another square.

Question 4: Measure the sides of your squares with a ruler. Use the measurements to prove that your square from step 1 is similar to your square from step 7.

Each side of the original square is 3cm.
Each side of the dilated square is 6cm.

6/3=6/3=6/3=6/3 so the squares are similar.

Name: _____ Date: _____

Step 9: **Graph** and **label** the following points on your coordinate plane.

E (13, -5) **F** (13, -14) **G** (5, -14)

Step 10: **Connect** the dots in alphabetical order to make a right triangle.

Step 11: What will you need to do to reflect your triangle over the y-axis (look at step 4 if you aren't sure).

Change the x-coordinate to the opposite (or multiply by -1).

Step 12: **Reflect** your triangle over the y-axis.

What are the coordinates of your new points?

E' (-13, -5) **F'** (-13, -14) **G'** (-5,-14)

Step 13: Move your triangle from step 12 up 15 spaces. This means you will need to add 15 to each y-coordinate. This is called a translation.

What are the coordinates of your new points?

E'' (-13,10) **F''** (-13,1) **G''** (-5, 1)

Step 14: **Color** your shapes.

Name: _____ Date: _____

Question 5: How do you think you would move your original square (from step 1) to Quadrant III? What would you need to do to the x and y coordinates?

You would need to multiply both the x and y coordinates by -1.

Question 6: Use a ruler and a protractor to measure the side lengths and angle measures of your 3 triangles. Did any of these transformations change the triangle measurements?

Reflections and translations do not change either the angle or side measures (the triangles are congruent). Dilations change the side lengths but not the angle measures (this makes similar triangles).

Challenge: Draw the line y=x on your graph. What would you need to do to the coordinates of ΔEFG to reflect it over the line y=x?

To reflect over the line y=x, switch the x and y coordinates, so the point (x,y) becomes (y,x).