

### 1. (AREIA1) Answer the question below.

Carmen is asked to solve this linear equation for  $x$ . She completes these steps.

Original equation: $-\frac{1}{4}(x+4) = -\frac{3}{4}x + 2$
Step 1: $-\frac{1}{4}x - 1 = -\frac{3}{4}x + 2$
Step 2: $\frac{2}{4}x - 1 = 2$
Step 3: $\frac{2}{4}x = 2 + 1$
Step 4: $\frac{1}{2}x = 3$
Step 5: $x = 6$

What is the justification for the math used to complete each step?

Step 1: Distributive Property

Step 2: Addition Property of Equality

Step 3: Addition Property of Equality

Step 4: Combine Like Terms (or "Simplify")

Step 5: Multiplication PoE (by 2)  
OR Division PoE (by 1/2)

### 2. (AREIA1)

The steps below show how a student solved an equation.

- Step 1:  $4x - 7 = x + 5$
- Step 2:  $4x - 7 + (-x) = x + 5 + (-x)$
- Step 3:  $(4x - x) - 7 = (x - x) + 5$
- Step 4:  $3x - 7 = 5$
- Step 5:  $3x - 7 + (-7) = 5 + (-7)$
- Step 5:  $3x = -2$
- Step 6:  $x = -\frac{2}{3}$

a. In which step did the student make a mistake? Describe the mistake made.

In step 5, the student  
"adds negative 7" to both sides  
but this will not cancel -7.

The student should have added  
7 to both sides.

b. Solve the equation correctly, justifying each step of your work.

$4x - 7 = x + 5$	
$-x \quad -x$	Addition PoE
$3x - 7 = 5$	
$+7 \quad +7$	Addition PoE
$3x = 12$	
$\frac{3x}{3} = \frac{12}{3}$	Division PoE
$x = 4$	

3. (AREIB3) Solve the equation below and justify each step. Box and check your answer.

$$2(3x - 8) = 2(7x + 2)$$

$$6x - 16 = 14x + 4$$

+16                      +16

Distributive Prop  
Addition PoE

$$6x = 14x + 20$$

-14x    -14x

Subtraction PoE

$$-8x = 20$$

-8            -8

Division PoE

$$x = -2.5$$

$$2(3(-2.5) - 8) = 2(7(-2.5) + 2)$$

$$2(-7.5 - 8) = 2(-17.5 + 2)$$

$$2(-15.5) = 2(-15.5)$$

$$-31 = -31$$

✓

4. (AREIB3) Solve the equation below for y. Box your answer.

$$ax - by = c$$

-ax            -ax

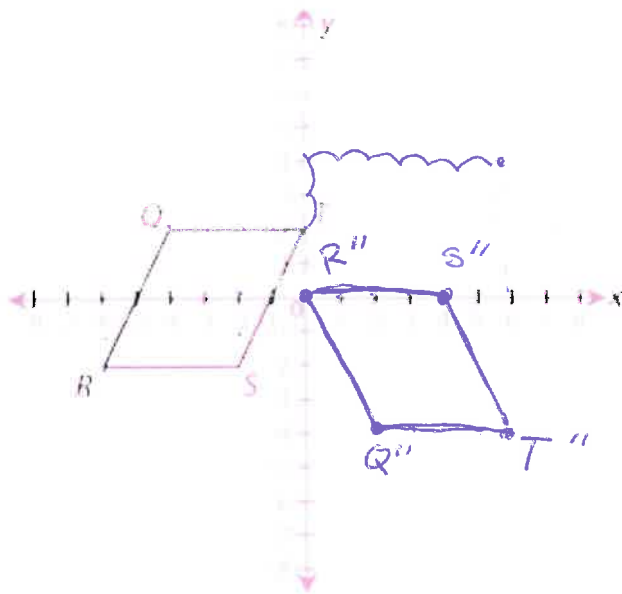
$$+by = \frac{c - ax}{-b}$$

+b            -b

$$y = \frac{c - ax}{-b}$$

5. (GC05) Draw and label the new parallelogram given the transformations listed below.

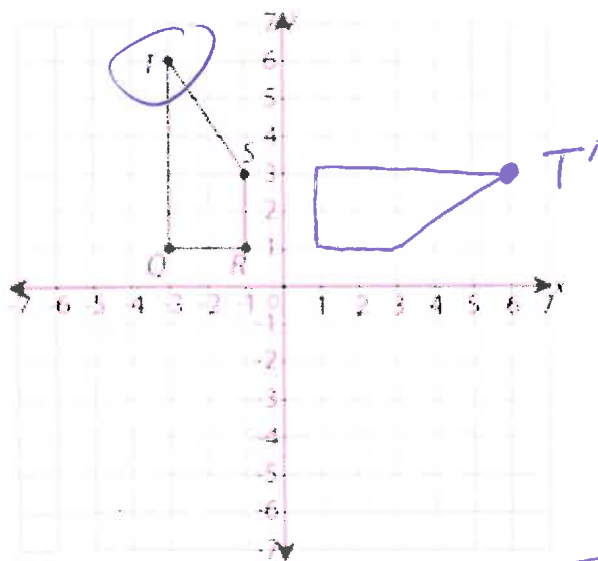
A parallelogram is shown on the coordinate plane below.



- Translate 2 units in a positive y-direction
- Translate 6 units in a positive x-direction
- Reflect across the x-axis

6. (GC05) Draw on the coordinate grid below and then circle the best possible answer.

Trapezoid *QRST* is shown below.



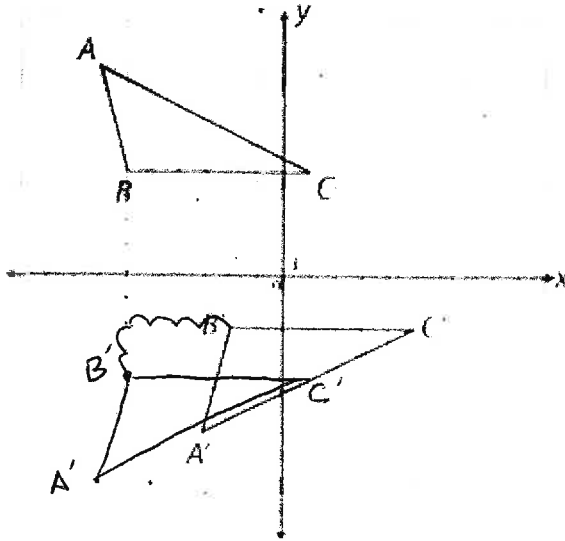
- A. (4, 3)
- B. (1, 6)
- C. (3, 6)
- D. (6, 3)

The trapezoid is rotated 90° clockwise about the origin. What are the coordinates of the image of point *T*?

$(x, y) \rightarrow (y, -x)$   
 $T(-3, 6) \rightarrow (6, 3)$

7. (GC06) Answer the question below in complete sentences and neatly draw the correct transformations on the grid below.

Look at the two triangles on the coordinate grid below.



Two students, Jerry and Teresa, are trying to figure out how many transformations it would take to move triangle  $ABC$  onto triangle  $A'B'C'$ .

Jerry thinks it will take two transformations to map triangle  $ABC$  onto triangle  $A'B'C'$ . Teresa thinks it will take three or more transformations to map triangle  $ABC$  onto triangle  $A'B'C'$ .

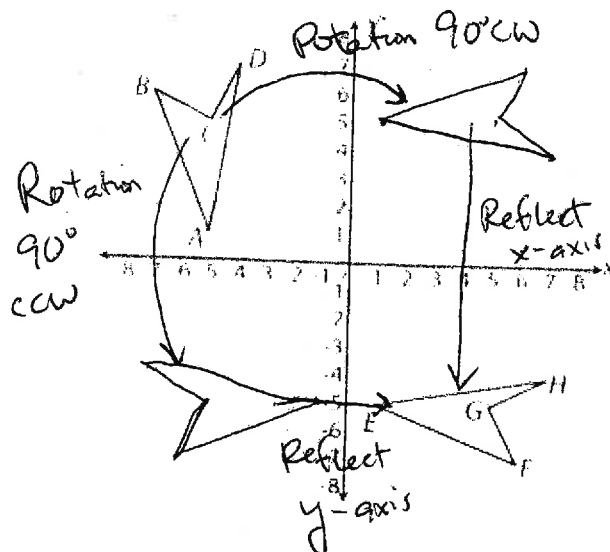
Which student is correct? Explain how you know that student is correct. Make sure you include the transformations.

Answers may vary

Teresa is correct. The three transformations are (1) reflection across the x-axis (2) translate 4 units to the right and (3) translate 2 units up.

8. (GC06) Verify that your answer choice is correct by drawing the transformations on the graph, using arrows to label each step.

On the coordinate plane below, polygon  $ABCD$  has been transformed to form  $EFGH$ .



Which of these could be the transformation? Choose all that are correct.

- (A) A rotation  $90^\circ$  counter-clockwise about the origin, then a reflection across the y-axis  
 (B) A rotation  $90^\circ$  clockwise about the origin, then a reflection across the x-axis  
 (C) A rotation of  $180^\circ$  about the origin  
 (D) A reflection across the x-axis, then a reflection across the y-axis  
 (E) A reflection across the line  $y=x$   
 (F) A reflection across the line  $y=-x$ , then a rotation  $180^\circ$  about the origin

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1 missed a correct answer!