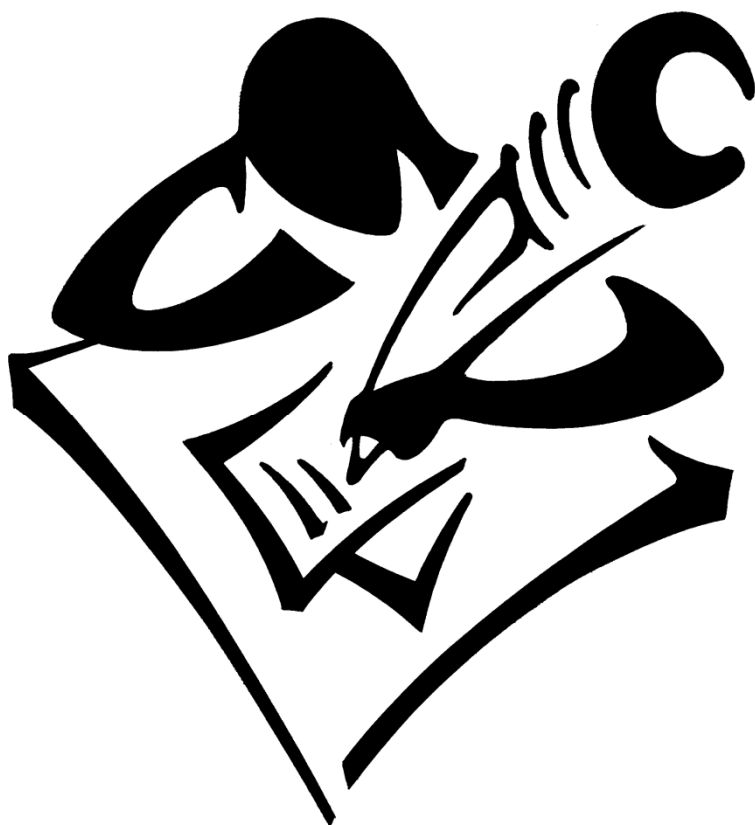**Tennessee Comprehensive Assessment Program**

TCAP/CRA 2013
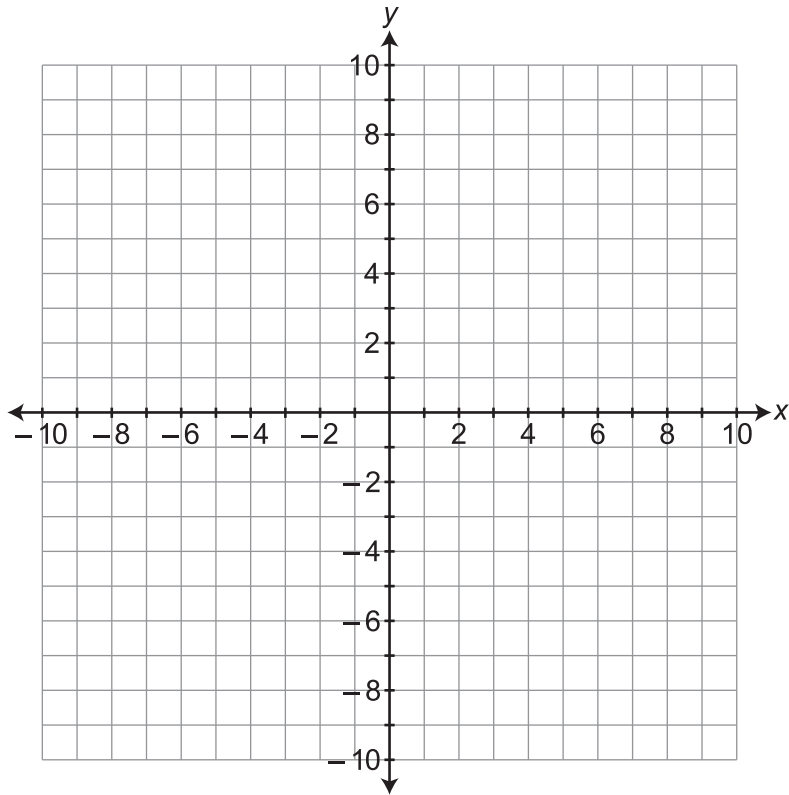
6

Anchor Set

Grade 6 – Changing Signs Task

SECURE MATERIAL - Reader Name: _____

Tennessee Comprehensive Assessment Program

Part 1: Constructed Response Task Section

Changing Signs Task

a. Plot and label the given pairs of points on the coordinate plane above.
    ♦ P(2, 3) and Q(–2, 3)
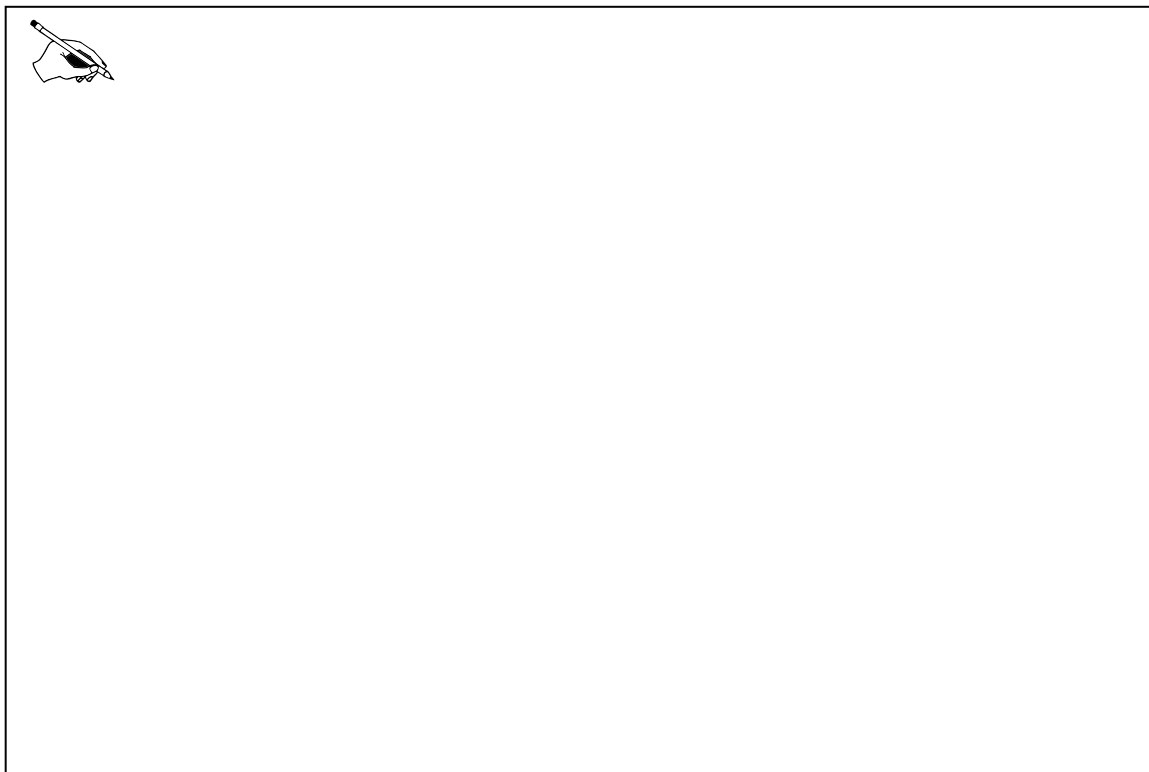   ♦ R(4, –1) and S(–4, –1)
    ♦ T(5.5, 6) and U(–5.5, 6)

b. Explain how you use *x*- and *y*-coordinates to plot points.

c. Each pair of points you plotted differ only by the sign of the *x*-coordinate. How does changing the sign of the *x*-coordinate without changing the *y*-coordinate affect the position of the point with respect to the *y*-axis? Use observations about each pair of the points you plotted above to support your reasoning.

Changing Signs Task Scoring Guide

The CCSS for Mathematical Content   (3 points)

6.NS.C.6cx   Plots the given points correctly on the coordinate plane provided.   _____

6.NS.C.6cz   Explains how the location of a point is determined using the coordinates in any   _____
of the following ways:

- Indicating that the x-coordinate describes horizontal distance from the origin and the sign of the x-coordinate determines the direction from the origin. Similarly the y-coordinate describes vertical distance from the origin and the sign of the y-coordinate determines the direction from the origin;

- Explaining that the point is located at the intersection of the vertical line through the given x value on the x-axis and the horizontal line through the given y value on the y-axis;

6.NS.C.6b   Describes the effect of changing the sign of the x-coordinate in any of   _____
the following ways:

- Describing the resulting point as a reflection or mirror image of the original point over the y-axis;

- Explaining that the points are the same horizontal distance from the origin in opposite directions and are the same vertical distance and direction from the origin;

- Stating that the point is in the same relative position in the quadrant across the y- axis;

The CCSS for Mathematical Practices   (2 points)

MP6   Uses precise mathematical language when referring to axes, coordinates   _____
and locations in the coordinate plane.

(MP6: Attend to precision.)

MP8   Uses the observed relationship from part A to make a generalization about   _____
the effect of changing the sign of the x-coordinate.

(MP8: Look for and express regularity in repeated reasoning.)

TOTAL POINTS: 5

The CCSS for Mathematical Content Addressed In This Task

| Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers. |
|---|
| 6.NS.C.6b   Understand signs of numbers in ordered pairs as indicating location in quadrants of the coordinate plane; recognize that when two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes. |
| 6.NS.C.6c   Find and position integers and other rational numbers on a horizontal or vertical number line diagram; find and position pairs of integers and other rational numbers on a coordinate plane. |

| The CCSS for Mathematical Practice* |
|---|
| 1.   Make sense of problems and persevere in solving them. |
| 2.   Reason abstractly and quantitatively. |
| 3.   Construct viable arguments and critique the reasoning of others. |
| 4.   Model with mathematics. |
| 5.   Use appropriate tools strategically. |
| 6.   Attend to precision. |
| 7.   Look for and make use of structure. |
| 8.   Look for and express regularity in repeated reasoning. |
| * Gray type indicates Mathematical Practices not addressed in this assessment. |

1. Changing Signs Task
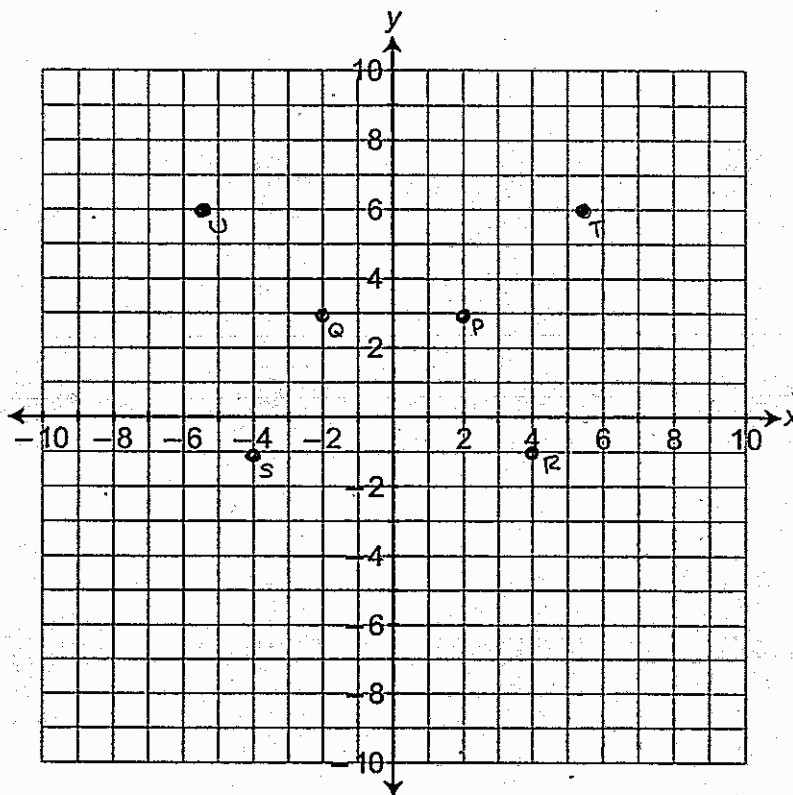
A-1a

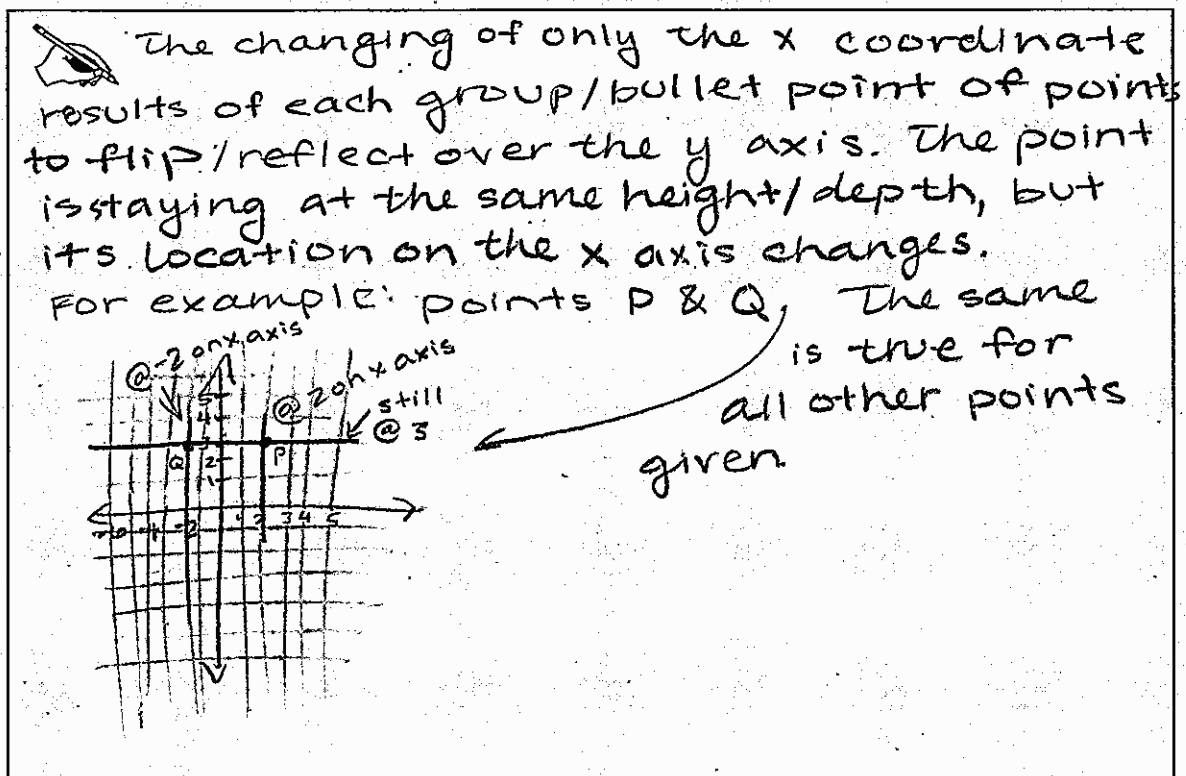a. Plot and label the given pairs of points on the coordinate plane above.
   - P(2, 3) and Q(–2, 3)
   - R(4, –1) and S(–4, –1)
   - T(5.5, 6) and U(–5.5, 6)

b. Explain how you use *x*- and *y*-coordinates to plot points.

Each pair of points are set up using the format (x,y), x being distance on the x axis/ horizontal axis, and y being distance on the y axis/ vertical axis. For example, P's coordinates are (2, 3), 2 being x and 3 being y. To find 2 on the x axis, start from the center/origin of the plane and go 2 ticks to the right to find 2. This is the center of the line 2, a verticle line. Next, find 3 on the y axis. This tick is the center of line 3, a horizontal line. If you draw out both lines, the intersection of the two is point P.
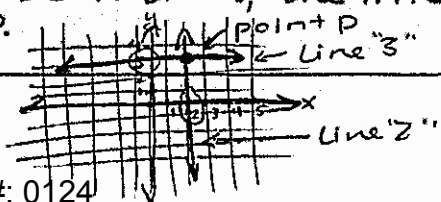
Litho#: 0124

c. Each pair of points you plotted differ only by the sign of the *x*-coordinate. How does changing the sign of the *x*-coordinate without changing the *y*-coordinate affect the position of the point with respect to the *y*-axis? Use observations about each pair of the points you plotted above to support your reasoning.

The changing of only the x coordinate results of each group/bullet point of points to flip/reflect over the y axis. The point is staying at the same height/depth, but its location on the x axis changes. For example: points P & Q, The same is true for all other points given.

@-2 on x axis
@2 on y axis
still @ 3
Q @2
P

Anchor 1   Litho 0124

Total Content Points: 3   (6.NS.C.6cx, 6.NS.C.6cz, 6.NS.C.6b)

Total Practice Points: 2   (MP6, MP8)

The student correctly plots and labels the given pairs of points on the coordinate plane (6.NS.C.6cx). Also provided are a thorough step-by-step explanation of how to plot point *P* (2, 3) and a general explanation of how to use *x*- and *y*-coordinates to plot points (6.NS.C.6cz). The student clearly describes the effect of changing the sign of the *x*-coordinate by indicating that the *y*-coordinate stays the same but the changed sign on the *x*-coordinate will "flip/reflect" the point over the *y*-axis (6.NS.C.6b). This also demonstrates that the student uses the observed relationship from Part A to make a generalization about the effect of changing the sign of the *x*-coordinate (MP8). The student uses precise mathematical language with thorough descriptions throughout the response (MP6), thus providing a strong response on all score points with regards to correctness and preciseness.

Total Awarded Points: 5 out of 5
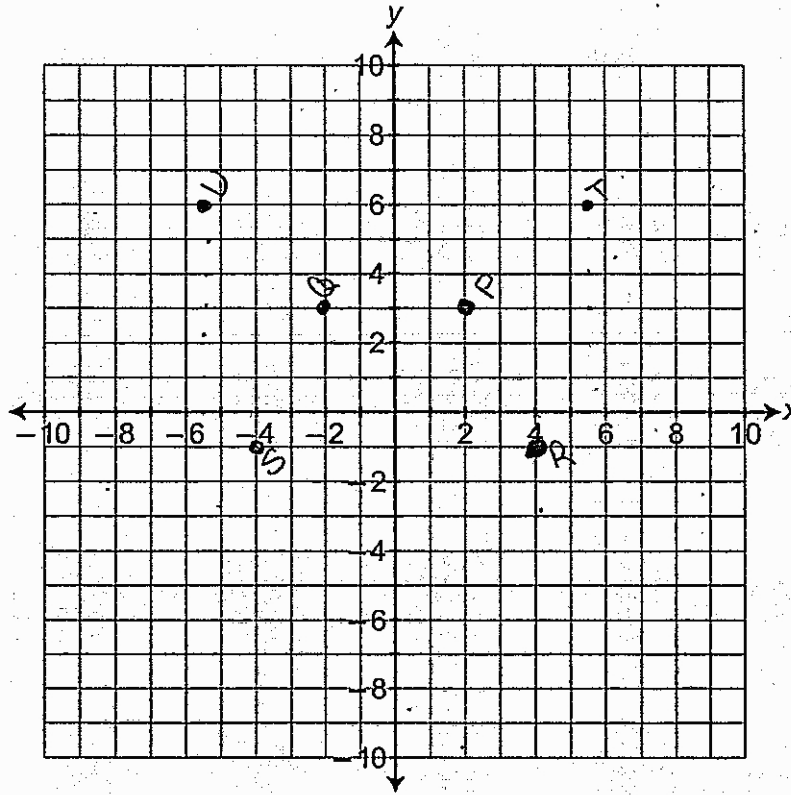
A-2a

1. Changing Signs Task

a. Plot and label the given pairs of points on the coordinate plane above.
   ♦ P(2, 3) and Q(–2, 3)
   ♦ R(4, –1) and S(–4, –1)
   ♦ T(5.5, 6) and U(–5.5, 6)

b. Explain how you use x- and y-coordinates to plot points.

You use x and y coordinates by first you always do your x axis because x comes before y. So the first point it says to plot is on the y axis. The second point goes up or down which is the y- axis.

Litho#: 0139

A-2b

c. Each pair of points you plotted differ only by the sign of the x-coordinate. How does changing the sign of the x-coordinate without changing the y-coordinate affect the position of the point with respect to the y-axis? Use observations about each pair of the points you plotted above to support your reasoning.

Each pair was the same almost. Suchas point P & Q. The only differnce was that the first point you plotted, Point Q, was a negative number. On point P the first number was a positive number. They are almost like reflections. They have the same numbers just some are positive some are negative.

Anchor 2   Litho 0139

Total Content Points: 3   (6.NS.C.6cx, 6.NS.C.6cz, 6.NS.C.6b)

Total Practice Points: 1   (MP8)

The student correctly plots and labels the given pairs of points on the coordinate plane (6.NS.C.6cx). An understanding is also displayed of how the location of a point is determined using the coordinate axes ("first point…is on the *x*-axis. The second point goes up or down which is the *y*-axis") (6.NS.C.6cz). The student describes the effect of changing the sign of the *x*-coordinate by indicating that the only difference is that one point (*Q*) is a negative number and one point (*P*) is a positive number, and "They are almost like reflections" (6.NS.C.6b). This also demonstrates that the student uses the observed relationship from Part A to make a generalization about the effect of changing the sign of the *x*-coordinate (MP8). The student incorrectly describes each of the *x*- and *y*-coordinates as a "point" in Part B, and does not precisely explain how to use direction to locate the coordinate on the *x*-axis as they do with the *y*-axis ("goes up or down") (no credit for MP6).

Total Awarded Points: 4 out of 5
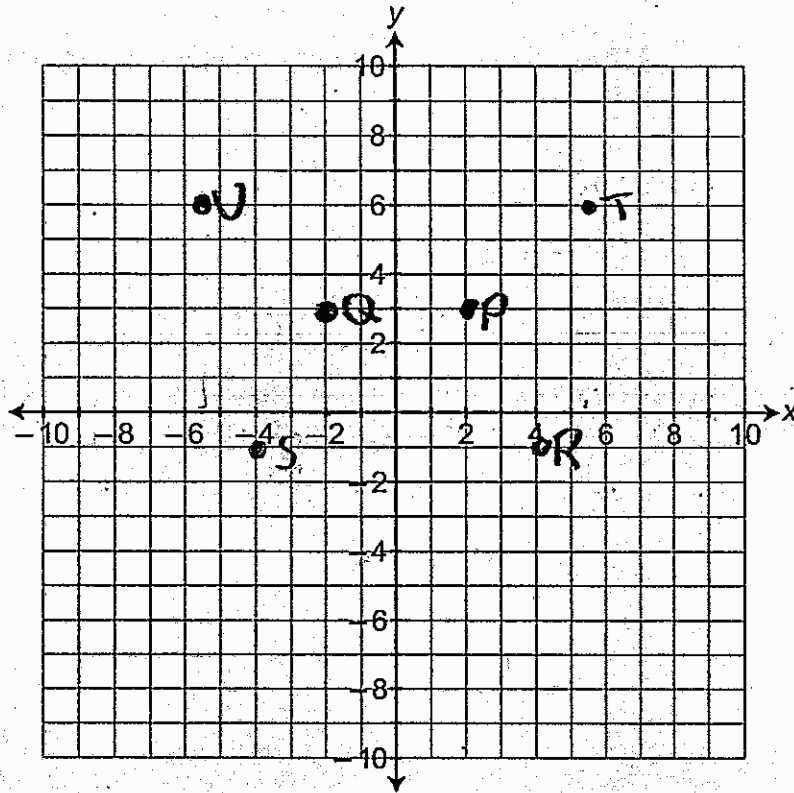
A-3a

1. Changing Signs Task

a. Plot and label the given pairs of points on the coordinate plane above.
   - ◆ P(2, 3) and Q(–2, 3)
   - ◆ R(4, –1) and S(–4, –1)
   - ◆ T(5.5, 6) and U(–5.5, 6)

b. Explain how you use x- and y-coordinates to plot points.

The X coordinates are always the First number in a pair and are on the horizontal axis. The y coordinates are always the second number in the ordered pair and are on the vertical axis.

Litho#: 0157

c.   Each pair of points you plotted differ only by the sign of the *x*-coordinate. How does changing the sign of the *x*-coordinate without changing the *y*-coordinate affect the position of the point with respect to the *y*-axis? Use observations about each pair of the points you plotted above to support your reasoning.

> Each pair on the plot and the one put on with it were reflected or fliped. So, you don't have to change the y axis, but you do: if you fliped it over the x axis. All the pairs were fliped over the y axis.

Anchor 3   Litho 0157

Total Content Points: 3   (6.NS.C.6cx, 6.NS.C.6cz, 6.NS.C.6b)

Total Practice Points: 1   (MP8)

The student correctly plots and labels the given pairs of points on the coordinate plane (6.NS.C.6cx). An understanding of how the location of a point is determined is demonstrated by stating that the *x*-coordinates are located on the horizontal axis and the *y*-coordinates are located on the vertical axis (6.NS.C.6cz). The student describes the effect of changing the sign of the *x*-coordinate by indicating that "All the pairs were fliped over the *y* axis" (6.NS.C.6b). This also demonstrates that the student uses the observed relationship from Part A to make a generalization about the effect of changing the sign of the *x*-coordinate (MP8). The student does not precisely explain how the *x*- and *y*-coordinates are determined on their respective axes, only that they are located on the horizontal and vertical axes (no credit for MP6).
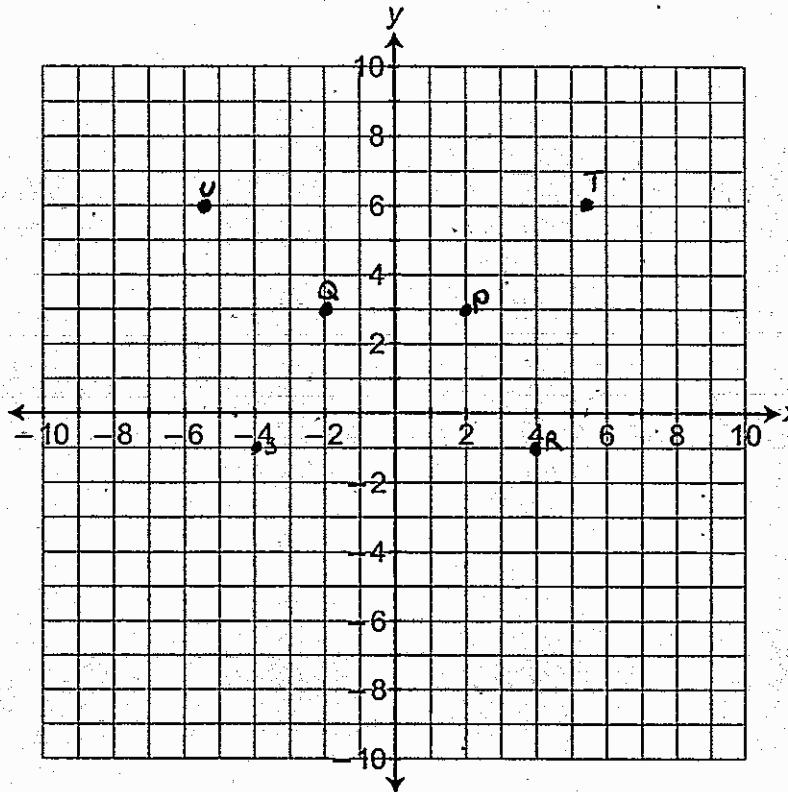
Total Awarded Points: 4 out of 5

A-4a

1. Changing Signs Task

a. Plot and label the given pairs of points on the coordinate plane above.
   ◆ P(2, 3) and Q(–2, 3)
   ◆ R(4, –1) and S(–4, –1)
   ◆ T(5.5, 6) and U(–5.5, 6)

b. Explain how you use *x*- and *y*-coordinates to plot points.

You use the X cordinate as your first number an2 thats the line that goes horizontally, You use the Y cordinate as the second number an2 it is going vertically, so the first number you go across an2 the second number goes up or down.

Litho#: 0148

c. Each pair of points you plotted differ only by the sign of the *x*-coordinate. How does changing the sign of the *x*-coordinate without changing the *y*-coordinate affect the position of the point with respect to the *y*-axis? Use observations about each pair of the points you plotted above to support your reasoning.

So, since one is positive and one is negative you, would either go left or right on the x axis. If on the y axis it's go up or down. So it's pretty much the fact if a number is positive or negative.

x axis { negative = left
         positive = right

y axis   negative = down
          positive = up.

Anchor 4   Litho 0148

Total Content Points: 2   (6.NS.C.6cx, 6.NS.C.6cz)

Total Practice Points: 1   (MP6)

The student correctly plots and labels the given pairs of points on the coordinate plane (6.NS.C.6cx). An understanding of how the location of a point is determined using the coordinate axes is demonstrated by describing the *x*-coordinate as being the first number, which goes horizontally/across, and the *y*-coordinate as being the second number, which goes vertically/up or down (6.NS.C.6cz). The student's description in Part C of the coordinates being positive or negative, going left or right, or going up or down does not adequately describe the effect of changing the sign of the *x*-coordinate (no credit for 6.NS.C.6b). This also demonstrates that the student does not use the observed relationship from Part A to make a generalization about the effect of changing the sign of the *x*-coordinate, because only a generic description of coordinates and axes is given (no credit for MP8). The student uses precise mathematical language when referring to axes, coordinates, and locations in the coordinate plane in the descriptions in Parts B and C (MP6).

Total Awarded Points: 3 out of 5
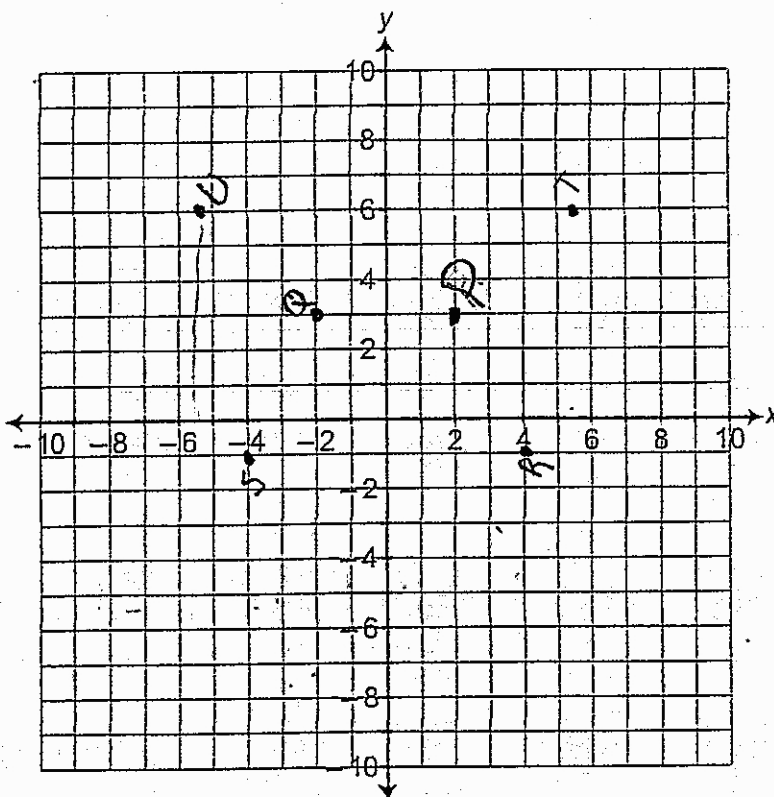
A-5a

1. Changing Signs Task

a.   Plot and label the given pairs of points on the coordinate plane above.
- ♦ P(2, 3) and Q(–2, 3)
- ♦ R(4, –1) and S(–4, –1)
- ♦ T(5.5, 6) and U(–5.5, 6)

b.   Explain how you use x- and y-coordinates to plot points.

> x goes first so you would find the 1st number on the x-axis (horizontal)
>
> y-goes 2nd, so you find the 2nd number on the y-axis (vertical)

Litho#: 0082

c. Each pair of points you plotted differ only by the sign of the x-coordinate. How does changing the sign of the x-coordinate without changing the y-coordinate affect the position of the point with respect to the y-axis? Use observations about each pair of the points you plotted above to support your reasoning.

They would reflect vertiealy.

(2,-2)(2,2)
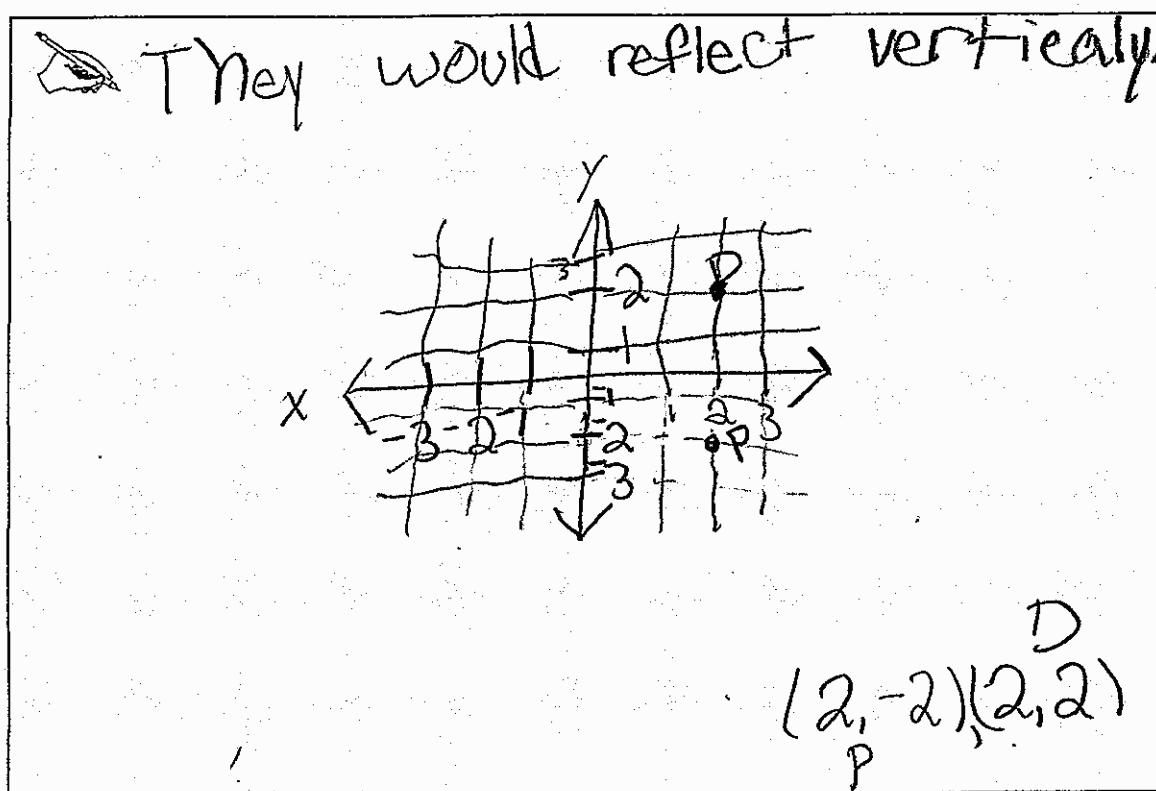
Anchor 5   Litho 0082

Total Content Points: 3 (6.NS.C.6cx, 6.NS.C.6cz, 6.NS.C.6b)

Total Practice Points: 0

The student correctly plots and labels the given pairs of points on the coordinate plane (6.NS.C.6cx). An understanding of how the location of a point is determined using the coordinate axes is demonstrated by describing the x-coordinate as being the first number on the x-axis (horizontal), and the y-coordinate as being the second number on the y-axis (vertical) (6.NS.C.6cz). The student creates and plots a pair of points in Part C ((2, –2) and (2, 2)) to demonstrate understanding that these points reflect across the x-axis because a coordinate sign was changed (6.NS.C.6b). However, the student does not use the observed relationship from Part A to make a generalization about the effect of changing the sign of the x-coordinate (no credit for MP8). Although the student's description in Part B is accurate, it does not use precise mathematical language to determine how to plot the points, the student stating instead "1st number on the x-axis" and "2nd number on the y-axis" (no credit for MP6).
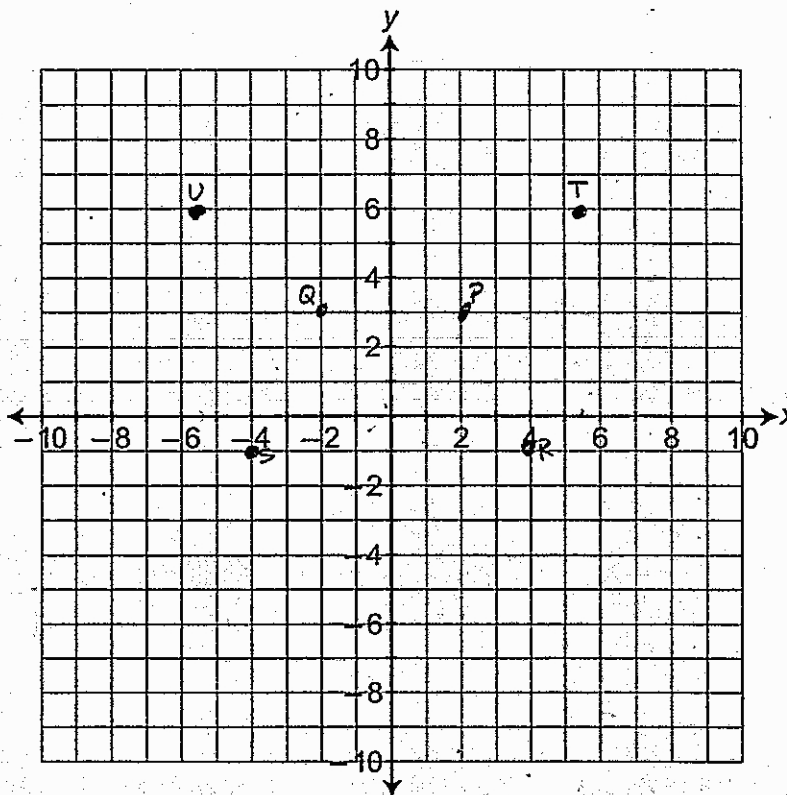
Total Awarded Points: 3 out of 5
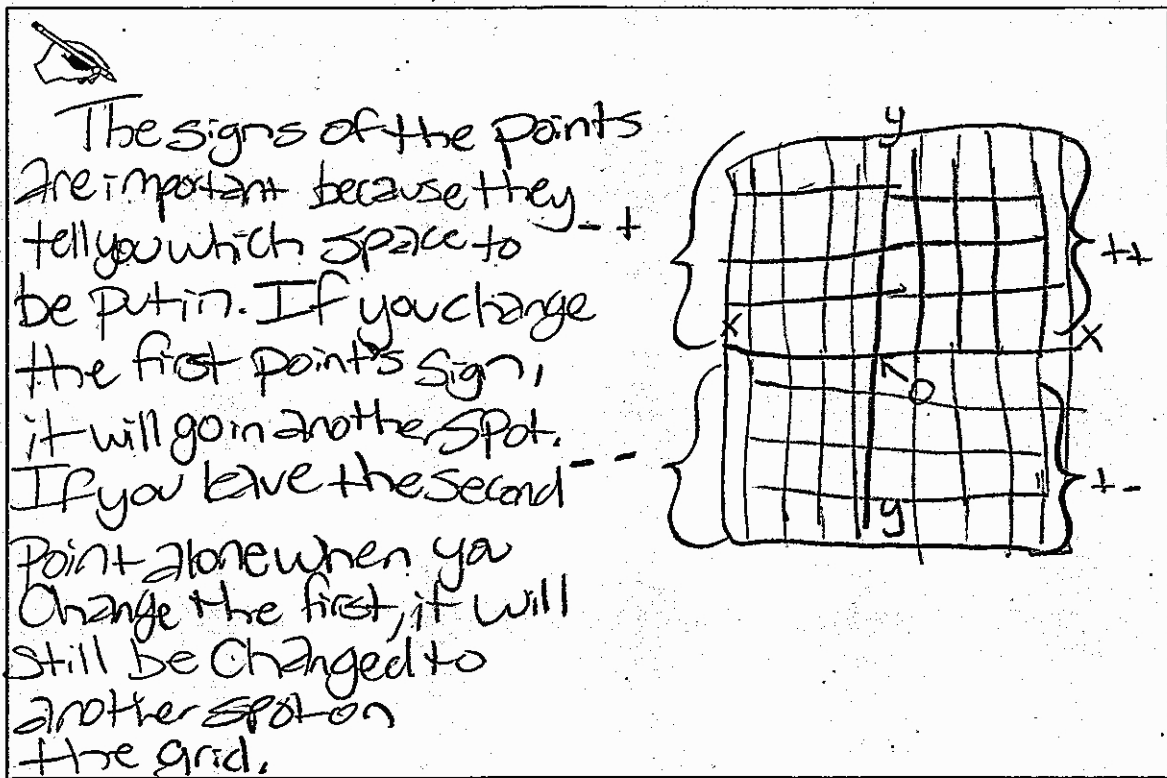
A-6a

1. Changing Signs Task

a.   Plot and label the given pairs of points on the coordinate plane above.
   ♦   P(2, 3) and Q(–2, 3)
   ♦   R(4, –1) and S(–4, –1)
   ♦   T(5.5, 6) and U(–5.5, 6)

b.   Explain how you use x- and y-coordinates to plot points.

I used the x and y coordinates by first knowing X is verticle, and Y is horizontal. Next, I knew negative numbers is behind 0, or the middle of the chart. Then, I figured out which way to go: This is how I used the X and y condinates to plot my points.

Litho#: 0147

A-6b

c. Each pair of points you plotted differ only by the sign of the *x*-coordinate. How does changing the sign of the *x*-coordinate without changing the *y*-coordinate affect the position of the point with respect to the *y*-axis? Use observations about each pair of the points you plotted above to support your reasoning.

The signs of the points are important because they tell you which space to be put in. If you change the first point's sign, it will go in another spot. If you leave the second point alone when you change the first, it will still be changed to another spot on the grid.

Litho#: 0147

Anchor 6   Litho 0147

Total Content Points: 2   (6.NS.C.6cx, 6.NS.C.6cz)

Total Practice Points: 0

The student correctly plots and labels the given pairs of points on the coordinate plane (6.NS.C.6cx). An understanding of how the location of a point is determined using the coordinate axes is demonstrated by explaining how to plot points in quadrants depending on whether the coordinates are positive or negative numbers (6.NS.C.6cz). The student's generic description of quadrants in Part C does not indicate an understanding of the effect of changing the sign of a coordinate (no credit for 6.NS.C.6b). The student's positive and negative number quadrant analysis in Part C does not demonstrate that the student uses any observed relationship from Part A to make a generalization about the effect of changing the sign of the x-coordinates (no credit for MP8). The student's terminology in Part B ("x is verticle" and "y is horizontal") lacks precise mathematical language (no credit for MP6).

Total Awarded Points: 2 out of 5

A-7a

1. Changing Signs Task
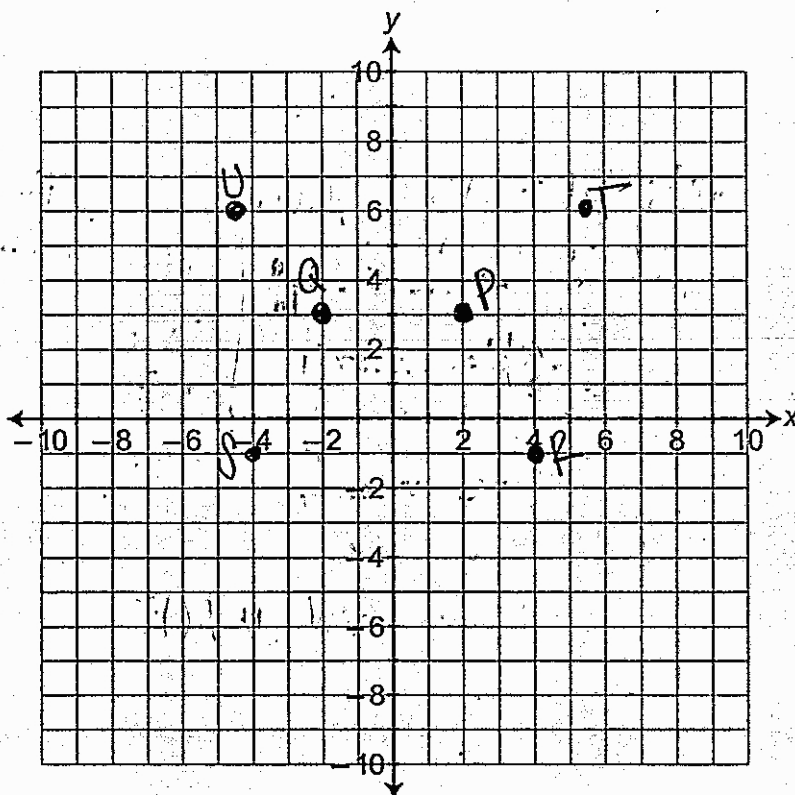
a. Plot and label the given pairs of points on the coordinate plane above.
   - ♦ P(2, 3) and Q(–2, 3)
   - ♦ R(4, –1) and S(–4, –1)
   - ♦ T(5.5, 6) and U(–5.5, 6)

b. Explain how you use x- and y-coordinates to plot points.

To use the x- and y-coordinates you always go to the x axis first and the y axis second. For example if your point was (5,-2) you would go 5 right and down 2.

Litho#: 0152

c. Each pair of points you plotted differ only by the sign of the x-coordinate. How does changing the sign of the x-coordinate without changing the y-coordinate affect the position of the point with respect to the y-axis? Use observations about each pair of the points you plotted above to support your reasoning.

while ploting these points I noticed that two points are parallel from each other. They are parallel from each other because when you make the x-coordinate negative the points just move to another quadrant.

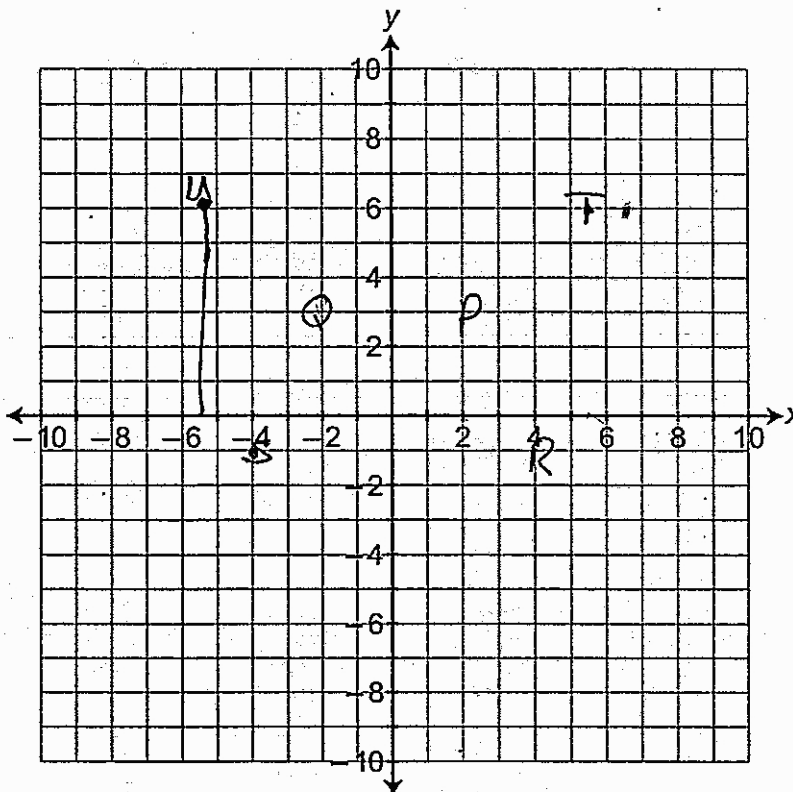Anchor 7   Litho 0152

Total Content Points: 1   (6.NS.C.6cz)
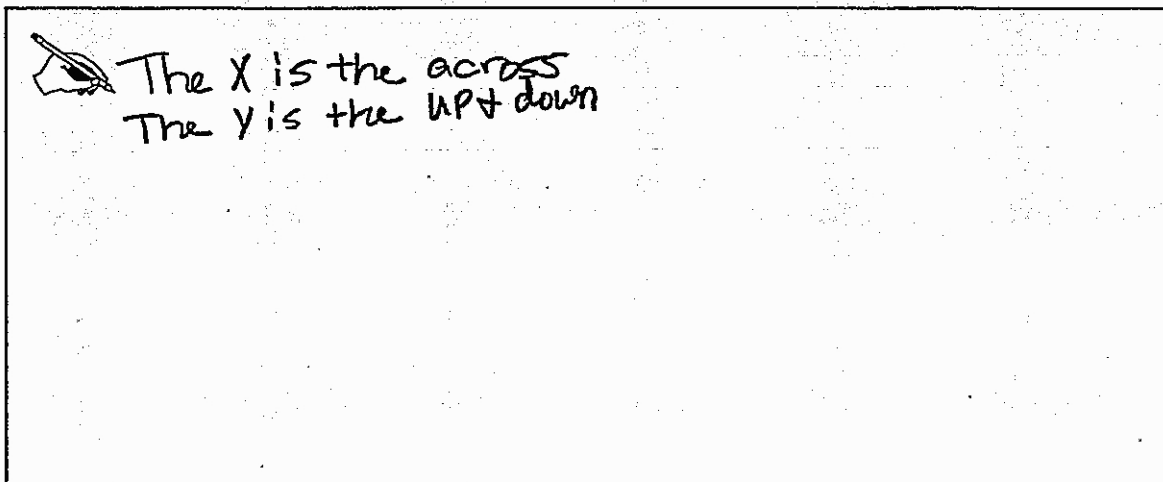
Total Practice Points: 1   (MP8)

The student incorrectly plots point *U* (–5.5, 6) as (–4.5, 6) on the coordinate plane
(no credit for 6.NS.C.6cx). The student demonstrates an understanding of how the
location of a point is determined using the coordinate axes by providing an example that
states for "(5, –2) you would go 5 right and down 2" (6.NS.C.6cz). The student's
description in Part C of two points being "parallel from each other" is not specific enough
to adequately describe the effect of changing the sign of a coordinate (no credit
for 6.NS.C.6b). However, this response demonstrates that the student uses an observed
relationship from Part A to make a generalization about the effect of changing the sign of
the *x*-coordinate by indicating that if the *x*-coordinate was changed to a negative number,
then the points would move to another quadrant (MP8). The student's use of the word
"parallel" in Part C is incorrect in the context of the situation and therefore does not count
as precise mathematical language (no credit for MP6).
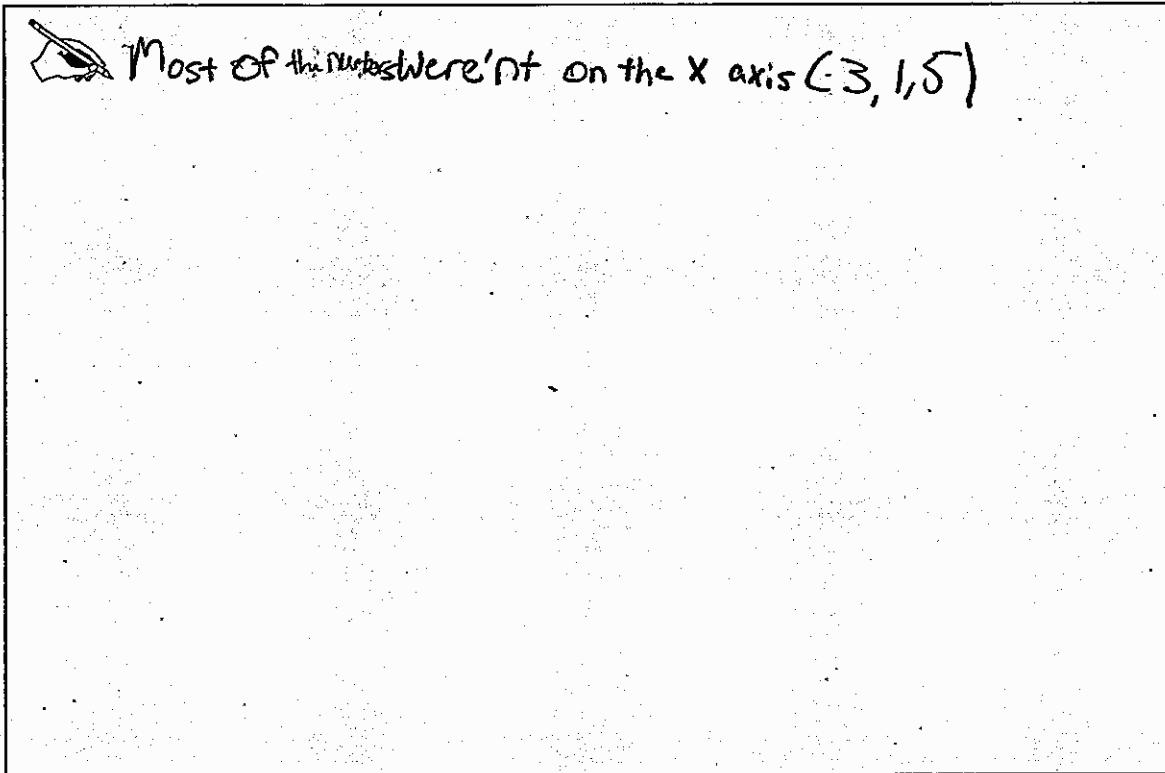
Total Awarded Points: 2 out of 5

A-8a

1. Changing Signs Task

a. Plot and label the given pairs of points on the coordinate plane above.
- ♦ P(2, 3) and Q(−2, 3)
- ♦ R(4, −1) and S(−4, −1)
- ♦ T(5.5, 6) and U(−5.5, 6)

b. Explain how you use *x*- and *y*-coordinates to plot points.

The X is the across
The Y is the up+down

c. Each pair of points you plotted differ only by the sign of the *x*-coordinate. How does changing the sign of the *x*-coordinate without changing the *y*-coordinate affect the position of the point with respect to the *y*-axis? Use observations about each pair of the points you plotted above to support your reasoning.

Most of the numbers were'nt on the x axis (-3, 1, 5)

Anchor 8   Litho 0133

Total Content Points: 1   (6.NS.C.6cx)

Total Practice Points: 0

The student uses a combination of dots and labels to plot the points on the coordinate plane (6.NS.C.6cx). The student does not demonstrate an understanding of how the location of a point is determined using the coordinate axes (no credit for 6.NS.C.6cz). The student's minimal response in Part C does not describe the effect of changing the sign of a coordinate (no credit for 6.NS.C.6b). The student does not use the observed relationship from Part A to make a generalization about the effect of changing the sign of the x-coordinate (no credit for MP8). The student does not use precise plotting and labeling techniques on the coordinate plane in Part A, nor is precise mathematical language used when referring to axes, coordinates, and locations in the coordinate plane in Part B (no credit for MP6).

Total Awarded Points: 1 out of 5
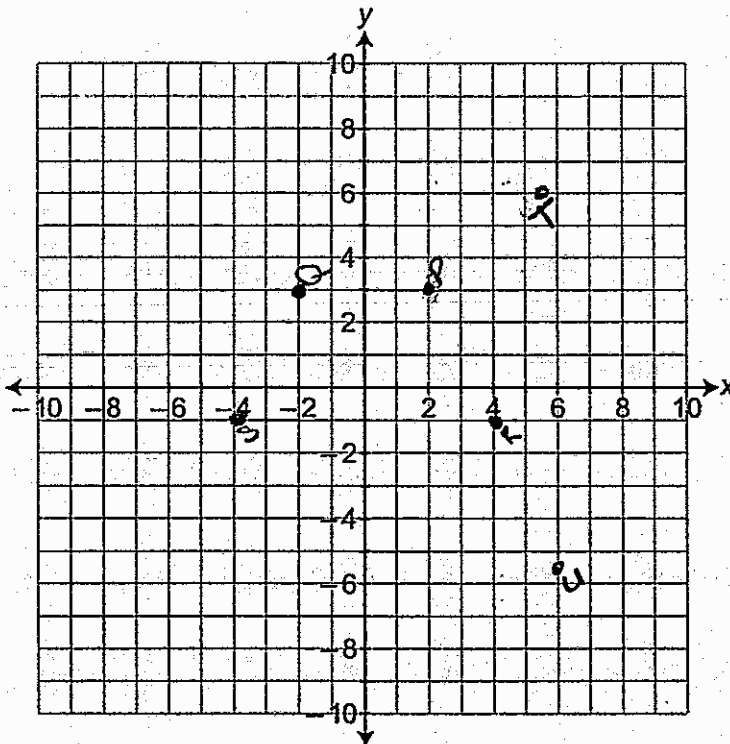
A-9a

1. Changing Signs Task

a.   Plot and label the given pairs of points on the coordinate plane above.
- P(2, 3) and Q(–2, 3)
- R(4, –1) and S(–4, –1)
- T(5.5, 6) and U(–5.5, 6)

b.   Explain how you use *x*- and *y*-coordinates to plot points.

X- and y-coordinates are easy to plot points like X comes before y in the alfabet so X comes first so if (2,3) was your coordinates the 2 goes on the X- and 3 goes on Y-

c. Each pair of points you plotted differ only by the sign of the x-coordinate. How does changing the sign of the x-coordinate without changing the y-coordinate affect the position of the point with respect to the y-axis? Use observations about each pair of the points you plotted above to support your reasoning.

> If you change the x-and y-coordinats to negative and/or positive then just swap lihe
> say P(2,3) Q(-2,-3)
>
> You stay positive all the way | You go to positive but then -3 makes you go to the negative

Litho#: 0064

Anchor 9   Litho 0064

Total Content Points: 1   (6.NS.C.6cz)

Total Practice Points: 0

The student incorrectly plots point U (–5.5, 6) as (6, –5.5) on the coordinate plane
(no credit for 6.NS.C.6cx). The student demonstrates an understanding of how the
location of a point is determined using the coordinate axes by describing how to plot the
point (2, 3), saying "2 goes on the x- and 3 goes on y-" (6.NS.C.6cz). The student's
response in Part C, which states "just swap" coordinates from negative to positive, does
not indicate an understanding of the effect of changing a coordinate's sign (no credit
for 6.NS.C.6b). The student does not use the observed relationship from Part A to make a
generalization about the effect of changing the sign of the x-coordinate, because point Q
from the coordinate plane in Part A was not accurately represented (no credit for MP8).
The student does not use precise mathematical language in Part B when referring to axes,
coordinates, and locations in the coordinate plane in Part A (no credit for MP6).

Total Awarded Points: 1 out of 5
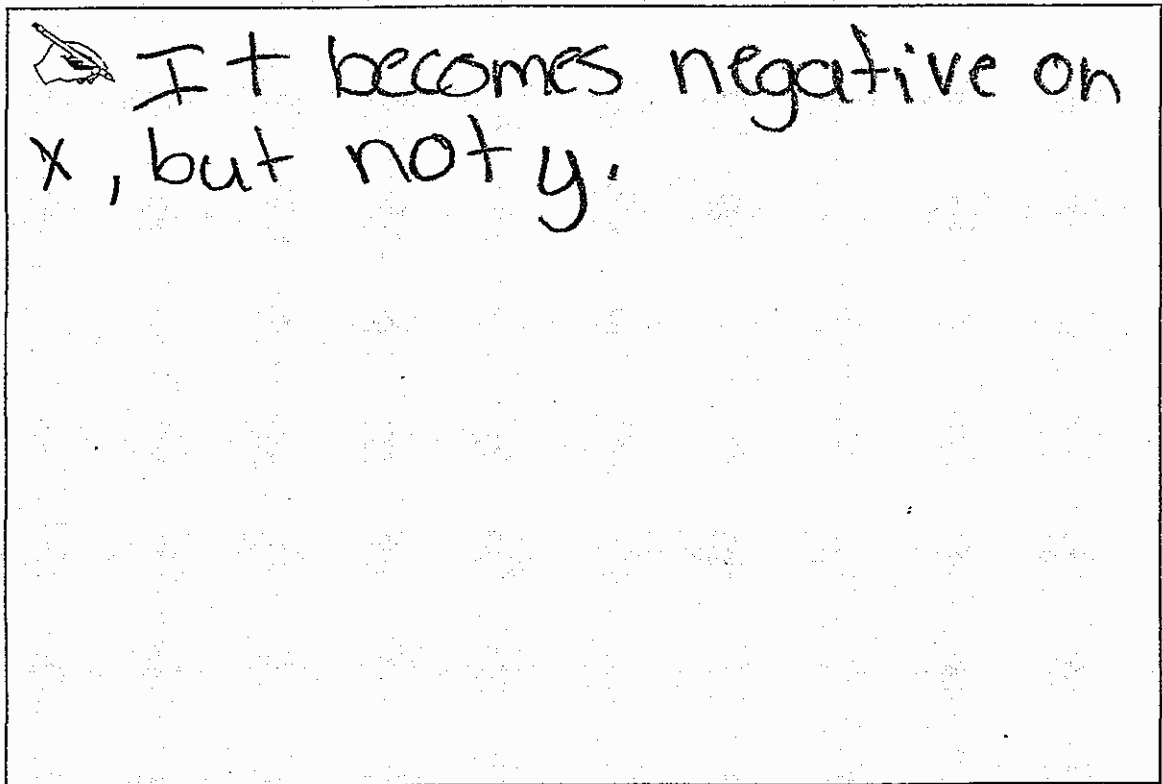
1. Changing Signs Task
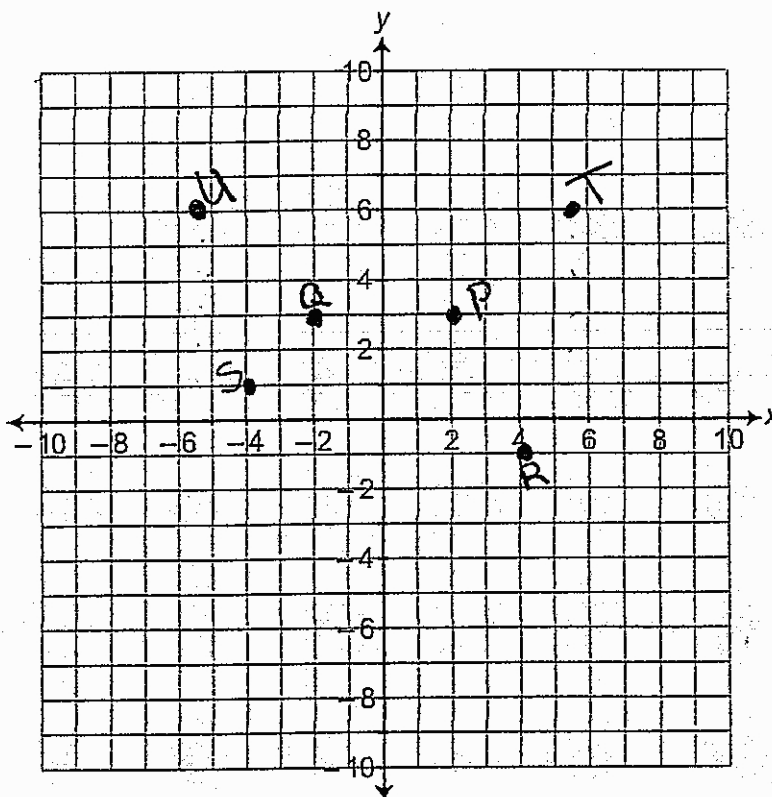
a. Plot and label the given pairs of points on the coordinate plane above.
   ♦ P(2, 3) and Q(−2, 3)
   ♦ R(4, −1) and S(−4, −1)
   ♦ T(5.5, 6) and U(−5.5, 6)

b. Explain how you use x- and y-coordinates to plot points.

I start with x, & then go to y.

Litho#: 0077

c.   Each pair of points you plotted differ only by the sign of the *x*-coordinate. How does changing the sign of the *x*-coordinate without changing the *y*-coordinate affect the position of the point with respect to the *y*-axis? Use observations about each pair of the points you plotted above to support your reasoning.

It becomes negative on x, but not y.

Litho#: 0077

Anchor 10   Litho 0077

Total Content Points: 0

Total Practice Points: 0

The student incorrectly plots point S (–4, –1) as (–4, 1) on the coordinate plane (no credit for 6.NS.C.6cx). The student does not demonstrate an understanding of how the location of a point is determined using the coordinate axes (no credit for 6.NS.C.6cz). The student's minimal response in Part C does not indicate an understanding of the effect of changing a coordinate's sign (no credit for 6.NS.C.6b). The student does not use the observed relationship from Part A to make a generalization about the effect of changing the sign of the x-coordinate (no credit for MP8). The student does not use precise mathematical language in Part B when referring to axes, coordinates, and locations in the coordinate plane in Part A (no credit for MP6).

Total Awarded Points: 0 out of 5