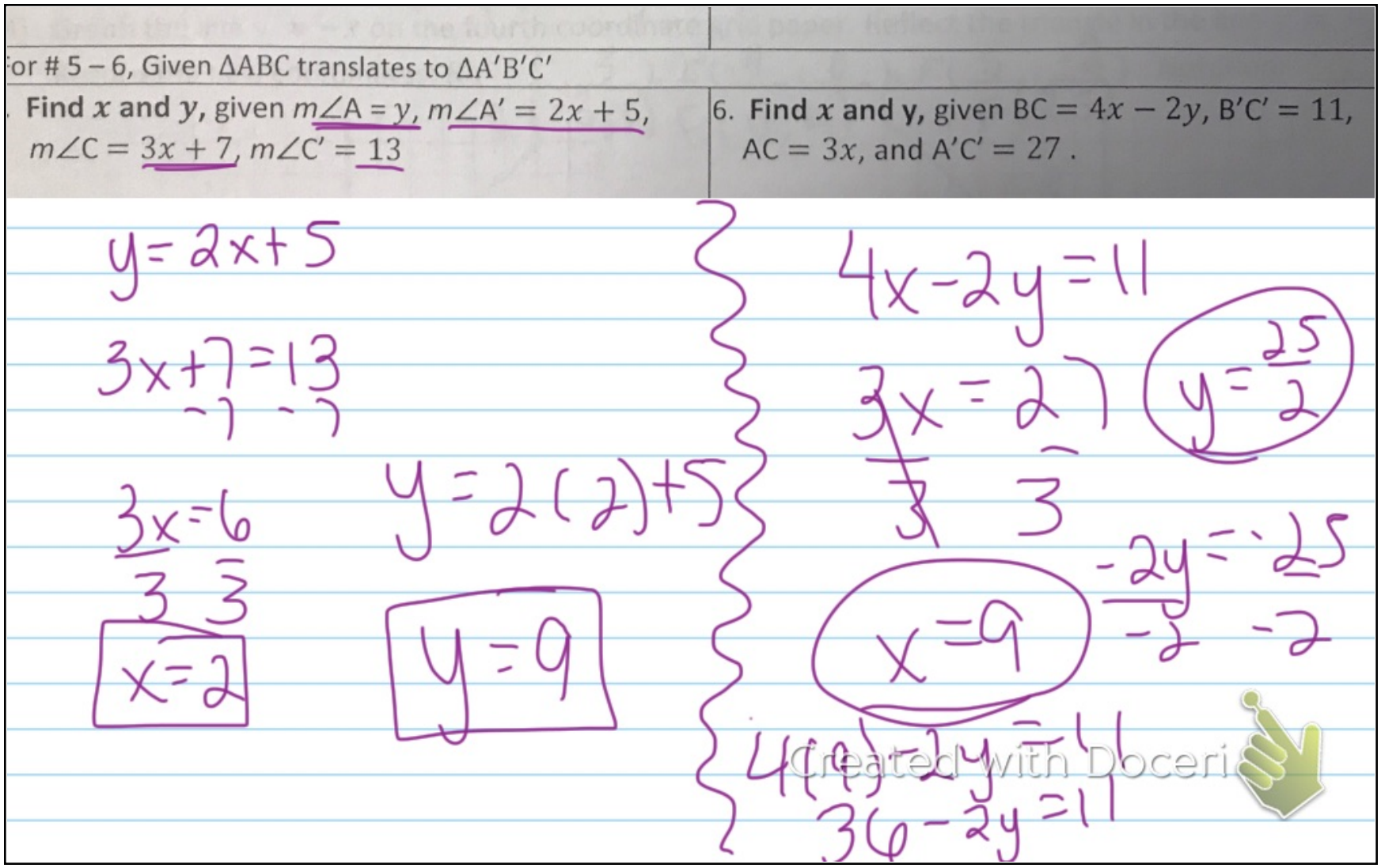
Unit 1

Lesson 2

Reflections


or # 5 – 6, Given ΔABC translates to ΔA′B′C′
Find x and y, given m∠A = y, m∠A′ = 2x + 5, m∠C = 3x + 7, m∠C′ = 13
6. Find x and y, given BC = 4x − 2y, B′C′ = 11, AC = 3x, and A′C′ = 27 .
y = 2x + 5
3x + 7 = 13
−7 −7
3x = 6
3 3
x = 2
y = 2(2) + 5
y = 9
4x − 2y = 11
3x = 27
3 3
x = 9
y = 25/2
−2y = −25
−2 −2
4(9) − 2y = 11
36 − 2y = 11
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Math 2
Unit 1 – Geometric Transformations
Lesson 2 – Reflections

Name_____
Date_____ Pd_____

Reflections:

- A reflection is a transformation in which the image is a mirror image of the preimage.
- A point on the line of reflection maps to itself.
- Other points map to the opposite side of the reflection line so that the reflection line is the perpendicular bisector of the segment joining a preimage and image point.
- Preimage and image points are **equidistant** from the line of reflection.
- Notation for reflections is $R_{Line\ of\ Reflection}$. Example: R_{x-axis} means "reflection in or across the $x-axis$."

$m = \frac{1}{3}$

$\perp m = -3$

write say it

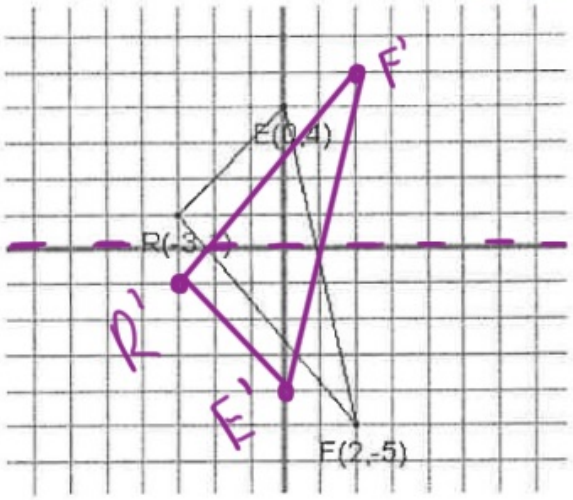
Reflections in the coordinate plane. Given ΔREF: $R(-3,1), E(0,4), F(2,-5)$

1) On the first grid, draw the reflection of ΔREF in the $x-axis$. Notation: $R_{x\text{-axis}}$ / $R_{y=0}$

   Record the new coordinates: $R'(-3,-1)$, $E'(0,-4)$, $F'(2,5)$

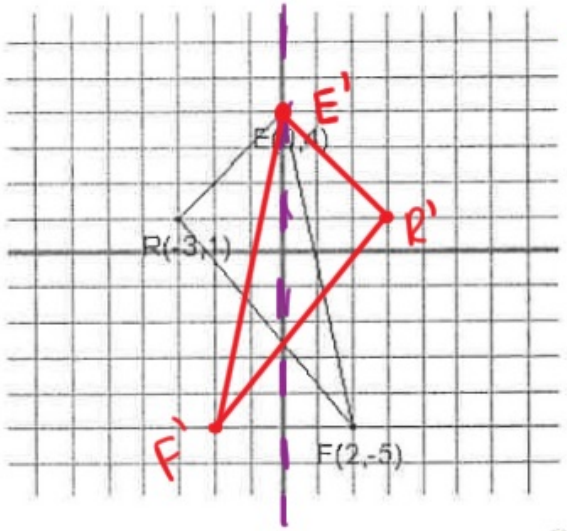
2) On the second grid, draw the reflection of ΔREF in the $y-axis$. Notation: $R_{y\text{-axis}}$ / $R_{x=0}$

   Record the new coordinates: $R'(3,1)$, $E'(0,4)$, $F'(-2,-5)$



y = # H

X = # V



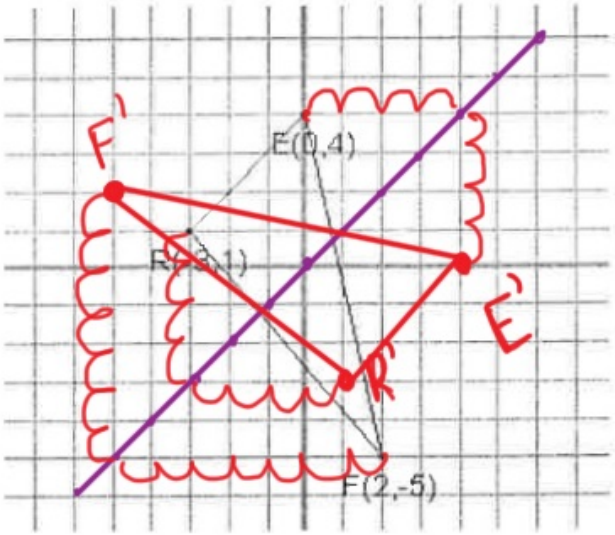
X=0

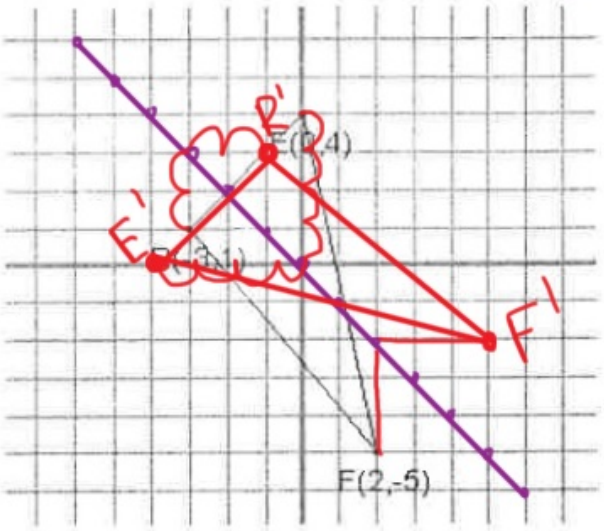
3) Graph the line $y = x$ on the third coordinate grid. Reflect the triangle in the line $y = x$.

Record the new coordinates: $R'(\underline{1}, \underline{-3})$, $E'(\underline{4}, \underline{0})$, $F'(\underline{-5}, \underline{2})$ Notation: $R_{y=x}$

4) Graph the line $y = -x$ on the fourth coordinate grid paper. Reflect the triangle in the line $y = -x$.

Record the new coordinates: $R'(\underline{-1}, \underline{3})$, $E'(\underline{-4}, \underline{0})$, $F'(\underline{5}, \underline{-2})$ Notation: $R_{y=-x}$





Look at the patterns and complete the rule. Then write the rule using proper notation.

1. Reflection in the $x-axis$ maps $(x, y) \rightarrow$ (x , -y) opposite Notation: Ry=0
2. Reflection in the $y-axis$ maps $(x, y) \rightarrow$ (-x , y) Notation: Rx=0
3. Reflection in the line $y = x$ maps $(x, y) \rightarrow$ (y , x) Notation: Ry=x
4. Reflection in the line $y = -x$ maps $(x, y) \rightarrow$ (-y , -x) 3-(-5) Notation: Ry=-x

Reflections with Polygons

Reflection Symmetry

1. Given $Triangle\ ABC$.
   a. What is the equation of the line of reflection that maps $angle\ A$ onto $angle\ B$? X=7
   b. If we reflect $Triangle\ ABC$ over the line of reflection found in part a, $\overline{AC}$ maps to $\overline{BC}$.
   c. What can we conclude about the **measures** of $\angle A$ and $\angle B$? ≅, Reflect ∠A over x=7 =∠B
      What can we conclude about the **lengths** of $\overline{AC}$ and $\overline{BC}$? ~

2. Given *Regular Hexagon ABCDEF*.

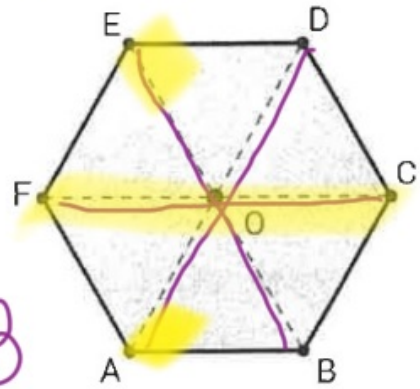
   a. List the three lines of symmetry drawn on the diagram at right: $\overline{FC}$, $\overline{EB}$, $\overline{OA}$

   b. What is the image of point D when reflected across $\overleftrightarrow{BE}$? $\angle F$

   c. What is the image of $\angle OED$ when reflected across $\overleftrightarrow{FC}$? $\angle OAB$

   d. What conclusions can you make about these angles?

   $\cong$, reflect over $\overline{FC}$, map onto $\angle OAB$



3. Given *Quadrilateral ABCD*

   a. The slope of $\overleftrightarrow{BC}$ is 0. The slope of $\overleftrightarrow{AD}$ is 0. Parallel

   What kind of quadrilateral is ABCD? Explain how you know.

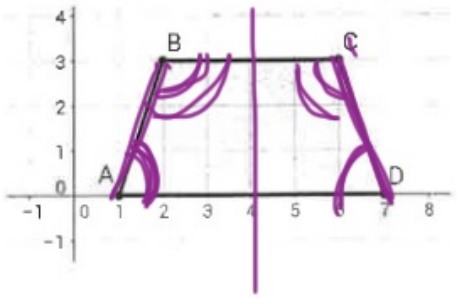
   Trapezoid

   b. Let line m be the equation of the reflection line mapping $\overline{CD}$ to $\overline{BA}$.

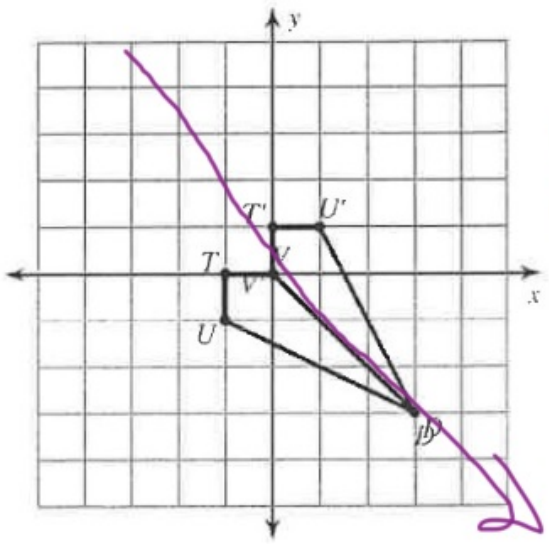
   Write the equation of line m. $x = 4$

   c. Reflect *Quadrilateral ABCD* over *line* m.

   $\angle A$ maps to D $\angle B$ maps to C



13)



Description:

$y = -x$

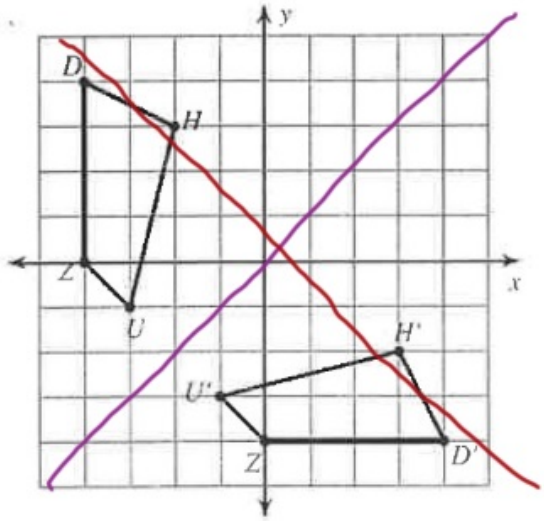
Algebraic Rule:

N/A

Notation:

$R_{y=-x}$

14)



Description:

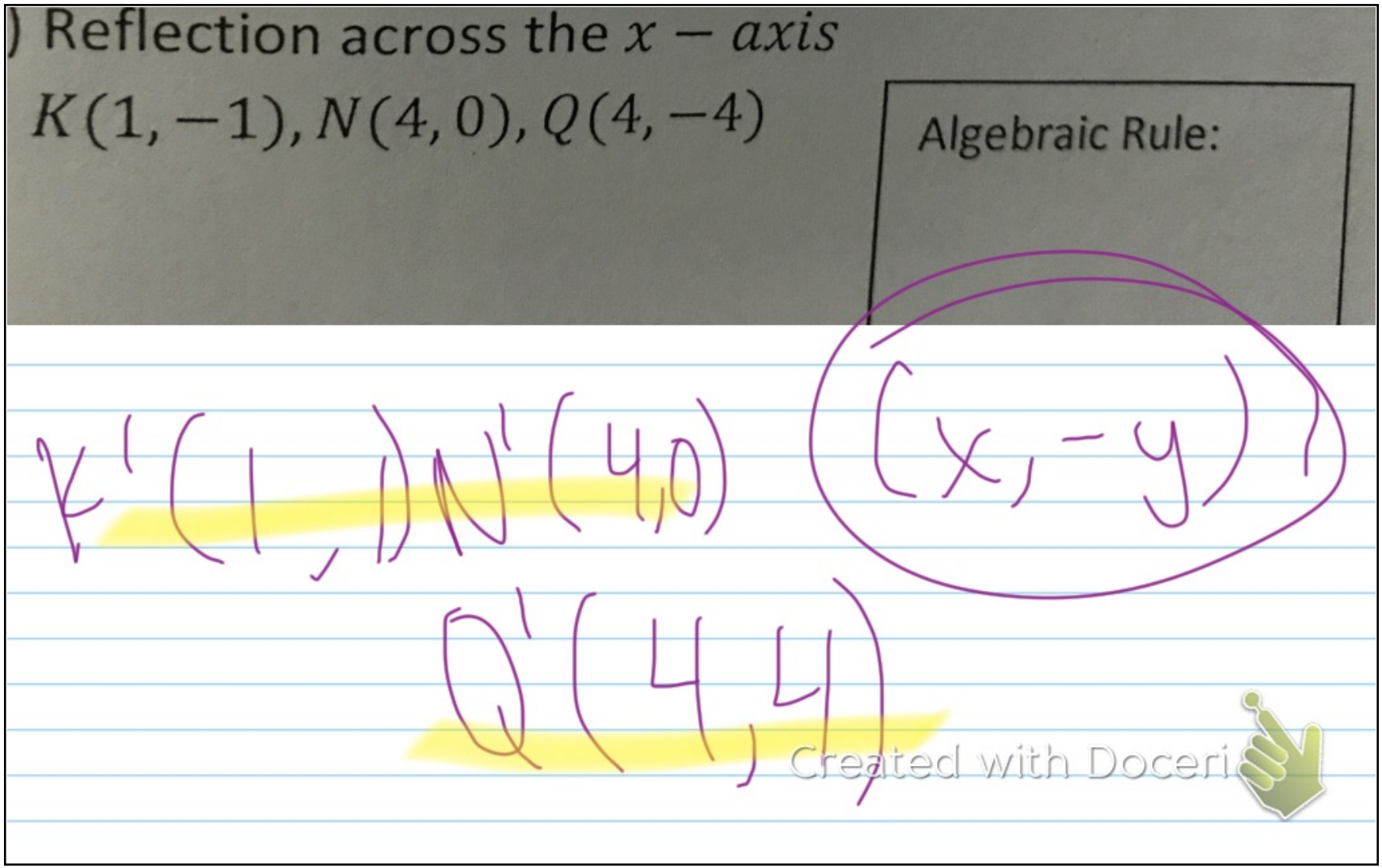
Algebraic Rule

Notation:

$R_{y=x}$

HW: Syllabus

Pages: 8-11


) Reflection across the $x-axis$
$K(1,-1), N(4,0), Q(4,-4)$
Algebraic Rule:
$K'(1,1) N'(4,0)$
$(x,-y)$
$Q'(4,4)$
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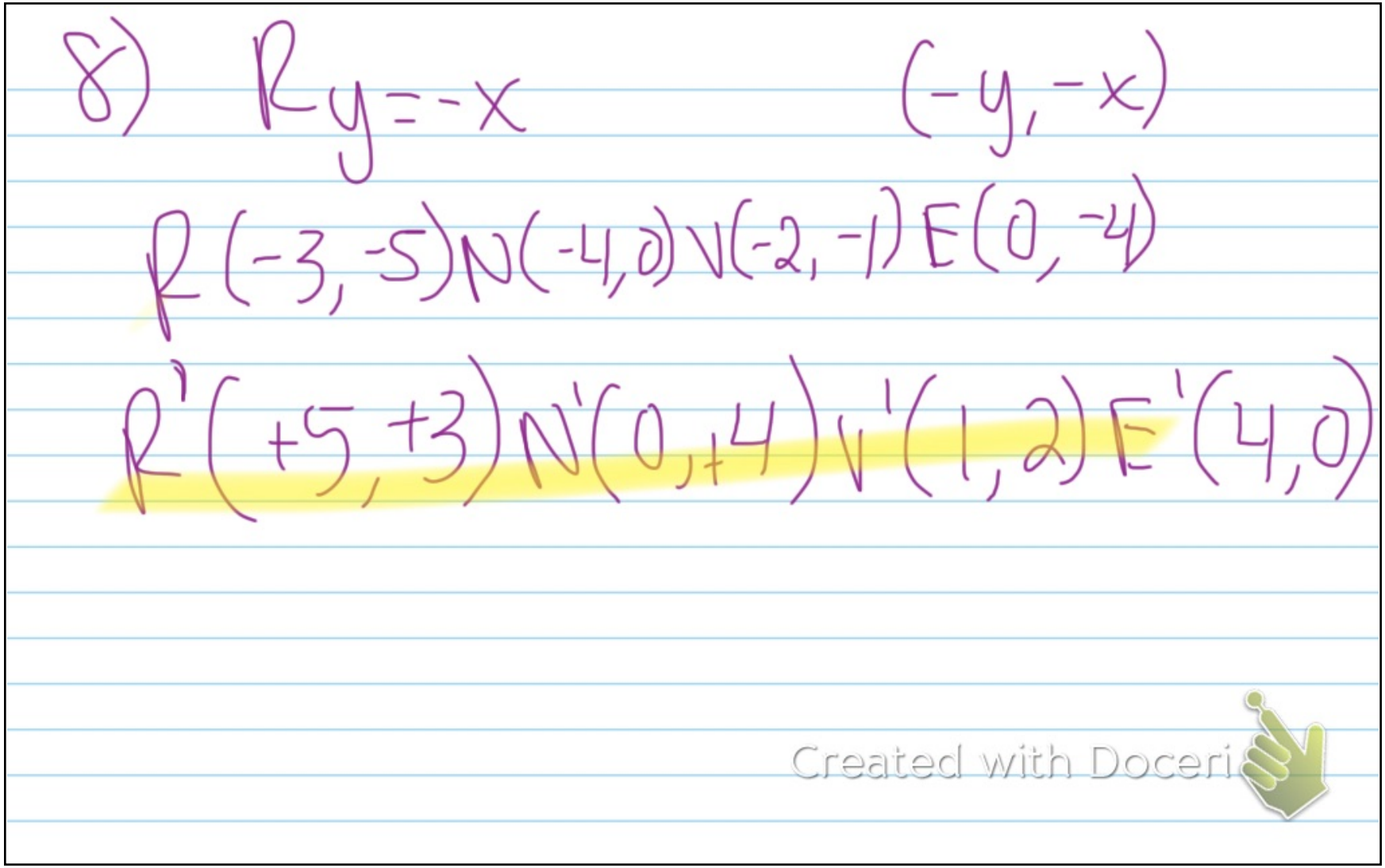
8) $R_{y=-x}$ $(-y,-x)$
R(-3,-5) N(-4,0) V(-2,-1) E(0,-4)
R'(+5,+3) N'(0,+4) V'(1,2) E'(4,0)
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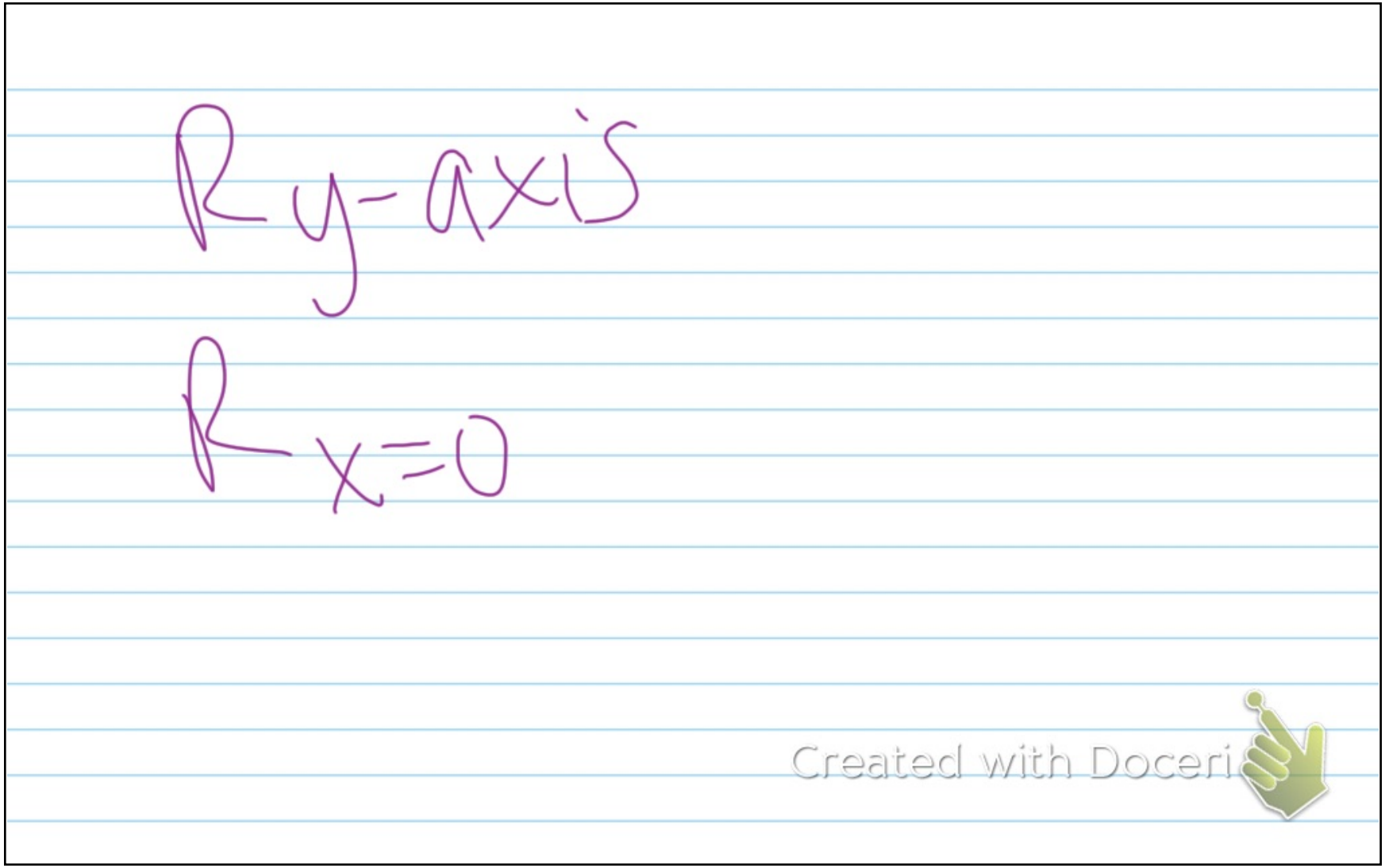
R y-axis
R x=0
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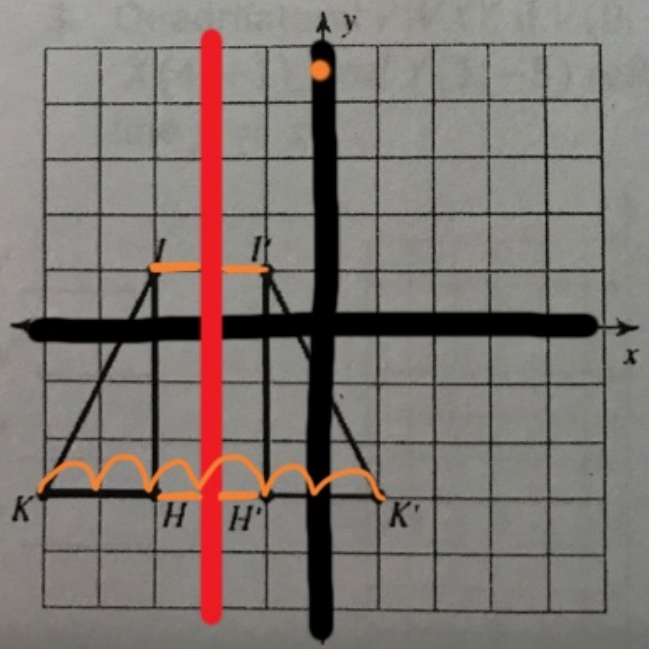
11)



12)

Description:

Notation:

$x = -2$