

Math 2

Need:

- Toolkits
- glue sticks
- scissors

Reminder !!

Test Friday

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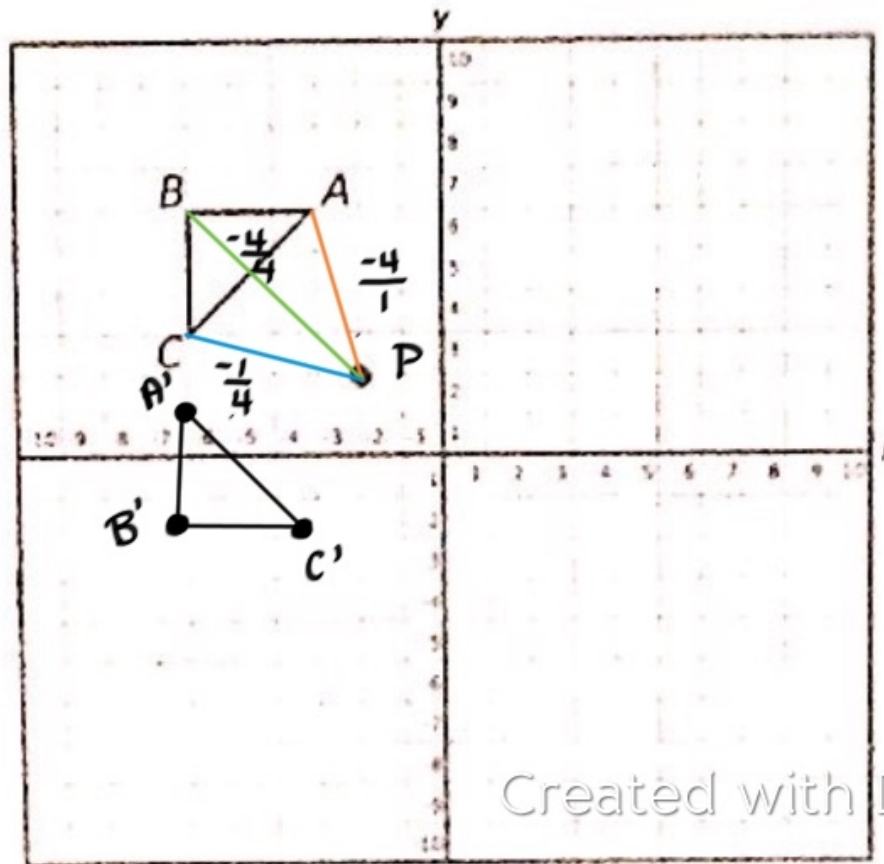
| <u>outside</u> | Rules | Verification Characteristics |
|----------------|--|---|
| Translation | $(x, y) \rightarrow (x \pm \text{horiz}, y \pm \text{vert})$ <div style="display: flex; justify-content: center; gap: 20px;"> <div style="text-align: center;"> \downarrow - left, + right </div> <div style="text-align: center;"> \downarrow + up - down </div> </div> | Be able to: Count _____ the given number of units <u>up/down</u> and/or <u>left/right</u> and end up on the new image. *Image should have not change composition, just position |
| Rotation | $\frac{90^\circ \text{ CCW}}{(x, y) \rightarrow (-y, x)} \longrightarrow 270^\circ \text{ CW}$ $\frac{180^\circ \text{ CCW}}{(x, y) \rightarrow (-x, -y)} \longrightarrow 180^\circ \text{ CW}$ $\frac{270^\circ \text{ CCW}}{(x, y) \rightarrow (y, -x)} \longrightarrow 90^\circ \text{ CW}$ | 90° and 270° The original point connected to the center of rotation should be <u>perpendicular</u> to the rotated point connected to the center. $\perp = 90^\circ$ and slopes are negative reciprocals ($\frac{a}{b} \perp -\frac{b}{a}$) 180° The original point connected to the center of rotation and the rotated point connected to the center of rotation should be a straight line or have <u>parallel</u> slopes. $\parallel \rightarrow$ same slope |
| Reflection | <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <u>Across x-axis</u> $(x, y) \rightarrow (x, -y)$ </div> <div style="text-align: center;"> <u>Across y-axis</u> $(x, y) \rightarrow (-x, y)$ </div> </div> <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <div style="text-align: center;"> <u>Across $y=x$</u> $(x, y) \rightarrow (y, x)$ </div> <div style="text-align: center;"> <u>Across $y=-x$</u> $(x, y) \rightarrow (-y, -x)$ </div> </div> | For all reflections: The lines that connect any point to its reflector point will be... <ol style="list-style-type: none"> 1. <u>parallel</u> to each other 2. <u>perpendicular</u> to line of reflection 3. <u>cut in half</u> by the line of reflection. |

| TRANSLATION | ROTATION | REFLECTION |
|---|---|--|
| | | |
| <p>Count!</p> <p>How to verify a translation:</p> <p>$\overline{AA'}$ → up 6 right 13</p> <p>$\overline{BB'}$ → up 6 right 13</p> <p>$\overline{CC'}$ ↓</p> <p>$\overline{DD'}$ ↓</p> <p>$\overline{EE'}$ ↓</p> | <p>Center of rotation (12,3)</p> <p>Perpendicular Slopes</p> <p>How to verify a rotation:</p> <p>$\overline{AP} = \frac{-7}{-6} = \frac{7}{6}$</p> <p>$\overline{A'P} = \frac{-6}{-7} = \frac{6}{7} \checkmark$</p> <p>$\overline{BP} = \frac{-9}{-4} = \frac{9}{4}$</p> <p>$\overline{B'P} = \frac{-4}{-9} = \frac{4}{9} \checkmark$</p> <p>$\overline{CP} = \dots$</p> <p>$\overline{C'P} = \frac{5}{4} \checkmark$</p> <p>$\overline{EP} = \frac{5}{4} \checkmark$</p> <p>$\overline{E'P} = \frac{4}{5} \checkmark$</p> | <p>How to verify a reflection:</p> <ol style="list-style-type: none"> ① What is the slope of the reflection line? ★ ② Points to the reflection line are \perp. ③ Pre-image points to the image points are \parallel. <p>Created with Doceri </p> <p>★ Always looking at slopes.</p> |

Example 1: Non-Origin based Rotations

rotate $\triangle ABC$ 90° about point $(-2, 2)$

$$\begin{matrix} \frac{-1}{-1} & \perp & \frac{-1}{4} = \frac{-1}{-4} \\ \frac{-1}{-4} & \perp & \frac{-4}{4} = \frac{-4}{-4} \\ \frac{-1}{-4} & \perp & \frac{-4}{-1} = \frac{-4}{-1} \end{matrix}$$

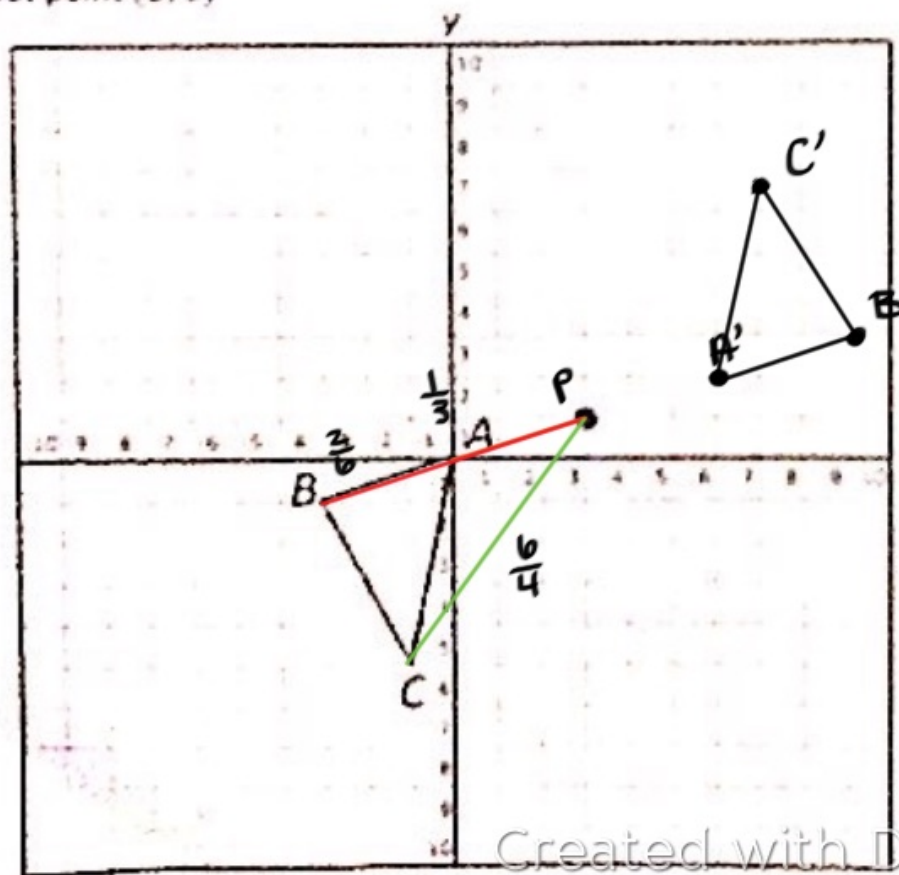


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Practice problem
Rotate $\triangle ABC$ 180° about point $(3, 1)$

Parallel

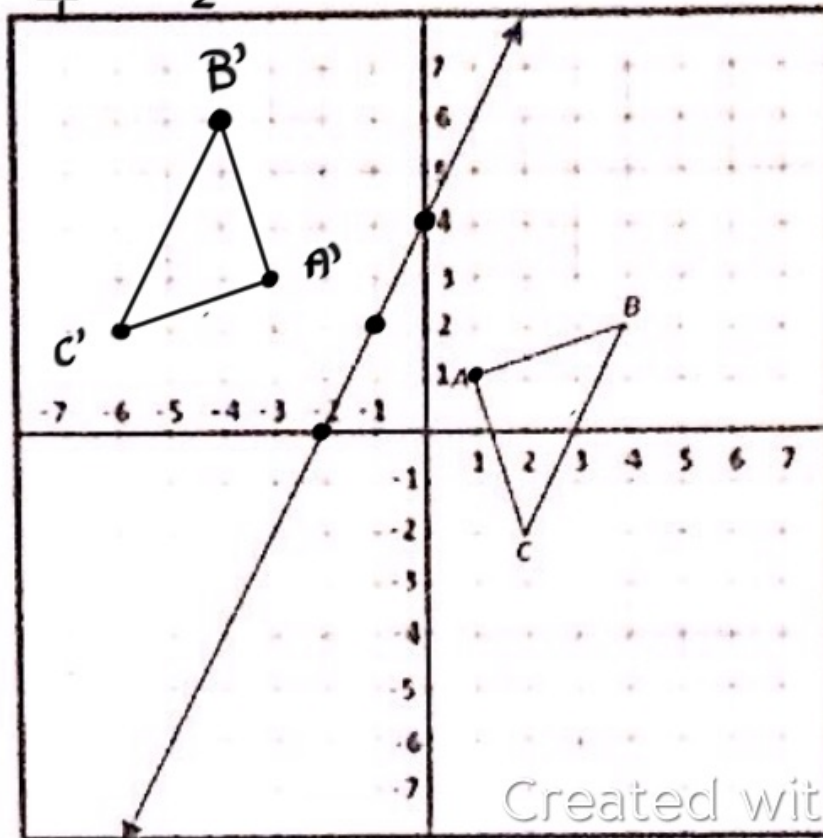


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Example 2: Reflections in Oblique Lines

Reflect $\triangle ABC$ in line $y = 2x + 4$

$$m = \frac{2}{1} \perp -\frac{1}{2}$$



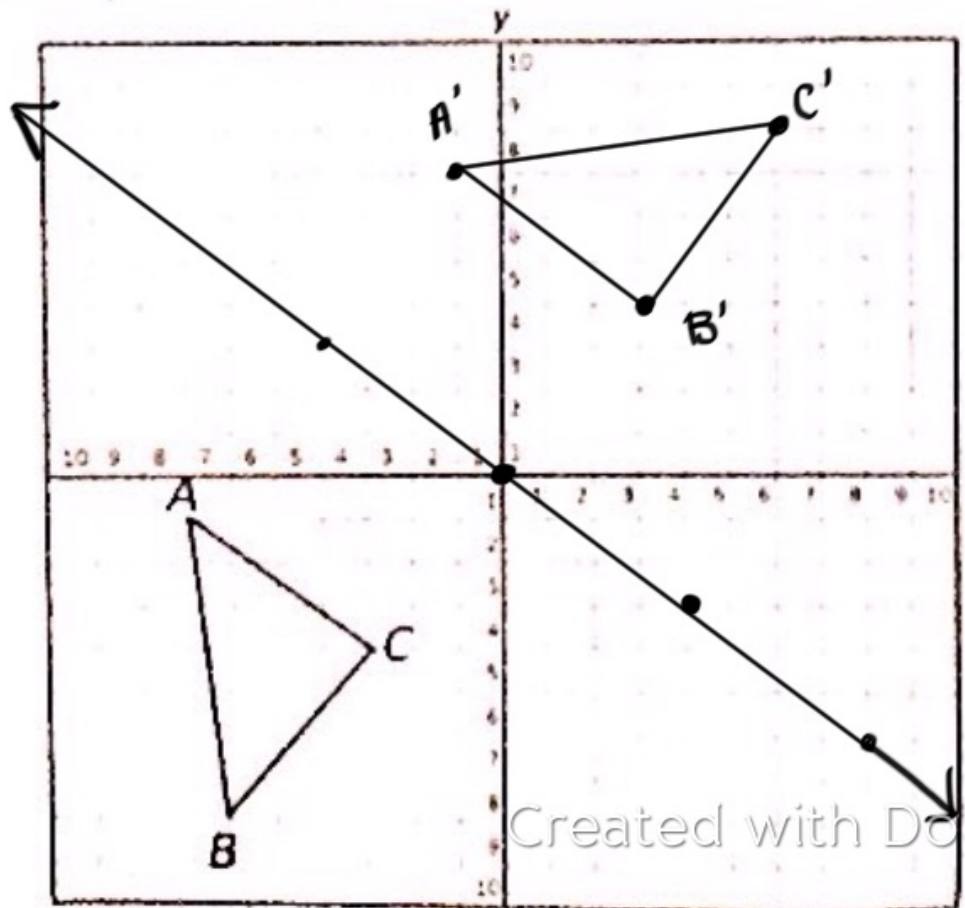
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Practice problem

Reflect $\triangle ABC$ in line $y = -\frac{3}{4}x + 0$ $\begin{matrix} \nearrow m \\ \leftarrow b \\ \downarrow y\text{-int} \end{matrix}$

$$-\frac{3}{4} \perp \frac{4}{3}$$



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1. reflection across y-axis

$$(x, y) \rightarrow (-x, y)$$

$$\begin{array}{l} (0, -3) \rightarrow (0, -3) \\ (4, -3) \rightarrow (-4, -3) \\ (2, 0) \rightarrow (-2, 0) \end{array}$$

2. $(x, y) \rightarrow (-x, -y)$

$$\begin{array}{l} (5, -4) \rightarrow (-5, 4) \\ (-2, 7) \rightarrow (2, -7) \\ (0, 8) \rightarrow (0, -8) \end{array}$$

3. $(x, y) \rightarrow (x+5, y-4)$

4. $90^\circ \text{ CW} = 270^\circ \text{ CCW}$
 $(x, y) \rightarrow (y, -x)$

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