Unit 1 Review - Transformations

Identify the type of transformation the rule represents. Use the given rule to determine the image of (2, -4) and the pre-image of (0, 3). (Sketching a graph may help you.)

1. T: (x, y) \rightarrow (x + 5, y - 6)  
   Transformation Name: **Translation**
   Image of (2, -4) is \((7, -10)\).  
   Pre-image of (0, 3) is \((-5, 9)\).

2. R_x: (x, y) \rightarrow (x, -y)  
   Transformation Name: **Reflection**
   Image of (2, -4) is \((2, -4)\).  
   Pre-image of (0, 3) is \((0, -3)\).

3. R_y: (x, y) \rightarrow (-x, y)  
   Transformation Name: **Reflection**
   Image of (2, -4) is \((-2, -4)\).  
   Pre-image of (0, 3) is \((0, 3)\).

4. R_{yx}: (x, y) \rightarrow (y, x)  
   Transformation Name: **Reflection**
   Image of (2, -4) is \((-4, 2)\).  
   Pre-image of (0, 3) is \((2, 0)\).

5. R_{90}: (x, y) \rightarrow (-y, x)  
   Transformation Name: **Rotation**
   Image of (2, -4) is \((-4, 2)\).  
   Pre-image of (0, 3) is \((3, 0)\).

6. R_{-90}: (x, y) \rightarrow (-y, x)  
   Transformation Name: **Rotation**
   Image of (2, -4) is \((-4, -2)\).  
   Pre-image of (0, 3) is \((-3, 0)\).

7. D_0, \alpha: (x, y) \rightarrow (\frac{1}{2} x, \frac{1}{2} y)  
   Transformation Name: **Dilation**
   Image of (2, -4) is \((1, -2)\).  
   Pre-image of (0, 3) is \((0, 6)\).

8. D_0, 2: (x, y) \rightarrow (2x, 2y)  
   Transformation Name: **Dilation**
   Image of (2, -4) is \((4, -8)\).  
   Pre-image of (0, 3) is \((0, 1.5)\).

9. D_0, -1: (x, y) \rightarrow (-x, -y)  
   Transformation Name: **Dilation**
   Image of (2, -4) is \((-2, 4)\).  
   Pre-image of (0, 3) is \((-0, -3)\).

You may use the coordinate plane to determine each of the following. Identify the type of transformation and determine the image. Give your answer for the image as a coordinate point.

<table>
<thead>
<tr>
<th>Transformation Type</th>
<th>Image</th>
</tr>
</thead>
<tbody>
<tr>
<td>10. T: A \rightarrow (x + 3, y - 5)</td>
<td>Translation</td>
</tr>
<tr>
<td>11. R_x: B \rightarrow \ldots</td>
<td>Reflection</td>
</tr>
<tr>
<td>12. R_y: C \rightarrow \ldots</td>
<td>Reflection</td>
</tr>
<tr>
<td>13. R_{yx}: D \rightarrow \ldots</td>
<td>Reflection</td>
</tr>
<tr>
<td>14. R_{90}: E \rightarrow (2, -4)</td>
<td>Rotation</td>
</tr>
<tr>
<td>15. R_{-90}: F \rightarrow \ldots</td>
<td>Rotation</td>
</tr>
<tr>
<td>16. D_0, 3: G \rightarrow \ldots</td>
<td>Dilation</td>
</tr>
<tr>
<td>17. D_0, -2: H \rightarrow \ldots</td>
<td>Dilation</td>
</tr>
<tr>
<td>18. D_0, \alpha: I \rightarrow \ldots</td>
<td>Dilation</td>
</tr>
</tbody>
</table>
# Unit 2 Review - Vocabulary

Describe each theorem, definition or postulate. Draw a diagram to represent each, and write an equation that is used to solve for values using that theorem, definition or postulate.

<table>
<thead>
<tr>
<th>Segment Addition Postulate</th>
<th>Angle Addition Postulate</th>
<th>Definition of Midpoint</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Description</strong></td>
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</tr>
<tr>
<td><strong>Diagram</strong></td>
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<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equation: ( AB + BC = AC )</td>
<td>Equation: ( m\angle ABD + m\angle DBC = m\angle ABC )</td>
<td>Equation: ( AB = BC )</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Definition of Angle Bisector</th>
<th>Vertical Angle Theorem</th>
<th>Definition of Supplementary ( \angle s )</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Description</strong></td>
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</tr>
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</tr>
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<td>A</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>Equation: ( m\angle ABD = m\angle DBC )</td>
<td>Equation: ( m\angle AEB = m\angle CED )</td>
<td>Equation: ( m\angle ABD + m\angle DBC = 180 )</td>
</tr>
</tbody>
</table>

Use the given diagram to write an equation and solve for the value of \( x \).

1. \( \overline{CD} \) is the bisector of \( \angle BOD \).
   \[ m\angle BOC = 9x + 3 \text{ and } m\angle DOC = 8x + 7 \]
   \[ 9x + 3 = 8x + 7 \]
   \[ x = 4 \]

2. \( O \) is the midpoint of \( FC \)
   \[ FO = 3x + 6 \text{ and } OC = 5x - 4 \]
   \[ 3x + 6 = 5x - 4 \]
   \[ 2x = 10 \]
   \[ x = 5 \]

3. \( m\angle FOE = 3x - 1 \), \( m\angle EOD = 72^\circ \)
   And \( m\angle FOD = 6x + 11 \)
   \[ 3x - 1 + 72 = 6x + 11 \]
   \[ 3x + 71 = 6x + 11 \]
   \[ 3x = 60 \]
   \[ x = 20 \]

4. \( EB = 6x - 8 \), \( OB = 12 \) and \( OE = 4x - 2 \)
   \[ 4x - 2 + 12 = 6x - 8 \]
   \[ 4x + 10 = 6x - 8 \]
   \[ 2x = 18 \]
   \[ x = 9 \]

5. \( m\angle EOA = 13x \) and \( m\angle AOB = x + 12 \)
   \[ 13x + x + 12 = 180 \]
   \[ 14x = 168 \]
   \[ x = 12 \]
Unit 3 Review – Proofs & Reasons

Use the diagram to identify a reason that justifies each statement.
1. \( AF + FE = AE \) **Seg. Add. Post.**
2. \( m \angle BFC + m \angle CFE = m \angle BFE \) **Angle Add. Post.**
3. \( m \angle AFB + m \angle BFE = 180^\circ \) **Def. of Supp. \( \angle s \)**
4. If \( F \) is the midpoint of \( AE \), then \( AF = EF \). **Def. of midpoint**
5. If \( FD \) bisects \( \angle CFE \), then \( m \angle CFD = m \angle DFE \). **Def. of \( \angle \) bisector**
6. If \( \angle BFC \) and \( \angle CFD \) are complementary, then \( m \angle BFC + m \angle CFD = 90^\circ \). **Def. of comp. \( \angle s \)**

Identify the property, postulate, definition, or theorem that justifies each statement.
7. If \( m \angle A + m \angle B = 180^\circ \) and \( m \angle C + m \angle D = 180^\circ \).
   Then \( m \angle A + m \angle B = m \angle C + m \angle D \). **Subst. Prop.**
8. If \( AB = CD \) and \( EF = GH \), then \( AB + EF = CD + GH \). **Addition Prop.**
9. If \( m \angle A + m \angle B = m \angle C + m \angle B \), then \( m \angle A = m \angle C \). **Subtr. Prop.**
10. If \( MQ = MP + PQ \) and \( MP + PQ = RS \), then \( MQ = RS \). **Transitive Prop.**

**Proof 1:**
Given: \( MP = NQ \)
Prove: \( MN = PQ \)

<table>
<thead>
<tr>
<th>Statement</th>
<th>Reason</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. ( MP = NQ )</td>
<td><strong>Given</strong></td>
</tr>
<tr>
<td>2. ( NP = NP )</td>
<td><strong>Reflexive</strong></td>
</tr>
<tr>
<td>3. ( MP = MN + NP )</td>
<td><strong>Seg. Add. Post.</strong></td>
</tr>
<tr>
<td>4. ( NQ = NP + PQ )</td>
<td><strong>Subst.</strong></td>
</tr>
<tr>
<td>5. ( MN + NP = NP + PQ )</td>
<td><strong>Subtraction</strong></td>
</tr>
</tbody>
</table>

**Proof 2:**
Given: \( \angle 1 \) and \( \angle 5 \) are supplementary; 
\( \angle 3 \) and \( \angle 5 \) are supplementary;
Prove: \( m \angle 1 = m \angle 3 \)

<table>
<thead>
<tr>
<th>Statement</th>
<th>Reason</th>
</tr>
</thead>
</table>
| 1. \( \angle 1 \) and \( \angle 5 \) are supplementary; 
\( \angle 3 \) and \( \angle 5 \) are supplementary | **Given** |
| 2. \( m \angle 1 + m \angle 5 = 180^\circ \) | **Def. of supp. \( \angle s \)** |
| 3. \( m \angle 3 + m \angle 5 = 180^\circ \) | **Substitution Prop.** |
| 4. \( m \angle 1 + m \angle 5 = m \angle 3 + m \angle 5 \) | **Reflexive** |
| 5. \( m \angle 1 = m \angle 3 \) | **Subtraction Prop.** |
### Unit 4 Review – Parallel Lines

<table>
<thead>
<tr>
<th>Alternate Interior ( \angle s )</th>
<th>Corresponding ( \angle s )</th>
<th>Same-Side Interior ( \angle s )</th>
</tr>
</thead>
<tbody>
<tr>
<td>When parallel lines are cut by a transversal, alternate interior angles are equal.</td>
<td>When parallel lines are cut by a transversal, corresponding angles are equal.</td>
<td>When parallel lines are cut by a transversal, same-side interior angles are supplementary.</td>
</tr>
<tr>
<td><img src="image" alt="Diagram" /> ( 95^\circ ) ( \quad 3x - 1^\circ )</td>
<td><img src="image" alt="Diagram" /> ( 82^\circ ) ( 4x + 6^\circ )</td>
<td><img src="image" alt="Diagram" /> ( 5x^\circ )</td>
</tr>
</tbody>
</table>

**Equation and Solution**

\[
3x - 1 = 95 \\
3x = 96 \\
x = 32
\]

\[
82 = 4x + 6 \\
76 = 4x \\
x = 19
\]

\[
5x + 90 = 150 \\
5x = 90 \\
x = 18
\]

---

Determine the missing angle measure for each of the following angles. Justify your answer.

1. If \( m \angle 1 = 115^\circ \), then \( m \angle 2 = \frac{115}{\text{corr.}} \text{ because if } \angle C \parallel \angle D \), angles are equal.

2. If \( m \angle 5 = 70^\circ \), then \( m \angle 8 = \frac{70}{\text{corr.}} \text{ because if } \angle A \parallel \angle B \), angles are equal.

3. If \( m \angle 4 = 120^\circ \), then \( m \angle 5 = \frac{120}{\text{corr.}} \text{ because if } \angle C \parallel \angle D \), angles are supplementary.

---

Using the diagram and the given information, decide if there are parallel lines. If there are, state the lines/segments that must be parallel and explain the reason why. If there are no parallel lines, write ‘no parallel lines’ and explain the reason why.

4. \( \angle 3 = \angle 7 \)  \( \text{Yes; } AB \parallel EF \)  
   Explain: Because \( \angle 3 \) and \( \angle 7 \) are equal, \( \angle 15 \) that are given as equal, corresp. \( \angle 15 \) that are given as equal, then the lines are parallel.

5. \( \angle 4 = \angle 6 \)  \( \text{Yes; } AB \parallel EF \)  
   Explain: If 2 lines \( \angle CAT \) and \( \angle Alt. Int. \), \( \angle 15 \) are equal, then the lines are parallel.

6. \( \angle 2 = \angle 5 + \angle 6 \)  \( \text{No} \)  
   Explain: They are supplementary \( \angle 15 \), so they must be supplementary, not equal.

7. \( \angle 8 = 90^\circ \); \( \angle 9 = 90^\circ \)  \( \text{Yes; } \perp \)  
   Explain: 2 lines perpendicular to the same line are parallel.
Unit 5 Review – Congruent Triangles

Mark your diagram with any other known congruent pair(s). Identify the postulate or theorem that proves triangles congruent by writing the letters in the boxes on the left (i.e. S, A, S).

State the three congruent pairs of sides or angles that justify the triangles are congruent.

State the triangle congruence.

1. \[ \triangle ABC \cong \triangle ADC \]

2. \[ \triangle EFI \cong \triangle GHI \]

3. \[ \triangle NMJ \cong \triangle KLS \]

4. \[ \triangle ORQ \cong \triangle OQP \]

Mark all given and known congruent parts.

If the triangles are congruent, state the postulate or theorem that proves congruence.

5. \[ \frac{AB}{CD} \]
   \[ AD = BC \]

6. \[ \angle B \cong \angle C \]
   \[ AB \cong CD \]

7. \[ \frac{AB}{CD} \]
   \[ AB \parallel CD \]

8. B is the midpoint of \( AC \)
   \[ AC \perp DB \]

9. \[ \frac{AB}{CD} \]
   \[ AD \cong BC \]

10. \[ \frac{AE}{BD} \]
    \[ AB \cong DE \]
Fill in the following flow chart by stating the properties of each.

Quadrilateral

Parallelogram
- 2 pairs of \( \parallel \) opp. sides
- 2 pairs of \( = \) opp. sides
- Diagonals bisect

Rectangle
- 4 right angles
- Diagonals =

Rhombus
- 4 sides
- Diagonals are \( \perp \)
- Diagonals bisect \( \perp \)s

Square
- 4 sides
- 4 right \( \perp \)s

Match each shape name to the properties it has. Answers will be repeated.

- \( [A] \) parallelogram
- \( [B] \) rectangle
- \( [C] \) rhombus
- \( [D] \) square
- \( [E] \) trapezoid

1. \( A \) opposite sides are congruent
2. \( A \) opposite angles are congruent
3. \( B \) diagonals are congruent
4. \( B \) all sides and angles are congruent
5. \( C \) diagonals are perpendicular
6. \( A \) diagonals are bisected
7. \( C \) angles are bisected
8. \( B \) all angles are right angles
9. \( A \) opposite sides are parallel
10. \( E \) not a parallelogram

Solve for the missing lengths or angle measures. Explain where your answers came from.

11. \( a = \frac{4}{5} \) because diagonals are \( \perp \)
   \( b = \frac{5}{4} \) because opp. sides are \( = \)
   \( x = 65^\circ \) because Base \( \perp \)s are \( \perp \)
   \( y = 25^\circ \) because we have complementary \( \perp \)s

12. \( b^2 = 75 \)
   \( x = 105^\circ \) because opp. \( \perp \)s are \( \perp \)

13. \( 62 + y = 90 \)
   \( x = 90^\circ \) because diagonals are \( \perp \)