

Rigid Motions and Transformations: math test, Grade 10 – download the PDF

Suggested time: 45 minutes. Out of 20 points. Calculator allowed only when the problem says so.

1 Applying the rules

/ 4 pts

Let $P(-6, 2)$. Find the image of P under: (a) the translation by $\langle 7, -5 \rangle$; (b) the reflection in the y-axis; (c) the reflection in the x-axis; (d) the rotation of 90° counterclockwise about the origin.

2 A half turn

/ 3 pts

Triangle KLM has $K(1, 1)$, $L(4, 1)$, $M(1, 3)$.

- Rotate it 180° about the origin.
- Show that $LM = L'M'$.

3 Composition

/ 4 pts

Let $Q(3, -2)$, let T be the translation by $\langle -1, 4 \rangle$ and R the reflection in the x-axis.

- Find the image of Q by T then R .
- Find the image of Q by R then T .
- Are the two results the same? What does it show?

4 Identify the rotation

/ 3 pts

Triangle ABC with $A(1, 2)$, $B(4, 2)$, $C(1, 5)$ is mapped to $A'(-2, 1)$, $B'(-2, 4)$, $C'(-5, 1)$ by a rotation about the origin.

- Find the rule of the rotation.
- Verify it for B and C .
- Which clockwise angle gives the same image?

5 Symmetry

/ 3 pts

- A regular nonagon has 9 sides. How many lines of symmetry does it have, and what is its smallest rotation angle?
- A rhombus that is not a square: give its number of lines of symmetry and its smallest rotation angle.

6 Congruent triangles

/ 3 pts

Triangle ABC : $A(0, 0)$, $B(3, 0)$, $C(0, 4)$. Triangle GHI : $G(2, 2)$, $H(2, 5)$, $I(-2, 2)$.

- Show that the triangles are congruent.
- Describe two rigid motions that map ABC onto GHI .



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