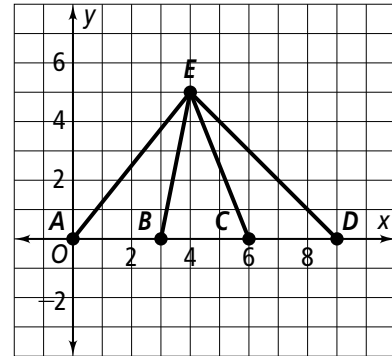# Standardized Test Prep

Ratios and Proportions

Gridded Response

Solve each exercise and enter your answer on the grid provided.

Use the graph at the right for Exercises 1 and 2.

1. What is $\frac{AD}{AB}$ in simplest form?

2. What is $\dfrac{\text{slope of } \overline{BE}}{\text{slope of } \overline{AE}}$ in simplest form?

3. What is the value of x in the proportion $\dfrac{(x-1)}{5} = \dfrac{(4x+2)}{35}$?

4. What is the value of x in the proportion $\dfrac{x+1}{x+3} = \dfrac{15}{21}$?

5. The lengths of the sides of a triangle are in the extended ratio $3 : 10 : 12$. The perimeter is 400 cm. What is the length of the longest side in centimeters?

Answers

1.


2.

3.

4.

5.

Standardized Test Prep

Similar Polygons

Multiple Choice

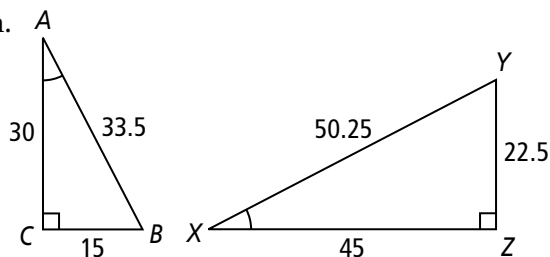**For Exercises 1–5, choose the correct letter.**

1. You make a scale drawing of a tree using the scale 5 in. = 27 ft. If the tree is 67.5 ft tall, how tall is the scale drawing?

   Ⓐ 10 in.   Ⓑ 11.5 in.   Ⓒ 12 in.   Ⓓ 12.5 in.

2. You make a scale drawing of a garden plot using the scale 2 in. = 17 ft. If the length of a row of vegetables on the drawing is 3 in., how long is the actual row?

   Ⓕ 17 ft   Ⓖ 25.5 ft   Ⓗ 34 ft   Ⓘ 42.5 ft

3. The scale factor of $\triangle RST$ to $\triangle DEC$ is 3 : 13. What is the scale factor of $\triangle DEC$ to $\triangle RST$?

   Ⓐ 3 : 13   Ⓑ 1 : 39   Ⓒ 39 : 1   Ⓓ 13 : 3

4. $\triangle ACB \sim \triangle FED$. What is the value of x?

   Ⓕ 4   Ⓖ 4.2   Ⓗ 4.5   Ⓘ 5
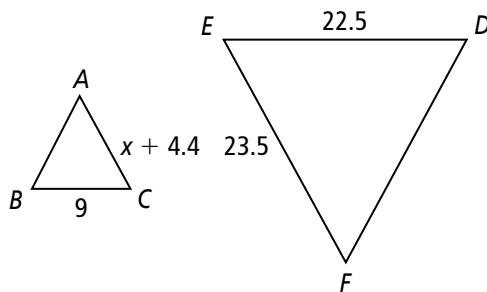
5. $MNOP \sim QRST$ with a scale factor of 5 : 4. $MP = 85$ mm. What is the value of QT?

   Ⓐ 60 mm   Ⓑ 68 mm   Ⓒ 84 mm   Ⓓ 106.25 mm

Short Response
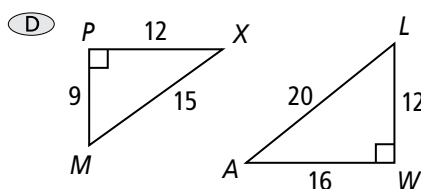
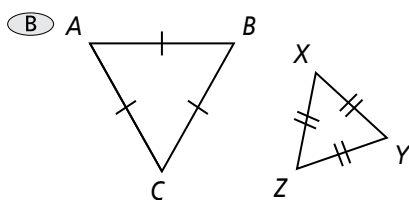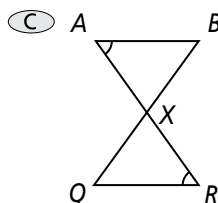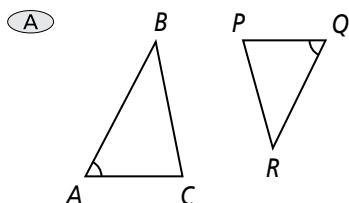**6.** Are the triangles at the right similar? Explain.

Standardized Test Prep

Proving Triangles Similar

Multiple Choice

For Exercises 1–3, choose the correct letter.

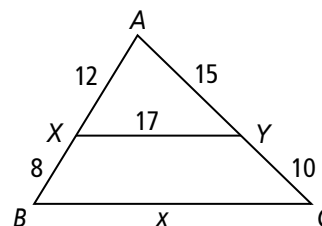1. Which pair of triangles can be proven similar by the AA ~ Postulate?

2. $\triangle AXY \sim \triangle ABC$. What is the value of *x?*

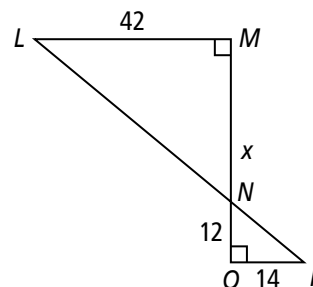 Ⓕ $10\frac{1}{5}$ Ⓗ $11\frac{1}{3}$

  Ⓖ 19   Ⓘ $28\frac{1}{3}$

3. $\triangle LMN \sim \triangle PON$. What is the value of *x?*

  Ⓐ 36   Ⓒ 25
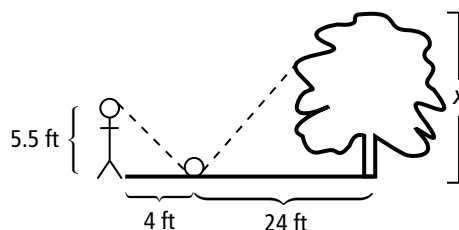
  Ⓑ 20   Ⓓ $28\frac{1}{3}$

Short Response

4. Irene places a mirror on the ground 24 ft from the base of an oak tree. She walks backward until she can see the top of the tree in the middle of the mirror. At that point, Irene's eyes are 5.5 ft above the ground, and her feet are 4 ft from the mirror. How tall is the oak tree? Explain.
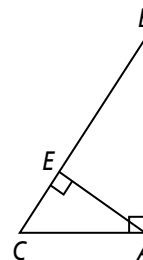
Standardized Test Prep

Similarity in Right Triangles

Multiple Choice

For Exercises 1–5, choose the correct letter.

1. Which segment of the hypotenuse is adjacent to $\overline{AB}$?

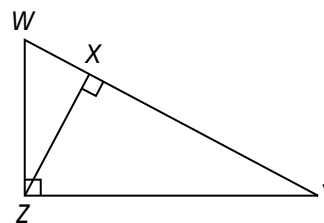   Ⓐ $\overline{EC}$　　　　Ⓑ $\overline{AC}$　　　　Ⓒ $\overline{AE}$　　　　Ⓓ $\overline{BE}$

2. What is the geometric mean of 7 and 12?

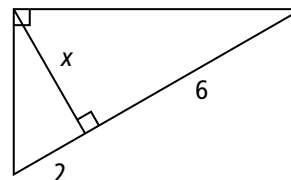   Ⓕ $1\frac{5}{7}$　　　　Ⓖ 9.5　　　　Ⓗ $2\sqrt{21}$　　　　Ⓘ $4\sqrt{21}$

3. Which similarity statement is true?

   Ⓐ $\triangle WYZ \sim \triangle XZW \sim \triangle XYZ$

   Ⓑ $\triangle WYZ \sim \triangle WZX \sim \triangle ZYX$

   Ⓒ $\triangle YZW \sim \triangle XZW \sim \triangle XZY$

   Ⓓ $\triangle YZW \sim \triangle ZXW \sim \triangle ZYX$

4. What is the value of *x*?
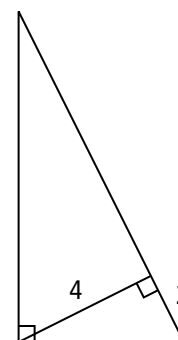
   Ⓕ $2\sqrt{3}$　　　　Ⓗ 4

   Ⓖ $4\sqrt{3}$　　　　Ⓘ 6

5. The altitude of the hypotenuse of a right triangle divides the hypotenuse into segments of lengths 14 and 8. What is the length of the altitude?

   Ⓐ $2\sqrt{77}$　　　　Ⓑ $4\sqrt{7}$　　　　Ⓒ $4\sqrt{11}$　　　　Ⓓ 11

Extended Response

6. What is the perimeter of the large triangle shown at the right? Show your work.
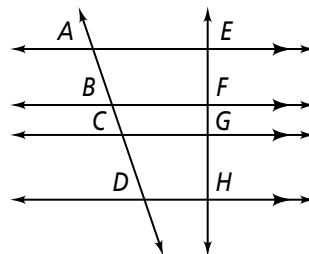
Standardized Test Prep

Proportions in Triangles

Multiple Choice

For Exercises 1–5, choose the correct letter.

For Exercises 1 and 2, use the diagram at the right.

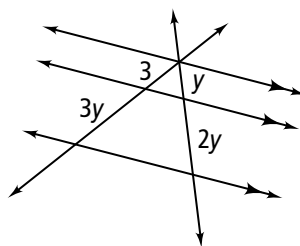1. Which makes the proportion true? $\dfrac{AB}{\square} = \dfrac{EF}{GH}$

   Ⓐ AD　　　　　Ⓒ CD

   Ⓑ DH　　　　　Ⓓ BC

2. Which proportion is *not* true?

   Ⓕ $\dfrac{BC}{CD} = \dfrac{FG}{GH}$　　　Ⓖ $\dfrac{AC}{CD} = \dfrac{EG}{GH}$　　　Ⓗ $\dfrac{BD}{FH} = \dfrac{AD}{EH}$　　　Ⓘ $\dfrac{AB}{AE} = \dfrac{EF}{BF}$
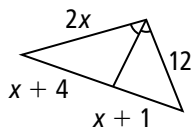
3. What is the value of *y?*

   Ⓐ 2　　　　　Ⓒ 3

   Ⓑ 4　　　　　Ⓓ 6

4. What is the value of *x?*

   Ⓕ 3　　　　　Ⓗ 6

   Ⓖ 8　　　　　Ⓘ 12

5. In △*DEF,* the bisector of ∠*F* divides the opposite sides into segments that are 4 and 9 in. long. The side of the triangle adjacent to the 4 in. segment is 6 in. long. To the nearest tenth of an inch, how long is the third side of the triangle?

   Ⓐ 2.7 in.　　　　Ⓑ 6 in.　　　　Ⓒ 13 in.　　　　Ⓓ 13.5 in.

Short Response

6. In △*QRS,* $\overline{XY} \parallel \overline{SR}$. $\overline{XY}$ divides $\overline{QR}$ and $\overline{QS}$ into segments as follows: $\overline{SX} = 3$, $\overline{XQ} = 2x$, $\overline{RY} = 4.5$, and $\overline{YQ} = 7.5$. Write a proportion to find *x.* What is the length of $\overline{QS}$*?*
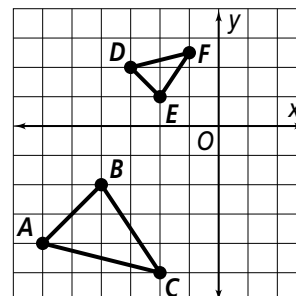
Standardized Test Prep

Similarity Transformations

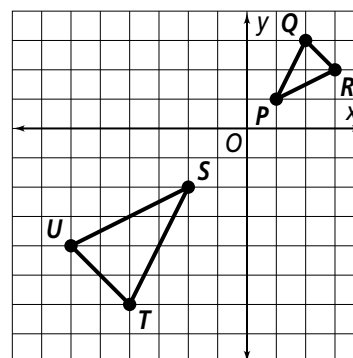## Multiple Choice

For Exercises 1–3, choose the correct letter.

1. Which similarity transformation maps $\triangle ABC$ to $\triangle DEF$?

   Ⓐ $R_{x\text{-axis}} \circ D_{0.5}$ Ⓒ $R_{x\text{-axis}} \circ D_2$

   Ⓑ $r_{(270°,\, O)} \circ D_{0.5}$ Ⓓ $r_{(90°,\, O)} \circ D_2$

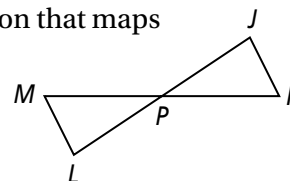2. Which similarity transformation does not map $\triangle PQR$ to $\triangle STU$?

   Ⓕ $r_{(180°,\, O)} \circ D_2$ Ⓗ $D_2 \circ R_{x\text{-axis}} \circ R_{y\text{-axis}}$

   Ⓖ $D_2 \circ r_{(180°,\, O)}$ Ⓘ $D_2 \circ R_{x\text{-axis}} \circ r_{(90°,\, O)}$

3. Which of the following best describes a similarity transformation that maps $\triangle JKP$ to $\triangle LMP$?

   Ⓐ a dilation only

   Ⓑ a rotation followed by a dilation

   Ⓒ a reflection followed by a dilation

   Ⓓ a translation followed by a dilation

Short Response

4. $\triangle ABC$ has vertices $A(1, 0)$, $B(2, 4)$, and $C(3, 2)$. $\triangle RST$ has vertices $R(0, 3)$, $S(-12, 6)$, and $T(-6, 9)$. What is a similarity transformation that maps $\triangle ABC$ to $\triangle RST$?

Name _____ Class _____ Date _____

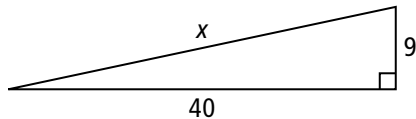# Standardized Test Prep

The Pythagorean Theorem and Its Converse

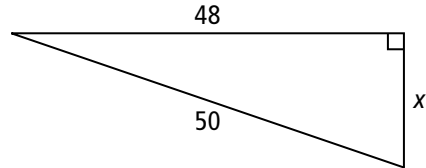## Gridded Response

Solve each exercise and enter your answer on the grid provided.
What is the value of *x*?
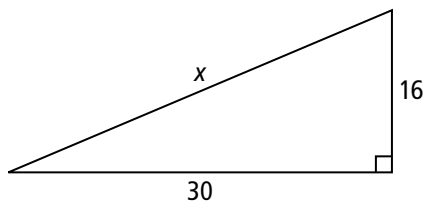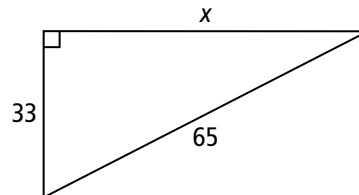
1.

2.

3.

4.

5. An acute triangle has sides that are 14 mm and 97 mm long,
respectively. The third side of the triangle must be greater than
what whole number of millimeters?

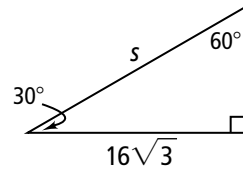## Answers

Standardized Test Prep

Special Right Triangles

Multiple Choice

For Exercises 1–5, choose the correct letter.

1. What is the value of *s?*

   (A) 8   (C) $16\sqrt{2}$

   (B) 16   (D) 32

2. What are the angle measures of the triangle?

   (F) 30°, 60°, and 90°   (H) 60°, 60°, and 60°

   (G) 45°, 45°, and 90°   (I) They cannot be determined.
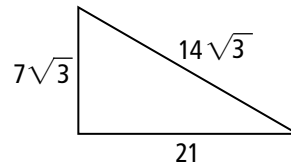
3. What is the value of *p?*

   (A) 22   (C) 44

   (B) $22\sqrt{2}$ (D) $44\sqrt{3}$
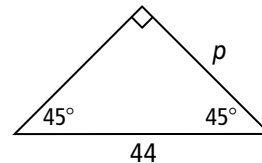
4. In the center of town there is a square park with side length 30 ft. If a person walks from one corner of the park to the opposite corner, how far does the person walk? Round to the nearest foot.

   (F) 21 ft   (G) 42 ft   (H) 52 ft   (I) 60 ft

5. An equilateral triangle has an altitude of 15 m. What is the perimeter of the triangle?

   (A) $30\sqrt{2}$ m   (B) 45 m   (C) $30\sqrt{3}$ m   (D) $60\sqrt{3}$ m

Short Response

6. The hypotenuse of a 30°-60°-90° triangle is 24.2 ft. Explain how to find the lengths of the legs of the triangle.

Standardized Test Prep

Trigonometry

Multiple Choice

For Exercises 1–6, choose the correct letter.

1. What is the value of sin *N*?

    Ⓐ $\frac{1}{2}$ Ⓒ $\frac{\sqrt{3}}{2}$
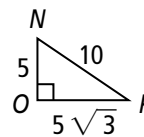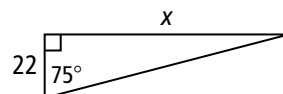
    Ⓑ $\frac{\sqrt{3}}{3}$ Ⓓ $\sqrt{3}$

2. What is the value of *x* to the nearest tenth?

    Ⓕ 5.7   Ⓗ 30.3

    Ⓖ 21.2   Ⓘ 82.1

3. What is the value of *x* to the nearest degree?

    Ⓐ 18   Ⓒ 71

    Ⓑ 19   Ⓓ 72
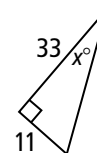
4. A 14-ft-long ramp rises at an angle of 22.2°. How long is the base of the ramp to the nearest foot?

    Ⓕ 11 ft   Ⓖ 13 ft   Ⓗ 17 ft   Ⓘ 22 ft

5. What is the value of *w* to the nearest degree?

    Ⓐ 25   Ⓒ 40

    Ⓑ 35   Ⓓ 45
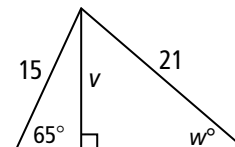
6. A right triangle has an angle that measures 34 and the adjacent side measures 17. What is the length of the hypotenuse to the nearest tenth?

    Ⓕ 20.5   Ⓖ 25.2   Ⓗ 30.4   Ⓘ 34

Short Response

7. A 12-ft-long ladder is leaning against a wall and makes an 80° angle with the ground. How high up the wall does the ladder reach, and how far is the base of the ladder from the base of the wall? Round to the nearest inch.

Standardized Test Prep

Angles of Elevation and Depression

Multiple Choice

For Exercises 1–5, choose the correct letter.

1. A person can see the top of a building at an angle of 65°. The person is standing 50 ft away from the building and has an eye level of 5 ft. How tall is the building to the nearest tenth of a foot?

   Ⓐ 26.1 ft   Ⓑ 50.3 ft   Ⓒ 107.2 ft   Ⓓ 112.2 ft

2. A fire ranger on a 150-ft-tall tower spots a fire at a 30° angle of depression. How many feet away from the tower is the fire to the nearest tenth?

   Ⓕ 86.6 ft   Ⓖ 129.9 ft   Ⓗ 259.8 ft   Ⓘ 300 ft

3. What is the value of x to the nearest foot?

   Ⓐ 6713 ft   Ⓒ 10,443 ft

   Ⓑ 9534 ft   Ⓓ 12,445 ft

4. What is the value of x to the nearest foot?

   Ⓕ 2097 ft   Ⓗ 3108 ft

   Ⓖ 2529 ft   Ⓘ 6706 ft

5. A wildlife biologist looks up at a 78° angle of elevation to see a flock of geese in the air. The biologist is standing 200 ft away from a place directly underneath the geese. How high are the geese flying, to the nearest tenth of a foot?

   Ⓐ 195.6 ft   Ⓑ 204.5 ft   Ⓒ 940.9 ft   Ⓓ 961.9 ft
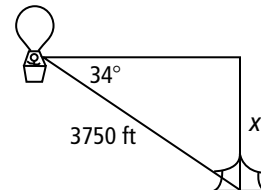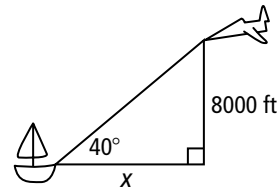
Extended Response

6. Two buildings stand 90 ft apart at their closest points. At those points, the angle of depression from the top of the taller building to the top of the shorter building is 12°. How much taller is the taller building? Draw a diagram to support your answer. Round your answer to the nearest foot. Explain.
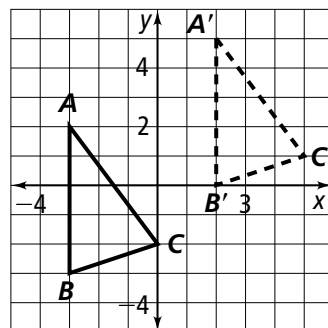
Standardized Test Prep

Translations

Multiple Choice

For Exercises 1–4, choose the correct letter.

1. In the diagram, $\triangle A'B'C'$ is an image of $\triangle ABC$. Which rule describes this translation?

    Ⓐ $T_{<-5,\,-3>}(\triangle ABC)$

    Ⓑ $T_{<5,\,3>}(\triangle ABC)$

    Ⓒ $T_{<-3,\,-5>}(\triangle ABC)$

    Ⓓ $T_{<3,\,5>}(\triangle ABC)$

2. If $T_{<3,\,-7>}(TUVW) = T'U'V'W'$, what translation maps $T'U'V'W'$ onto $TUVW$?

    Ⓕ $T_{<3,\,-7>}(T'U'V'W')$ Ⓗ $T_{<7,\,-3>}(T'U'V'W')$

    Ⓖ $T_{<-7,\,3>}(T'U'V'W')$ Ⓘ $T_{<-3,\,7>}(T'U'V'W')$

3. Which of the following is true for a rigid motion?

    Ⓐ The preimage and the image have the same measurements.

    Ⓑ The preimage is larger than the image.

    Ⓒ The preimage is smaller than the image.

    Ⓓ The preimage is in the same position as the image.

4. $\triangle RSV$ has coordinates $R(2, 1)$, $S(3, 2)$, and $V(2, 6)$. A translation maps point R to R' at $(-4, 8)$. What are the coordinates for S' for this translation?

    Ⓕ $(-6, -4)$ Ⓖ $(-3, 2)$ Ⓗ $(-3, 9)$ Ⓘ $(-4, 13)$

Short Response

5. $\triangle LMP$ has coordinates $L(3, 4)$, $M(6, 6)$, and $P(5, 5)$. A translation maps point L to L' at $(7, -4)$. What are the coordinates for M' and for P' for this translation?
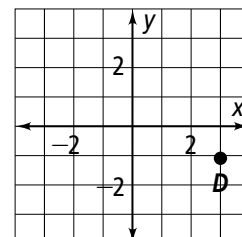
Standardized Test Prep

Reflections

Multiple Choice

For Exercises 1–5, choose the correct letter.

1. In the graph at the right, what are the coordinates of $R_{y\text{-axis}}(D)$?

   Ⓐ $(3, -1)$ Ⓒ $(-3, -1)$

   Ⓑ $(3, 1)$ Ⓓ $(-3, 1)$

2. The coordinates of the vertices of $\triangle CDE$ are $C(1, 4)$, $D(3, 6)$, and $E(7, 4)$. What are the coordinates of $R_{y = 3}(D)$?
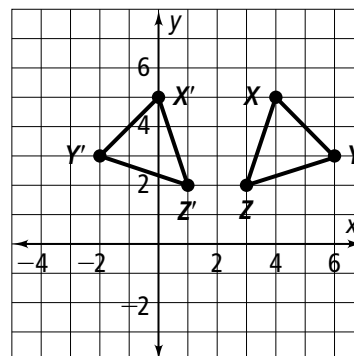
   Ⓕ $(3, -6)$ Ⓖ $(3, -3)$

   Ⓗ $(3, 0)$ Ⓘ $(3, 9)$

3. What is true for an image and a preimage in a reflection?

   Ⓐ The image is larger than the preimage.

   Ⓑ The image is smaller than the preimage.

   Ⓒ The image and the preimage have the same orientation.

   Ⓓ The image and the preimage have different orientations.

4. In the graph at the right, what is the line of reflection for $\triangle XYZ$ and $\triangle X'Y'Z'$?

   Ⓕ the x-axis

   Ⓖ the y-axis

   Ⓗ $x = 2$

   Ⓘ $y = 2$

5. What is the image of $A(3, -1)$ after a reflection, first across the line $y = 3$, and then across the line $x = -1$?

   Ⓐ $(-5, 7)$ Ⓒ $(-5, -1)$

   Ⓑ $(3, -1)$ Ⓓ $(1, -5)$

Extended Response

6. The coordinates of the vertices of parallelogram $RSTU$ are $R(0, 0)$, $S(2, 3)$, $T(6, 3)$, and $U(4, 0)$. What are the coordinates of the vertices of $R_{y = x}(RSTU)$?

Standardized Test Prep

Rotations

Multiple Choice

In Exercises 1–5, choose the correct letter.

1. Square *ABCD* has vertices *A*(3, 3), *B*(−3, 3), *C*(−3, −3), and *D*(3, −3).
Which of the following images is *A*?

   Ⓐ $r_{(90°, O)}(C)$ Ⓑ $r_{(180°, O)}(D)$ Ⓒ $r_{(270°, O)}(B)$ Ⓓ $r_{(270°, O)}(C)$

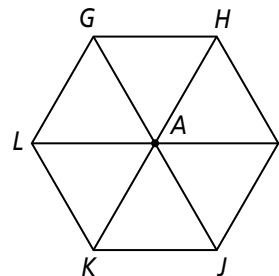**2.** $r_{(90°, O)}(PQRS)$ has vertices $P'(1, 5), Q'(3, −2), R'(−3, −2)$, and $S'(−5, 1)$.
What are the coordinates of *Q*?

   Ⓕ (−2, −3)   Ⓖ (−3, 2)   Ⓗ (2, 3)   Ⓘ (−3, −2)

3. Point *A* is the center of regular hexagon *GHIJKL*.
What is $r_{(300°, A)}(I)$?

   Ⓐ *J*   Ⓒ *L*

   Ⓑ *K*   Ⓓ *M*

4. A Ferris wheel has 16 cars spaced equal distances apart. The cars are
numbered 1–16 clockwise. What is the measure of the angle of rotation
that will map the position of car 16 onto the position of car 13?

   Ⓕ 22.5°   Ⓖ 45°   Ⓗ 67.5°   Ⓘ 90°

5. Given *P*(2, −5), what are the coordinates of $r_{(90°, O)}(P)$?

   Ⓐ (5, 2)   Ⓑ (−5, 2)   Ⓒ (5, −2)   Ⓓ (−2, −5)

Short Response

6. △*ABC* has coordinates *A*(3, 3), *B*(0, 0), and *C*(3, 0). What are the coordinates
of $r_{(180°, B)}(A)$ and $r_{(180°, B)}(C)$?

Standardized Test Prep
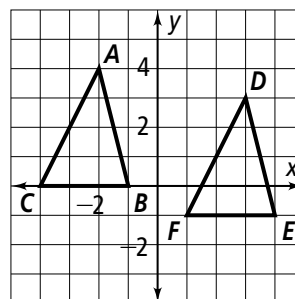
Compositions of Isometries

Multiple Choice

For Exercises 1–5, choose the correct letter.

1. Which transformation is the same as the composition $R_{x=-1} \circ R_{x=2}$?

   Ⓐ $r_{(180°,\,(-1,\,2))}$　　Ⓑ $r_{(180°,\,(2,\,-1))}$　　Ⓒ $T_{<3,\,0>}$　　Ⓓ $T_{<6,\,0>}$

2. What type of transformation maps $\triangle ABC$
   onto $\triangle DEF?$

   Ⓕ translation
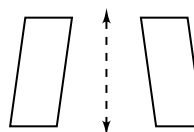
   Ⓖ rotation

   Ⓗ reflection

   Ⓘ glide reflection

3. A triangle is reflected across line ℓ and then across line m. If the lines intersect, what type of isometry is this composition of reflections?

   Ⓐ translation　　　Ⓑ rotation　　　Ⓒ reflection　　　Ⓓ glide reflection

4. What type of isometry is shown at the right?

   Ⓕ translation　　　Ⓗ reflection

   Ⓖ rotation　　　　Ⓘ glide reflection

5. If $(R_{y=-1} \circ T_{<0,3>})(X) = X'(3, -2)$, what are the coordinates of $X?$

   Ⓐ $(-5, -2)$　　　Ⓑ $(-2, -2)$　　　Ⓒ $(-2, -5)$　　　Ⓓ $(3, -3)$

Short Response

6. What type of transformation is shown? Give the translation rule, reflection rule, rotation rule, or composition rule of the glide reflection.