# Answer Key: Designing With Geometry

**Worksheet 1:**

## Polygons on the Coordinate Plane

**1 and 2** The side lengths are 4 and 6, so the perimeter is 20 meters and the area is 24 square meters.

**3** (5, -7)

**4 and 5** The side lengths are 10 and 4, so the perimeter is 28 meters and the area is 40 square meters.

**6** Answers will vary.

**Worksheet 2:**

## Scale Drawings of Geometric Figures

**1** 6 meters x 12 meters

**2** 6 meters

**3** 24 meters

**4** 90 square meters

**5** Answers will vary.

**Worksheet 3:**

## Finding Missing Angle Measurements

**1** 35°. $\angle EDF$ and $\angle CDG$ are vertical angles so they have the same measurement.

**2** $x = 180° - 35°$, so $x = 145°$. From problem 1, we know that the measurement of $\angle EDF = 35°$. $\angle EDF$ and $\angle EDC$ are supplementary and must add up to 180°. Thus, $\angle EDC = 180° - 35°$, so $x = 145°$.

**3** If the tetherball arena is rectangular, then $\angle IBJ = 90°$. $\angle IBJ$ and $\angle ABI$ are supplementary, so $\angle ABI$ must also be 90°.

**4** $x = 180° - (90° + 35°)$, so $x = 55°$. Recognize that the snack bar is a right triangle, with the three angles adding up to 180°. $\angle JBC$ is a right angle because it and $\angle ABI$ are vertical angles, and we know that $\angle ABI = 90°$ from problem 3. In the triangle, we also know that $\angle CDG = \angle EDF$ because they are also vertical angles, and we know from problem 1 that $\angle EDF = 35°$. So we know that two of the three angle measurements in the triangle add up to 125°. Thus, the missing angle is 55° because 180° - 125° = 55°.

**5** 35°. $\angle JHG$ and $\angle GHM$ are complementary and must add up to 90°. We know from problem 4 that $\angle JHG = 55°$, so $\angle GHM$ must = 90° - 55° = 35°. Since $\angle GHM$ and $\angle KHL$ are vertical angles, then $\angle KHL$ must also equal 35°.

**Worksheet 4:**

## Congruence and Transformations

**1** The two triangles are congruent because their side lengths and angle measurements are the same.

**2** The transformation is a translation, i.e., a slide. If a reflection took place, $A'$ would be at the coordinates for $C'$ and vice versa.

**3** The location of the corners of the drum statue would be: $D'$ at (-3, -4), $E'$ at (-3, -3), $F'$ at (-5, -3).

**4** The location of the corners of the second seating area would be: $G'$ (1, 5), $H'$ (-1, 5), $I'$ at (1, 7), and $J'$ at (-1, 7).

**5** Answers will vary.

**Worksheet 5:**

## Applying the Pythagorean Theorem

**1** The lengths of the two sides are 3 and 4, so $3^2 + 4^2 = 25$, so the hypotenuse is $\sqrt{25} = 5$.

**2** $\sqrt{5}$. The side lengths are 1 and 2, so $1^2 + 2^2 = 5$, so the hypotenuse = $\sqrt{5}$.

**3** $2\sqrt{2}$. Each side is 2, so using the Pythagorean Theorem, $2^2 + 2^2 = 8$ and $\sqrt{8} = 2\sqrt{2}$.

**4** The legs are 3 and 3 and the hypotenuse is $3\sqrt{2}$. Add a point at (1, 4). One side length is the difference between the $y$ coordinates of (1, 4) and (1, 7) or 3, and the other side length is the difference between the $x$ coordinates of (1, 4) and (4, 4) or 3. Using the Pythagorean Theorem, the hypotenuse equals the square root of $3^2 + 3^2 = \sqrt{18}$. $\sqrt{18} = \sqrt{(9x2)}$, which equals $3\sqrt{2}$.

**5** The sides will be 2 and 3. The diagonal will be the square root of 13 because $2^2 + 3^2 = \sqrt{13}$.