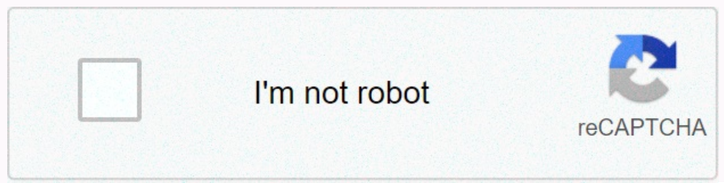

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Lesson 12-3 rotations

1 12-3 Rotations Warm Up Lesson Presentation Lesson Quiz Holt Geometry 2 1. The translation image of P(-3, –1) is Warm Up 1. The translation image of P(-3, –1) is P'(1, 3). Find the translation image of Q(2, –4). Q'(6, 0) Resolve for x. Around to the nearest tenth. 2. cos 30°= x ≈ 43.3 3. sin 30°= x = 25 3 Goals Identify and draw rotations. 4 Remember that a rotation is a transformation that turns a number around a fixed point, called the rotation center. A rotation is an isometry, so the image of a rotated shape is congruent to the model. 5 Example 1: Identifying rotationsTell about each transformation appears to be a rotation. Explain. B.A. No, no, I'm not with the number seems to have been reversed. Yes, that's right. the number appears to have been turned around a point. 6 Check it out! Example 1 Tell if each transformation appears to be a rotation. b. a. Yes, the number seems to have been turned around a point. No, the number appears to be a translation. 7 Draw a segment from each node to the rotation centerDraw a segment from each node to the center of rotation. Your construction must show that a point's distance from the rotation center is equal to the distance of the image from the center of rotation. The angle formed by a point, the center of rotation, and the point image is the angle at which the shape was rotated. 8 9 Example 2: Drawing RotationalCopy shape and angle of rotation. Draw the triangle rotation around point Q 🪄A. Q A Q Step 1 Draw a segment from each node to point Q. 10 Step 3 Connect the images of vertices. Example 2 Continued step 2 Construct an angle congruent 🪄A on each segment. Measure the distance from each node to point Q, and mark that distance on the corresponding beam to find the image of each node. Q Q Step 3 Connect the images of the nodes. 11 Unless otherwise stated, all rotations in this book are counterclockwise. Useful Tip 12 Check It Out! Example 2 Copy the shape and angle of rotation. Draw the segment rotation on point Q 🪄 and X. Step 1 Draw a line from each end of the segment to point Q. 13 Check it out! Example 2 ContinuedStep 2 Construct an angle congruent 🪄 X on each segment. Measure the distance from each segment to point P and mark this distance on the corresponding beam to find the image of the new segment. Step 3 Connect the image of the segment. 14 If the angle of a coordinate plane rotation is not a multiple of 90°, you can use sineus and cosine ratios to find the coordinates of the image. 15 Example 3: Drawing rotations in the coordinate planetRotate ΔJKL with vertices J(2, 2), K(4, -5) and L(-1, 6) with 180° on origin. The rotation of (x, y) is (-x, –y). J(2, 2) J'(-2, -2) K(4, -5) K'(-4, 5) L(-1, 6) L'(1, -6) Graph picture and image. 16 Check it out! Example 3 Rotate ΔABC with 180° Origin. The rotation of (x, y) is (-x, –y). A(2, –1) A'(-2, 1) B(4, 1) B'(-4, -1) C(3, 3) C'(-3, -3) Graph the picture and image. 17 Example 4: Engineering ApplicationA Ferris wheel has a 100 ft diameter and takes 60s to make a complete rotation. A chair starts at 10:00. After 5 s, what are the coordinates of its location to the nearest tenth? Step 1 Find the angle of rotation. Five seconds is of a complete rotation, or ° = 30°. Step 2 Draw a right triangle to represent the position of the car (x, y) after a 30° rotation of the origin. 18 Example 4 Continued step 3 Use the cosinin ratio to find the x coordinate. cos 30° = x = 100 cos 30° ≈ 86.6 Loose for x. Step 4 Use the sine ratio to find the y-coordinate. sin 30° = y = 100 sin 30° = 50 Loose for y. The position of the chair after 5s is approximately 100 000. 19 Step 1 find the angle of rotation. six minutes is Check It Out! Example 4 London Eye observation wheel has a radius of 67.5 m and takes 30 minutes to complete a complete rotation. Find the coordinates of the observation car after 6 minutes. Around to the nearest tenth. Step 1 find the angle of rotation. six minutes is of a complete rotation, or ° = 36°. □ (67.5, 0) 36° 67.5 (x, y) Starting position Step 2 Draw a right triangle to represent the car's location (x, y) after a 36° rotation of the origin. 20 Check it out! Example 4 Step 3 Use the cosine ratio to find the x coordinate. cos 36° = x = 67.5 cos 36° ≈ 20.9 Loose for x. Step 4 Use the sine ratio to find the y-coordinate. sin 36° = y = 67.5 sin 36° = 64.2 Loose for y. The position of the chair after 6 m is approximately (20.9, 64.2). 21 Lesson Quiz: Part in 1. Tell me if the transformation appears to be a rotation. Yes 2. Copy the shape and angle of rotation. 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