ALBERT

Name _____ Date _____

Inscribed Polygon Constructions Worksheet

Geometry · Common Core HSG-CO.D.13

> Construct an equilateral triangle, a square, and a regular hexagon inscribed in a circle.

Practice

Builds the skill step by step.

1. A regular hexagon is inscribed in a circle with radius 5 cm. How long is each side?

2. To inscribe a regular hexagon in a circle, what do you set the compass to?

   A. the radius of the circle

   B. the diameter of the circle

   C. half the radius

   D. any width

3. A square is inscribed in a circle with radius 4. How long is each diagonal of the square?

4. An equilateral triangle is inscribed by using every other mark from the hexagon construction. How many of the six marks are used?

5. What is the central angle between two neighboring vertices of an inscribed regular hexagon?

6. What is the central angle between two neighboring vertices of an inscribed square?

7. What is the central angle between two neighboring vertices of an inscribed equilateral triangle?

8. How do you inscribe a square in a circle?

   A. Draw one diameter and connect its endpoints.

   B. Step off the radius four times.

   C. Draw two perpendicular diameters and connect their four endpoints.

   D. Draw a tangent line.

9. A regular hexagon is inscribed in a circle with radius 7. What is its perimeter?

10. A square is inscribed in a circle with radius 5. What is the exact side length of the square?

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On Level

Grade-level practice.

1. A square is inscribed in a circle with radius 3. What is the area of the square?

2. An equilateral triangle is inscribed in a circle with radius 6. What is the exact side length?

3. A regular hexagon is inscribed in a circle with radius 4. What is the exact area of the hexagon?

4. Explain why stepping off the radius around a circle six times makes a regular hexagon.

5. What is the central angle between two neighboring vertices of an inscribed regular octagon?

6. How can you inscribe a regular octagon after inscribing a square?

   A. Draw a smaller square inside.

   B. Step off the radius eight times.

   C. Double the length of each side.

   D. Bisect each central angle of the square and mark where the bisectors meet the circle.

7. An equilateral triangle with side 9 is inscribed in a circle. What is the exact radius?

8. A square with side 6 is inscribed in a circle. What is the exact radius?

9. An equilateral triangle is inscribed in a circle with radius 2. What is its exact perimeter?

10. A regular hexagon with side 10 is inscribed in a circle. What is the diameter of the circle?

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Challenge

Multi-step and word problems that stretch it.

1. A square is inscribed in a circle with radius 2. Use 3.14 for π. What is the area inside the circle but outside the square?

2. A regular hexagon is inscribed in a circle. What is the ratio of the hexagon's perimeter to the circle's diameter?

3. An equilateral triangle is inscribed in a circle with radius 10. How far is the center from each side?

4. Why does joining every other mark of the hexagon construction give an equilateral triangle?

   A. Because the radius is used.

   B. Each side cuts off a 120° arc, and equal arcs have equal chords.

   C. Because the marks are 60° apart.

   D. Because any three points on a circle make an equilateral triangle.

5. A square inscribed in a circle has an area of 50 square units. What is the radius?

6. A regular hexagon inscribed in a circle has a perimeter of 36. Use 3.14 for π. What is the area of the circle?

7. An equilateral triangle is inscribed in a circle with radius 8. What is the height of the triangle?

8. A square is inscribed in a circle with area 16π. What is the exact side length of the square?

9. Explain why the diagonals of a square inscribed in a circle must be diameters.

10. A regular 12-sided polygon is inscribed by bisecting each arc of an inscribed hexagon. What is the central angle between neighboring vertices?