



Sangaku-inspired geometry

PRACTICE WORKSHEET

12 exercises | A4 | 1 / 2

Name: _____ Date: _____

Show your working in the blank space or on separate paper. Sketch labelled rods/beads when asked to represent a number.

- 1 A circle touches all four sides of a square of side 12. Find its radius.

- 2 A circle touches all four sides of a square of side 14. Find its radius.

- 3 A circle touches all four sides of a square of side 10. Find its radius.

- 4 A circle touches all four sides of a square of side 24. Find its radius.

- 5 Two equal circles, each tangent to two sides at opposite corners of a square of side 20, also touch each other. Find their radius.

- 6 Two equal circles, each tangent to two sides at opposite corners of a square of side 16, also touch each other. Find their radius.

- 7 Two equal circles, each tangent to two sides at opposite corners of a square of side 12, also touch each other. Find their radius.

- 8 Two equal circles, each tangent to two sides at opposite corners of a square of side 8, also touch each other. Find their radius.

- 9 A circle touches all four sides of a square of side 14. Find the area outside the circle, inside the square.

- 10 A circle touches all four sides of a square of side 10. Find the area outside the circle, inside the square.

- 11 A circle touches all four sides of a square of side 24. Find the area outside the circle, inside the square.

- 12 A circle touches all four sides of a square of side 20. Find the area outside the circle, inside the square.

Practise interactively and explore the method:

<https://goofergames.com/math/world/sangaku>



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ANSWER KEY

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Use after completing the practice page. Values are generated by the page's shared engine.

Equivalent exact representations are valid where the prompt allows them. Non-integer results are rounded to two decimals.

1 Answer: 6
Radius = $12 \div 2 = 6$.

2 Answer: 7
Radius = $14 \div 2 = 7$.

3 Answer: 5
Radius = $10 \div 2 = 5$.

4 Answer: 12
Radius = $24 \div 2 = 12$.

5 Answer: 5.86
 $r = \text{side} \div (2 + \sqrt{2}) \approx 5.86$.

6 Answer: 4.69
 $r = \text{side} \div (2 + \sqrt{2}) \approx 4.69$.

7 Answer: 3.51
 $r = \text{side} \div (2 + \sqrt{2}) \approx 3.51$.

8 Answer: 2.34
 $r = \text{side} \div (2 + \sqrt{2}) \approx 2.34$.

9 Answer: 42.06
Difference ≈ 42.06 square units.

10 Answer: 21.46
Difference ≈ 21.46 square units.

11 Answer: 123.61
Difference ≈ 123.61 square units.

12 Answer: 85.84
Difference ≈ 85.84 square units.

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