

Finding Area on the Coordinate Plane

Name: _____ Date: _____ Score: _____ / 24

Q Quick Review

Once a polygon is drawn on the coordinate plane, you can find its **area** using the vertices. First find the side lengths: subtract matching x -coordinates for a horizontal length, or matching y -coordinates for a vertical length. For a **rectangle**, the area is length \times width. For a **right triangle** with one horizontal side and one vertical side, those two sides are the base and the height, so the area is $\frac{1}{2} \times$ base \times height. Counting coordinates carefully is the key — always subtract the smaller value from the larger.

◇ **Example:** A rectangle has vertices at (1, 1), (1, 5), (8, 5), and (8, 1). Find its area.

⇒ First find the two side lengths. From (1, 1) to (1, 5) the x stays the same, so this vertical side has length $5 - 1 = 4$. From (1, 5) to (8, 5) the y stays the same, so this horizontal side has length $8 - 1 = 7$. For a rectangle, the area is length times width: $7 \times 4 = 28$ square units.

Answer: 28 square units

PRACTICE

Find the area of each polygon from its vertices. Answers are in square units.

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| 1. Rectangle (0, 0), (0, 4), (5, 4), (5, 0) _____ | 11. Right triangle (0, 0), (6, 0), (0, 4) _____ |
| 2. Rectangle (1, 1), (1, 7), (4, 7), (4, 1) _____ | 12. Right triangle (0, 0), (8, 0), (0, 3) _____ |
| 3. Rectangle (2, 2), (2, 8), (8, 8), (8, 2) _____ | 13. Right triangle (2, 1), (8, 1), (2, 9) _____ |
| 4. Rectangle (0, 0), (0, 3), (10, 3), (10, 0) _____ | 14. Right triangle (1, 1), (11, 1), (1, 5) _____ |
| 5. Rectangle (1, 2), (1, 8), (5, 8), (5, 2) _____ | 15. Right triangle (0, 0), (0, 10), (7, 0) _____ |
| 6. Rectangle (3, 1), (3, 6), (12, 6), (12, 1) _____ | 16. Right triangle (3, 2), (3, 12), (15, 2) _____ |
| 7. Rectangle (0, 0), (0, 7), (7, 7), (7, 0) _____ | 17. Right triangle (0, 0), (9, 0), (0, 9) _____ |
| 8. Rectangle (2, 0), (2, 5), (14, 5), (14, 0) _____ | 18. Right triangle (1, 1), (13, 1), (1, 6) _____ |
| 9. Rectangle (-2, 1), (-2, 6), (6, 6), (6, 1) _____ | 19. Right triangle (2, 2), (2, 16), (10, 2) _____ |
| 10. Rectangle (1, 1), (1, 11), (9, 11), (9, 1) _____ | 20. Right triangle (0, 0), (20, 0), (0, 6) _____ |

◆ Word Problems

21. A rug is mapped as a rectangle with corners at (0, 0), (0, 6), (9, 6), and (9, 0), measured in feet. What is the area of the rug?

22. A triangular garden has corners at (0, 0), (10, 0), and (0, 8), measured in meters. How many square meters of soil will cover the garden?

23. A poster is shaped like a rectangle with corners at (2, 2), (2, 14), (10, 14), and (10, 2), measured in inches. What is the area of the poster?

24. A sail is shaped like a right triangle with corners at (0, 0), (0, 12), and (5, 0), measured in feet. What is the area of the sail?



Answer Keys

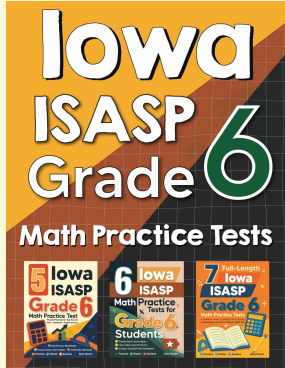
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|-------------------------------------|--|
| 1. <input type="text" value="20"/> | 13. <input type="text" value="24"/> |
| 2. <input type="text" value="18"/> | 14. <input type="text" value="20"/> |
| 3. <input type="text" value="36"/> | 15. <input type="text" value="35"/> |
| 4. <input type="text" value="30"/> | 16. <input type="text" value="60"/> |
| 5. <input type="text" value="24"/> | 17. <input type="text" value="40.5"/> |
| 6. <input type="text" value="45"/> | 18. <input type="text" value="30"/> |
| 7. <input type="text" value="49"/> | 19. <input type="text" value="56"/> |
| 8. <input type="text" value="60"/> | 20. <input type="text" value="60"/> |
| 9. <input type="text" value="40"/> | 21. <input type="text" value="54 ft<sup>2</sup>"/> |
| 10. <input type="text" value="80"/> | 22. <input type="text" value="40 m<sup>2</sup>"/> |
| 11. <input type="text" value="12"/> | 23. <input type="text" value="96 in<sup>2</sup>"/> |
| 12. <input type="text" value="12"/> | 24. <input type="text" value="30 ft<sup>2</sup>"/> |

Step-by-Step Explanations

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| <p>1. The sides are 4 and 5, so the area is $5 \times 4 = 20$.</p> <p>2. The sides are 6 and 3, so the area is $6 \times 3 = 18$.</p> <p>3. The sides are 6 and 6, so the area is $6 \times 6 = 36$.</p> <p>4. The sides are 3 and 10, so the area is $10 \times 3 = 30$.</p> <p>5. The sides are 6 and 4, so the area is $6 \times 4 = 24$.</p> <p>6. The sides are 5 and 9, so the area is $9 \times 5 = 45$.</p> <p>7. The sides are 7 and 7, so the area is $7 \times 7 = 49$.</p> <p>8. The sides are 5 and 12, so the area is $12 \times 5 = 60$.</p> <p>9. The sides are 5 and 8, so the area is $8 \times 5 = 40$.</p> <p>10. The sides are 10 and 8, so the area is $10 \times 8 = 80$.</p> <p>11. The legs are 6 and 4, so the area is $\frac{1}{2} \times 6 \times 4 = 12$.</p> <p>12. The legs are 8 and 3, so the area is $\frac{1}{2} \times 8 \times 3 = 12$.</p> <p>13. The legs are 6 and 8, so the area is $\frac{1}{2} \times 6 \times 8 = 24$.</p> <p>14. The legs are 10 and 4, so the area is $\frac{1}{2} \times 10 \times 4 = 20$.</p> | <p>15. The legs are 10 and 7, so the area is $\frac{1}{2} \times 10 \times 7 = 35$.</p> <p>16. The legs are 10 and 12, so the area is $\frac{1}{2} \times 10 \times 12 = 60$.</p> <p>17. The legs are 9 and 9, so the area is $\frac{1}{2} \times 9 \times 9 = 40.5$.</p> <p>18. The legs are 12 and 5, so the area is $\frac{1}{2} \times 12 \times 5 = 30$.</p> <p>19. The legs are 14 and 8, so the area is $\frac{1}{2} \times 14 \times 8 = 56$.</p> <p>20. The legs are 20 and 6, so the area is $\frac{1}{2} \times 20 \times 6 = 60$.</p> <p>21. The sides are $6 - 0 = 6$ ft and $9 - 0 = 9$ ft. The area of a rectangle is $9 \times 6 = 54$ square feet.</p> <p>22. The horizontal leg is 10 m and the vertical leg is 8 m. The area of the right triangle is $\frac{1}{2} \times 10 \times 8 = 40$ square meters.</p> <p>23. The sides are $14 - 2 = 12$ in and $10 - 2 = 8$ in. The area is $12 \times 8 = 96$ square inches.</p> <p>24. The vertical leg is 12 ft and the horizontal leg is 5 ft. The area is $\frac{1}{2} \times 12 \times 5 = 30$ square feet.</p> |
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