

Area of Parallelograms and Trapezoids

Name: _____

Date: _____

Score: _____ / 24

Q Quick Review

A **parallelogram** has two pairs of parallel sides. Its area is $A = b \times h$, where b is the base and h is the height measured straight up from that base — not the slanted side. A **trapezoid** has exactly one pair of parallel sides, called b_1 and b_2 . Its area is $A = \frac{1}{2}(b_1 + b_2) \times h$: add the two parallel bases, multiply by the height, then take half. A good way to remember the trapezoid rule is that you are using the *average* of the two bases. Both areas are measured in **square units**.

◇ **Example:** Find the area of a trapezoid with parallel bases of 8 m and 14 m and a height of 6 m.

⇒ Use the trapezoid formula $A = \frac{1}{2}(b_1 + b_2) \times h$. First add the two parallel bases: $8 + 14 = 22$. Next multiply by the height: $22 \times 6 = 132$. Finally take half: $\frac{1}{2} \times 132 = 66$. Since the measurements are in meters, the area is in square meters.

Answer: 66 m^2

PRACTICE

Find the area of each figure. Parallelograms give base and height; trapezoids give both bases and height.

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|---------------------------------------|-------|--|-------|
| 1. Parallelogram: base 5, height 4 | _____ | 11. Trapezoid: bases 6 and 10, height 4 | _____ |
| 2. Parallelogram: base 8, height 6 | _____ | 12. Trapezoid: bases 5 and 9, height 6 | _____ |
| 3. Parallelogram: base 10, height 3 | _____ | 13. Trapezoid: bases 8 and 12, height 5 | _____ |
| 4. Parallelogram: base 12, height 7 | _____ | 14. Trapezoid: bases 7 and 11, height 8 | _____ |
| 5. Parallelogram: base 9, height 9 | _____ | 15. Trapezoid: bases 10 and 14, height 6 | _____ |
| 6. Parallelogram: base 15, height 4 | _____ | 16. Trapezoid: bases 4 and 8, height 9 | _____ |
| 7. Parallelogram: base 7, height 8 | _____ | 17. Trapezoid: bases 12 and 18, height 10 | _____ |
| 8. Parallelogram: base 20, height 5 | _____ | 18. Trapezoid: bases 9 and 15, height 7 | _____ |
| 9. Parallelogram: base 11, height 6 | _____ | 19. Trapezoid: bases 5.5 and 8.5, height 4 | _____ |
| 10. Parallelogram: base 14, height 10 | _____ | 20. Trapezoid: bases 13 and 17, height 12 | _____ |

◆ Word Problems

21. A wooden deck is shaped like a parallelogram with a base of 16 feet and a height of 9 feet. What is the area of the deck?

22. A tabletop is shaped like a trapezoid. The two parallel edges measure 20 inches and 30 inches, and the distance between them is 12 inches. What is the area of the tabletop? _____
23. A parking space is shaped like a parallelogram with a base of 24 feet and a height of 18 feet. How many square feet of pavement does the space cover? _____
24. A vegetable garden is shaped like a trapezoid with parallel sides of 10 m and 16 m and a height of 8 m. What is the area of the garden? _____



Answer Keys

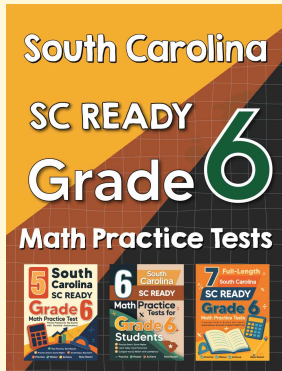
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|--------------------------------------|---|
| 1. <input type="text" value="20"/> | 13. <input type="text" value="50"/> |
| 2. <input type="text" value="48"/> | 14. <input type="text" value="72"/> |
| 3. <input type="text" value="30"/> | 15. <input type="text" value="72"/> |
| 4. <input type="text" value="84"/> | 16. <input type="text" value="54"/> |
| 5. <input type="text" value="81"/> | 17. <input type="text" value="150"/> |
| 6. <input type="text" value="60"/> | 18. <input type="text" value="84"/> |
| 7. <input type="text" value="56"/> | 19. <input type="text" value="28"/> |
| 8. <input type="text" value="100"/> | 20. <input type="text" value="180"/> |
| 9. <input type="text" value="66"/> | 21. <input type="text" value="144 ft<sup>2</sup>"/> |
| 10. <input type="text" value="140"/> | 22. <input type="text" value="300 in<sup>2</sup>"/> |
| 11. <input type="text" value="32"/> | 23. <input type="text" value="432 ft<sup>2</sup>"/> |
| 12. <input type="text" value="42"/> | 24. <input type="text" value="104 m<sup>2</sup>"/> |

Step-by-Step Explanations

- | | |
|--|---|
| <p>1. For a parallelogram, $A = b \times h = 5 \times 4 = 20$.</p> <p>2. Multiply base times height: $8 \times 6 = 48$.</p> <p>3. Multiply base times height: $10 \times 3 = 30$.</p> <p>4. Multiply base times height: $12 \times 7 = 84$.</p> <p>5. Multiply base times height: $9 \times 9 = 81$.</p> <p>6. Multiply base times height: $15 \times 4 = 60$.</p> <p>7. Multiply base times height: $7 \times 8 = 56$.</p> <p>8. Multiply base times height: $20 \times 5 = 100$.</p> <p>9. Multiply base times height: $11 \times 6 = 66$.</p> <p>10. Multiply base times height: $14 \times 10 = 140$.</p> <p>11. Add the bases $6 + 10 = 16$, multiply by 4 to get 64, then half is 32.</p> <p>12. Add $5 + 9 = 14$, multiply by 6 to get 84, then half is 42.</p> <p>13. Add $8 + 12 = 20$, multiply by 5 to get 100, then half is 50.</p> | <p>14. Add $7 + 11 = 18$, multiply by 8 to get 144, then half is 72.</p> <p>15. Add $10 + 14 = 24$, multiply by 6 to get 144, then half is 72.</p> <p>16. Add $4 + 8 = 12$, multiply by 9 to get 108, then half is 54.</p> <p>17. Add $12 + 18 = 30$, multiply by 10 to get 300, then half is 150.</p> <p>18. Add $9 + 15 = 24$, multiply by 7 to get 168, then half is 84.</p> <p>19. Add $5.5 + 8.5 = 14$, multiply by 4 to get 56, then half is 28.</p> <p>20. Add $13 + 17 = 30$, multiply by 12 to get 360, then half is 180.</p> <p>21. For a parallelogram, $A = b \times h$. Multiply $16 \times 9 = 144$ square feet.</p> <p>22. Add the parallel bases: $20 + 30 = 50$. Multiply by the height: $50 \times 12 = 600$. Then take half: $\frac{1}{2} \times 600 = 300$ square inches.</p> <p>23. Multiply base times height: $24 \times 18 = 432$ square feet.</p> <p>24. Add the bases: $10 + 16 = 26$. Multiply by the height: $26 \times 8 = 208$. Then take half: $\frac{1}{2} \times 208 = 104$ square meters.</p> |
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