Area of Parallelograms and Trapezoids

Name: _____	Date: _____	Score: _____ / 24

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.

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

1. 20	**13.** 50
2. 48	**14.** 72
3. 30	**15.** 72
4. 84	**16.** 54
5. 81	**17.** 150
6. 60	**18.** 84
7. 56	**19.** 28
8. 100	**20.** 180
9. 66	**21.** $144\ \text{ft}^2$
10. 140	**22.** $300\ \text{in}^2$
11. 32	**23.** $432\ \text{ft}^2$
12. 42	**24.** $104\ \text{m}^2$

Step-by-Step Explanations

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

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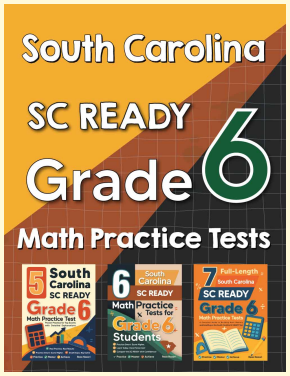

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