

# 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<sup>2</sup>

## PRACTICE

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

- |   |  |
|---|--|
| 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

- |                                      |   |
|--------------------------------------|---|
| 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&lt;sup&gt;2&lt;/sup&gt;"/> |
| 10. <input type="text" value="140"/> | 22. <input type="text" value="300 in&lt;sup&gt;2&lt;/sup&gt;"/> |
| 11. <input type="text" value="32"/>  | 23. <input type="text" value="432 ft&lt;sup&gt;2&lt;/sup&gt;"/> |
| 12. <input type="text" value="42"/>  | 24. <input type="text" value="104 m&lt;sup&gt;2&lt;/sup&gt;"/>  |

### Step-by-Step Explanations

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



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