

# Surface Area of Solids

Name: \_\_\_\_\_ Date: \_\_\_\_\_ Score: \_\_\_\_\_ / 30

## Quick Review and Helpful Hints

Surface area is the total area of all the faces of a solid. For a rectangular box:  $SA = 2(lw + lh + wh)$ . For a cube:  $SA = 6s^2$ . Add up every face; the answer is in square units.

▶ **Example:** Find the surface area of a cube with side 3.

**Work:**  $SA = 6s^2 = 6(3^2) = 6(9)$ .

★ **Answer:** 54



$SA = 2(lw + lh + wh)$ .

### ◆ Practice Problems

Find each surface area.

- |                               |       |                                 |       |
|-------------------------------|-------|---------------------------------|-------|
| 1. Cube, $s = 2$              | _____ | 8. Box, $l = 5, w = 2, h = 3$   | _____ |
| 2. Cube, $s = 4$              | _____ | 9. Box, $l = 4, w = 4, h = 2$   | _____ |
| 3. Cube, $s = 5$              | _____ | 10. Cube, $s = 6$               | _____ |
| 4. Cube, $s = 1$              | _____ | 11. Box, $l = 3, w = 3, h = 3$  | _____ |
| 5. Box, $l = 2, w = 3, h = 4$ | _____ | 12. Box, $l = 6, w = 1, h = 2$  | _____ |
| 6. Box, $l = 1, w = 1, h = 1$ | _____ | 13. Cube, $s = 7$               | _____ |
| 7. Cube, $s = 10$             | _____ | 14. Box, $l = 10, w = 2, h = 1$ | _____ |

### ◆ Word Problems

15. A cube-shaped box has side 5 in. Find its surface area. \_\_\_\_\_
16. A box is  $4 \times 3 \times 2$ . Find its surface area. \_\_\_\_\_
17. A cube has side 8 cm. Find its surface area. \_\_\_\_\_
18. A gift box is  $6 \times 2 \times 2$ . Find its surface area. \_\_\_\_\_

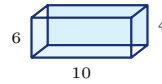


◆ **Illustrated Practice**

Use each picture. Find the total outside area of the solid.



19. Find the surface area of the cube. \_\_\_\_\_



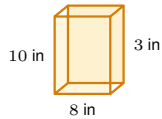
25. Find the surface area of the prism. \_\_\_\_\_



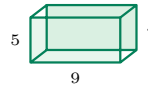
20. Find the surface area of the box. \_\_\_\_\_



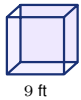
26. Find the surface area. \_\_\_\_\_



21. Find the surface area of the cereal box. \_\_\_\_\_



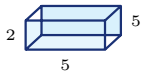
27. Find the surface area of the carton. \_\_\_\_\_



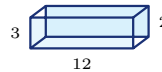
22. Find the surface area of the cube. \_\_\_\_\_



28. Find the surface area of the cube. \_\_\_\_\_



23. Find the wrapping area. \_\_\_\_\_



29. Find the surface area. \_\_\_\_\_



24. Find the painted area of the cube. \_\_\_\_\_



30. Find the surface area of the cube. \_\_\_\_\_



## Answer Keys

- |   |  |  |
|---|--|--|
| 1. <span style="border: 1px solid black; border-radius: 5px; padding: 2px;">24</span>   | 11. <span style="border: 1px solid black; border-radius: 5px; padding: 2px;">54</span>                 | 21. <span style="border: 1px solid black; border-radius: 5px; padding: 2px;">268 in<sup>2</sup></span> |
| 2. <span style="border: 1px solid black; border-radius: 5px; padding: 2px;">96</span>   | 12. <span style="border: 1px solid black; border-radius: 5px; padding: 2px;">40</span>                 | 22. <span style="border: 1px solid black; border-radius: 5px; padding: 2px;">486 ft<sup>2</sup></span> |
| 3. <span style="border: 1px solid black; border-radius: 5px; padding: 2px;">150</span>  | 13. <span style="border: 1px solid black; border-radius: 5px; padding: 2px;">294</span>                | 23. <span style="border: 1px solid black; border-radius: 5px; padding: 2px;">90</span>                 |
| 4. <span style="border: 1px solid black; border-radius: 5px; padding: 2px;">6</span>    | 14. <span style="border: 1px solid black; border-radius: 5px; padding: 2px;">64</span>                 | 24. <span style="border: 1px solid black; border-radius: 5px; padding: 2px;">864 cm<sup>2</sup></span> |
| 5. <span style="border: 1px solid black; border-radius: 5px; padding: 2px;">52</span>   | 15. <span style="border: 1px solid black; border-radius: 5px; padding: 2px;">150 in<sup>2</sup></span> | 25. <span style="border: 1px solid black; border-radius: 5px; padding: 2px;">248</span>                |
| 6. <span style="border: 1px solid black; border-radius: 5px; padding: 2px;">6</span>    | 16. <span style="border: 1px solid black; border-radius: 5px; padding: 2px;">52</span>                 | 26. <span style="border: 1px solid black; border-radius: 5px; padding: 2px;">64</span>                 |
| 7. <span style="border: 1px solid black; border-radius: 5px; padding: 2px;">600</span>  | 17. <span style="border: 1px solid black; border-radius: 5px; padding: 2px;">384 cm<sup>2</sup></span> | 27. <span style="border: 1px solid black; border-radius: 5px; padding: 2px;">202</span>                |
| 8. <span style="border: 1px solid black; border-radius: 5px; padding: 2px;">62</span>   | 18. <span style="border: 1px solid black; border-radius: 5px; padding: 2px;">56</span>                 | 28. <span style="border: 1px solid black; border-radius: 5px; padding: 2px;">54</span>                 |
| 9. <span style="border: 1px solid black; border-radius: 5px; padding: 2px;">64</span>   | 19. <span style="border: 1px solid black; border-radius: 5px; padding: 2px;">96 in<sup>2</sup></span>  | 29. <span style="border: 1px solid black; border-radius: 5px; padding: 2px;">132</span>                |
| 10. <span style="border: 1px solid black; border-radius: 5px; padding: 2px;">216</span> | 20. <span style="border: 1px solid black; border-radius: 5px; padding: 2px;">108 cm<sup>2</sup></span> | 30. <span style="border: 1px solid black; border-radius: 5px; padding: 2px;">216</span>                |

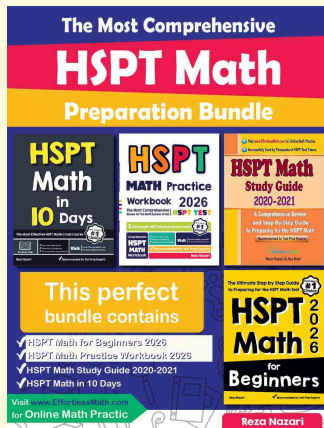
### Step-by-Step Explanations

1. Start by naming the process: Choose the surface-area formula for the solid, substitute the given dimensions, and simplify the arithmetic. The setup/work is  $6s^2 = 6(4) = 24$ . So the final answer is 24.
2. A good way to think about this is: Choose the surface-area formula for the solid, substitute the given dimensions, and simplify the arithmetic. The setup/work is  $6(16) = 96$ . So the final answer is 96.
3. Step by step: Choose the surface-area formula for the solid, substitute the given dimensions, and simplify the arithmetic. The setup/work is  $6(25) = 150$ . So the final answer is 150.
4. Take it one move at a time: Choose the surface-area formula for the solid, substitute the given dimensions, and simplify the arithmetic. The setup/work is  $6(1) = 6$ . So the final answer is 6.
5. Start by naming the process: Choose the surface-area formula for the solid, substitute the given dimensions, and simplify the arithmetic. The setup/work is  $2(lw + lh + wh) = 2(6 + 8 + 12) = 2(26) = 52$ . So the final answer is 52.
6. A good way to think about this is: Choose the surface-area formula for the solid, substitute the given dimensions, and simplify the arithmetic. The setup/work is  $6(1) = 6$ . So the final answer is 6.
7. Step by step: Choose the surface-area formula for the solid, substitute the given dimensions, and simplify the arithmetic. The setup/work is  $6(100) = 600$ . So the final answer is 600.
8. Take it one move at a time: Choose the surface-area formula for the solid, substitute the given dimensions, and simplify the arithmetic. The setup/work is  $2(10 + 15 + 6) = 2(31) = 62$ . So the final answer is 62.
9. Start by naming the process: Choose the surface-area formula for the solid, substitute the given dimensions, and simplify the arithmetic. The setup/work is  $2(16 + 8 + 8) = 2(32) = 64$ . So the final answer is 64.
10. A good way to think about this is: Choose the surface-area formula for the solid, substitute the given dimensions, and simplify the arithmetic. The setup/work is  $6(36) = 216$ . So the final answer is 216.
11. Step by step: Choose the surface-area formula for the solid, substitute the given dimensions, and simplify the arithmetic. The setup/work is  $6(9) = 54$ . So the final answer is 54.
12. Take it one move at a time: Choose the surface-area formula for the solid, substitute the given dimensions, and simplify the arithmetic. The setup/work is  $2(6 + 12 + 2) = 2(20) = 40$ . So the final answer is 40.
13. Start by naming the process: Choose the surface-area formula for the solid, substitute the given dimensions, and simplify the arithmetic. The setup/work is  $6(49) = 294$ . So the final answer is 294.
14. A good way to think about this is: Choose the surface-area formula for the solid, substitute the given dimensions, and simplify the arithmetic. The setup/work is  $2(20 + 10 + 2) = 2(32) = 64$ . So the final answer is 64.
15. Step by step: Choose the surface-area formula for the solid, substitute the given dimensions, and simplify the arithmetic. The setup/work is  $6(25) = 150$  in<sup>2</sup>. So the final answer is 150 in<sup>2</sup>.
16. Take it one move at a time: Choose the surface-area formula for the solid, substitute the given dimensions, and simplify the arithmetic. The setup/work is  $2(12 + 8 + 6) = 2(26) = 52$ . So the final answer is 52.
17. Start by naming the process: Choose the surface-area formula for the solid, substitute the given dimensions, and simplify the arithmetic. The setup/work is  $6(64) = 384$  cm<sup>2</sup>. So the final answer is 384 cm<sup>2</sup>.
18. A good way to think about this is: Choose the surface-area formula for the solid, substitute the given dimensions, and simplify the arithmetic. The setup/work is  $2(12 + 12 + 4) = 2(28) = 56$ . So the final answer is 56.
19. The picture shows a cube, so all 6 faces are the same square. Each face is  $4 \cdot 4 = 16$  in<sup>2</sup>, and  $6 \cdot 16 = 96$  in<sup>2</sup>.
20. For a rectangular box, add the three different face areas and double them:  $6 \cdot 4 = 24$ ,  $6 \cdot 3 = 18$ , and  $4 \cdot 3 = 12$ . Then  $2(24 + 18 + 12) = 108$  cm<sup>2</sup>.
21. Use  $SA = 2(lw + lh + wh)$  with 8, 10, and 3. The face areas are 80, 24, and 30, so  $2(80 + 24 + 30) = 268$  in<sup>2</sup>.
22. A cube has 6 matching square faces. One face is  $9 \cdot 9 = 81$  ft<sup>2</sup>, so the whole surface area is  $6 \cdot 81 = 486$  ft<sup>2</sup>.
23. The gift box is a rectangular prism with dimensions 5, 2, and 5. Add the three different face areas,  $10 + 25 + 10 = 45$ , then double because each has a matching opposite face:  $2 \cdot 45 = 90$ .
24. This is another cube. One face is  $12 \cdot 12 = 144$  cm<sup>2</sup>, and there are 6 faces, so  $6 \cdot 144 = 864$  cm<sup>2</sup>.
25. Use the rectangular-prism surface-area formula. The three different face areas are  $10 \cdot 6 = 60$ ,  $10 \cdot 4 = 40$ , and  $6 \cdot 4 = 24$ ; doubling their sum gives  $2(60 + 40 + 24) = 248$ .
26. The prism has dimensions 7, 2, and 2. The face areas are 14, 14, and 4, so the total outside area is  $2(14 + 14 + 4) = 64$ .
27. For the carton, multiply each pair of dimensions:  $9 \cdot 5 = 45$ ,  $9 \cdot 4 = 36$ , and  $5 \cdot 4 = 20$ . Double the sum:  $2(45 + 36 + 20) = 202$ .
28. The cube has side length 3. Each face is  $3 \cdot 3 = 9$ , and 6 matching faces make  $6 \cdot 9 = 54$ .
29. The prism dimensions are 12, 3, and 2. The three face areas are 36, 24, and 6, so  $2(36 + 24 + 6) = 132$ .
30. This is a cube with side length 6. One square face is  $6 \cdot 6 = 36$ , and  $6 \cdot 36 = 216$  for all six faces.



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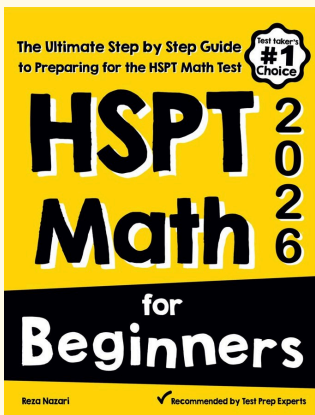
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