

Surface Area of Solids

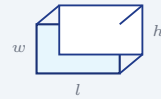
Name: _____ Date: _____ Score: _____ / 30

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. _____

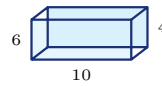


◆ **Illustrated Practice**

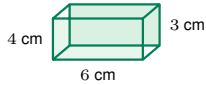
Use each picture. Find the total outside area of the solid.



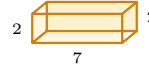
19. Find the surface area of the cube.



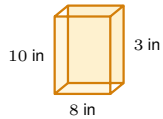
25. Find the surface area of the prism.



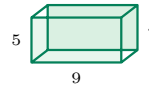
20. Find the surface area of the box.



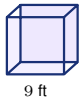
26. Find the surface area.



21. Find the surface area of the cereal box.



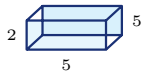
27. Find the surface area of the carton.



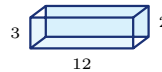
22. Find the surface area of the cube.



28. Find the surface area of the cube.



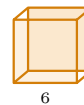
23. Find the wrapping area.



29. Find the surface area.



24. Find the painted area of the cube.



30. Find the surface area of the cube.



Answer Keys

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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 $6(25) = 150$ in². So the final answer is 150 in².

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 $6(64) = 384$ cm². So the final answer is 384 cm².

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 $4 \cdot 4 = 16$ in², and $6 \cdot 16 = 96$ in².

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 $2(24 + 18 + 12) = 108$ cm².

21. Use $SA = 2(lw + lh + wh)$ with 8, 10, and 3. The face areas are 80, 24, and 30, so $2(80 + 24 + 30) = 268$ in².

22. A cube has 6 matching square faces. One face is $9 \cdot 9 = 81$ ft², so the whole surface area is $6 \cdot 81 = 486$ ft².

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 $12 \cdot 12 = 144$ cm², and there are 6 faces, so $6 \cdot 144 = 864$ cm².

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 $2(36 + 24 + 6) = 132$.

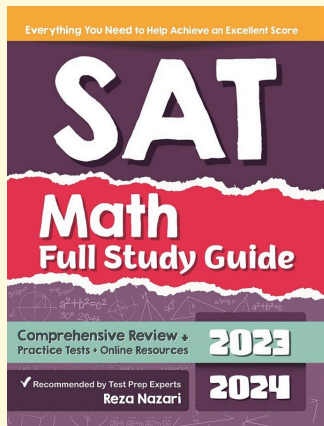
30. This is a cube with side length 6. One square face is $6 \cdot 6 = 36$, and $6 \cdot 36 = 216$ for all six faces.



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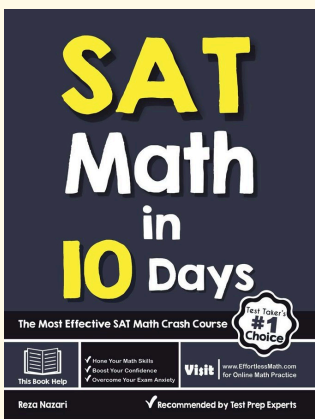
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