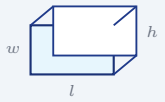
Surface Area of Solids

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, $s = 2$ _____

2. Cube, $s = 4$ _____

3. Cube, $s = 5$ _____

4. Cube, $s = 1$ _____

5. Box, $l = 2, w = 3, h = 4$ _____

6. Box, $l = 1, w = 1, h = 1$ _____

7. Cube, $s = 10$ _____

8. Box, $l = 5, w = 2, h = 3$ _____

9. Box, $l = 4, w = 4, h = 2$ _____

10. Cube, $s = 6$ _____

11. Box, $l = 3, w = 3, h = 3$ _____

12. Box, $l = 6, w = 1, h = 2$ _____

13. Cube, $s = 7$ _____

14. Box, $l = 10, w = 2, h = 1$ _____

Word Problems

15. A cube-shaped box has side 5 in. Find its surface area. _____

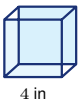
16. A box is $4 \times 3 \times 2$. Find its surface area. _____

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.

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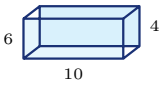

25. Find the surface area of the prism.

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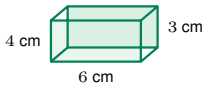

20. Find the surface area of the box.

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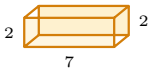

26. Find the surface area.

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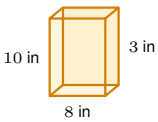

21. Find the surface area of the cereal box.

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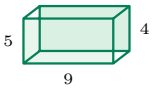

27. Find the surface area of the carton.

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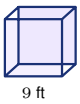

22. Find the surface area of the cube.

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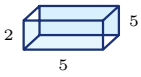
28. Find the surface area of the cube.

_____



23. Find the wrapping area.

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29. Find the surface area.

_____

24. Find the painted area of the cube.

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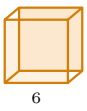

30. Find the surface area of the cube.

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Answer Keys

1. 24	**11.** 54	**21.** $268\ \text{in}^2$
2. 96	**12.** 40	**22.** $486\ \text{ft}^2$
3. 150	**13.** 294	**23.** 90
4. 6	**14.** 64	**24.** $864\ \text{cm}^2$
5. 52	**15.** $150\ \text{in}^2$	**25.** 248
6. 6	**16.** 52	**26.** 64
7. 600	**17.** $384\ \text{cm}^2$	**27.** 202
8. 62	**18.** 56	**28.** 54
9. 64	**19.** $96\ \text{in}^2$	**29.** 132
10. 216	**20.** $108\ \text{cm}^2$	**30.** 216

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 $6(25) = 150\ \text{in}^2$. So the final answer is $150\ \text{in}^2$.

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 $6(64) = 384\ \text{cm}^2$. So the final answer is $384\ \text{cm}^2$.

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 $4 \cdot 4 = 16\ \text{in}^2$, and $6 \cdot 16 = 96\ \text{in}^2$.

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 $2(24 + 18 + 12) = 108\ \text{cm}^2$.

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

22. A cube has 6 matching square faces. One face is $9 \cdot 9 = 81\ \text{ft}^2$, so the whole surface area is $6 \cdot 81 = 486\ \text{ft}^2$.

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 $12 \cdot 12 = 144\ \text{cm}^2$, and there are 6 faces, so $6 \cdot 144 = 864\ \text{cm}^2$.

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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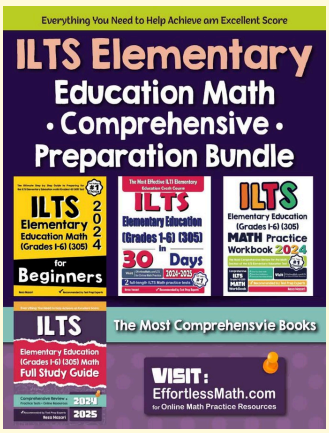

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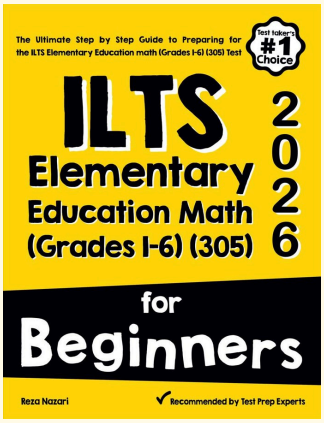

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