

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.

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

◆ 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. _____



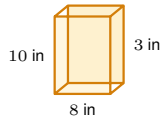
25. Find the surface area of the prism. _____



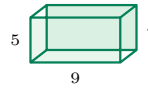
20. Find the surface area of the box. _____



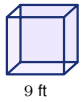
26. Find the surface area. _____



21. Find the surface area of the cereal box. _____



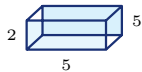
27. Find the surface area of the carton. _____



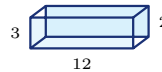
22. Find the surface area of the cube. _____



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. <input type="text" value="24"/> | 11. <input type="text" value="54"/> | 21. <input type="text" value="268 in<sup>2</sup>"/> |
| 2. <input type="text" value="96"/> | 12. <input type="text" value="40"/> | 22. <input type="text" value="486 ft<sup>2</sup>"/> |
| 3. <input type="text" value="150"/> | 13. <input type="text" value="294"/> | 23. <input type="text" value="90"/> |
| 4. <input type="text" value="6"/> | 14. <input type="text" value="64"/> | 24. <input type="text" value="864 cm<sup>2</sup>"/> |
| 5. <input type="text" value="52"/> | 15. <input type="text" value="150 in<sup>2</sup>"/> | 25. <input type="text" value="248"/> |
| 6. <input type="text" value="6"/> | 16. <input type="text" value="52"/> | 26. <input type="text" value="64"/> |
| 7. <input type="text" value="600"/> | 17. <input type="text" value="384 cm<sup>2</sup>"/> | 27. <input type="text" value="202"/> |
| 8. <input type="text" value="62"/> | 18. <input type="text" value="56"/> | 28. <input type="text" value="54"/> |
| 9. <input type="text" value="64"/> | 19. <input type="text" value="96 in<sup>2</sup>"/> | 29. <input type="text" value="132"/> |
| 10. <input type="text" value="216"/> | 20. <input type="text" value="108 cm<sup>2</sup>"/> | 30. <input type="text" value="216"/> |

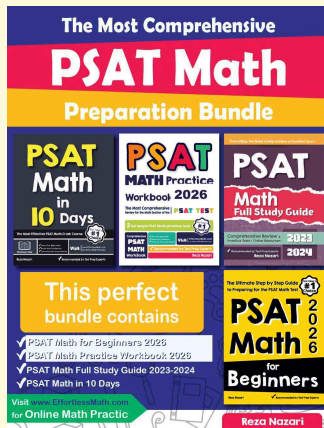
Step-by-Step Explanations

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 $6(25) = 150$ 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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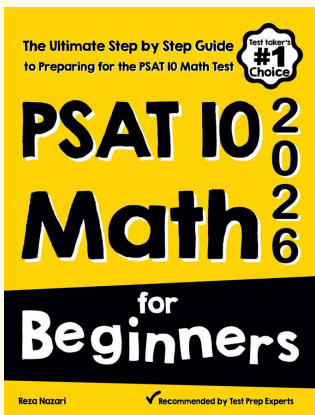
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