

Nets and Surface Area

Name: _____ Date: _____ Score: _____ / 24

Q Quick Review

A **net** is a flat pattern that folds up to make a solid figure. The net of a rectangular prism shows all 6 rectangular faces unfolded. The **surface area** is the total area of all those faces added together. A rectangular prism has 3 pairs of matching faces, so $SA = 2(lw + lh + wh)$: find the area of the three different faces, add them, then double. A **cube** has 6 identical square faces, so $SA = 6s^2$. Surface area is measured in **square units**, because you are covering the outside of the solid.

◇ **Example:** Find the surface area of a rectangular prism with length 6 cm, width 4 cm, and height 5 cm.
 ⇒ Use $SA = 2(lw + lh + wh)$. Find the three different face areas first: $lw = 6 \times 4 = 24$, $lh = 6 \times 5 = 30$, and $wh = 4 \times 5 = 20$. Add those together: $24 + 30 + 20 = 74$. Each face has a matching partner on the opposite side, so double the total: $2 \times 74 = 148$. The surface area is in square centimeters.

Answer: 148 cm²

PRACTICE

Find the surface area of each solid. Cubes give one side length; prisms give length, width, and height.

- | | | | |
|-----------------------------------|-------|-------------------------------------|-------|
| 1. Cube: side 2 | _____ | 11. Prism: $l = 8, w = 6, h = 2$ | _____ |
| 2. Cube: side 3 | _____ | 12. Prism: $l = 7, w = 7, h = 7$ | _____ |
| 3. Cube: side 4 | _____ | 13. Prism: $l = 3, w = 3, h = 10$ | _____ |
| 4. Cube: side 5 | _____ | 14. Prism: $l = 12, w = 5, h = 4$ | _____ |
| 5. Cube: side 6 | _____ | 15. Prism: $l = 9, w = 4, h = 6$ | _____ |
| 6. Cube: side 10 | _____ | 16. Prism: $l = 15, w = 10, h = 8$ | _____ |
| 7. Prism: $l = 2, w = 3, h = 4$ | _____ | 17. Cube: side 1 | _____ |
| 8. Prism: $l = 5, w = 5, h = 5$ | _____ | 18. Prism: $l = 4, w = 4, h = 2$ | _____ |
| 9. Prism: $l = 6, w = 4, h = 3$ | _____ | 19. Prism: $l = 10, w = 10, h = 10$ | _____ |
| 10. Prism: $l = 10, w = 2, h = 4$ | _____ | 20. Prism: $l = 20, w = 5, h = 3$ | _____ |

◆ Word Problems

21. A gift box is a cube with each side 8 inches long. How many square inches of wrapping paper are needed to cover it exactly?

22. A storage chest is a rectangular prism that is 20 cm long, 15 cm wide, and 10 cm tall. What is its surface area? _____
23. A fish tank is a rectangular prism 24 inches long, 12 inches wide, and 16 inches tall. The tank has no top. How many square inches of glass make up the bottom and four sides?

24. A number cube (die) has each edge measuring 5 mm. What is the total surface area of the cube?



Answer Keys

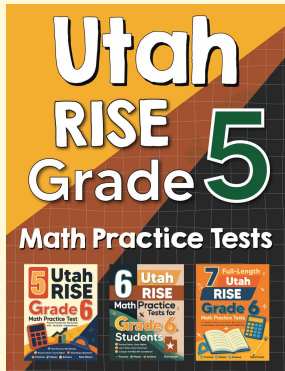
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|--------------------------------------|--|
| 1. <input type="text" value="24"/> | 13. <input type="text" value="138"/> |
| 2. <input type="text" value="54"/> | 14. <input type="text" value="256"/> |
| 3. <input type="text" value="96"/> | 15. <input type="text" value="228"/> |
| 4. <input type="text" value="150"/> | 16. <input type="text" value="700"/> |
| 5. <input type="text" value="216"/> | 17. <input type="text" value="6"/> |
| 6. <input type="text" value="600"/> | 18. <input type="text" value="64"/> |
| 7. <input type="text" value="52"/> | 19. <input type="text" value="600"/> |
| 8. <input type="text" value="150"/> | 20. <input type="text" value="350"/> |
| 9. <input type="text" value="108"/> | 21. <input type="text" value="384 in<sup>2</sup>"/> |
| 10. <input type="text" value="136"/> | 22. <input type="text" value="1300 cm<sup>2</sup>"/> |
| 11. <input type="text" value="152"/> | 23. <input type="text" value="1440 in<sup>2</sup>"/> |
| 12. <input type="text" value="294"/> | 24. <input type="text" value="150 mm<sup>2</sup>"/> |

Step-by-Step Explanations

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|--|--|
| <p>1. A cube has 6 square faces: $6 \times 2^2 = 6 \times 4 = 24$.</p> <p>2. $6 \times 3^2 = 6 \times 9 = 54$.</p> <p>3. $6 \times 4^2 = 6 \times 16 = 96$.</p> <p>4. $6 \times 5^2 = 6 \times 25 = 150$.</p> <p>5. $6 \times 6^2 = 6 \times 36 = 216$.</p> <p>6. $6 \times 10^2 = 6 \times 100 = 600$.</p> <p>7. $2(2 \cdot 3 + 2 \cdot 4 + 3 \cdot 4) = 2(6 + 8 + 12) = 2 \times 26 = 52$.</p> <p>8. $2(25 + 25 + 25) = 2 \times 75 = 150$.</p> <p>9. $2(24 + 18 + 12) = 2 \times 54 = 108$.</p> <p>10. $2(20 + 40 + 8) = 2 \times 68 = 136$.</p> <p>11. $2(48 + 16 + 12) = 2 \times 76 = 152$.</p> <p>12. $2(49 + 49 + 49) = 2 \times 147 = 294$.</p> <p>13. $2(9 + 30 + 30) = 2 \times 69 = 138$.</p> <p>14. $2(60 + 48 + 20) = 2 \times 128 = 256$.</p> | <p>15. $2(36 + 54 + 24) = 2 \times 114 = 228$.</p> <p>16. $2(150 + 120 + 80) = 2 \times 350 = 700$.</p> <p>17. $6 \times 1^2 = 6 \times 1 = 6$.</p> <p>18. $2(16 + 8 + 8) = 2 \times 32 = 64$.</p> <p>19. $2(100 + 100 + 100) = 2 \times 300 = 600$.</p> <p>20. $2(100 + 60 + 15) = 2 \times 175 = 350$.</p> <p>21. A cube has 6 identical faces: $SA = 6 \times 8^2 = 6 \times 64 = 384$ square inches.</p> <p>22. Find the three face areas: $lw = 300$, $lh = 200$, $wh = 150$. Add them: $300 + 200 + 150 = 650$. Double it: $2 \times 650 = 1300$ square centimeters.</p> <p>23. The bottom is $24 \times 12 = 288$. The two long sides are each $24 \times 16 = 384$, totaling 768. The two short sides are each $12 \times 16 = 192$, totaling 384. Add: $288 + 768 + 384 = 1440$ square inches.</p> <p>24. A cube has 6 square faces: $SA = 6 \times 5^2 = 6 \times 25 = 150$ square millimeters.</p> |
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