

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.

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|-----------------------------------|-------|-------------------------------------|-------|
| 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

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

Step-by-Step Explanations

- | | |
|--|--|
| <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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