

# 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 cm<sup>2</sup>

## 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

- |         |                          |
|---------|--------------------------|
| 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 <sup>2</sup>  |
| 10. 136 | 22. 1300 cm <sup>2</sup> |
| 11. 152 | 23. 1440 in <sup>2</sup> |
| 12. 294 | 24. 150 mm <sup>2</sup>  |

### Step-by-Step Explanations

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



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