Nets and Surface Area

Name: _____	Date: _____	Score: _____ / 24

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^2

PRACTICE

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

1. Cube: side 2 _____
2. Cube: side 3 _____
3. Cube: side 4 _____
4. Cube: side 5 _____
5. Cube: side 6 _____
6. Cube: side 10 _____
7. Prism: $l = 2,\ w = 3,\ h = 4$ _____
8. Prism: $l = 5,\ w = 5,\ h = 5$ _____
9. Prism: $l = 6,\ w = 4,\ h = 3$ _____
10. Prism: $l = 10,\ w = 2,\ h = 4$ _____
11. Prism: $l = 8,\ w = 6,\ h = 2$ _____
12. Prism: $l = 7,\ w = 7,\ h = 7$ _____
13. Prism: $l = 3,\ w = 3,\ h = 10$ _____
14. Prism: $l = 12,\ w = 5,\ h = 4$ _____
15. Prism: $l = 9,\ w = 4,\ h = 6$ _____
16. Prism: $l = 15,\ w = 10,\ h = 8$ _____
17. Cube: side 1 _____
18. Prism: $l = 4,\ w = 4,\ h = 2$ _____
19. Prism: $l = 10,\ w = 10,\ h = 10$ _____
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
2. 54
3. 96
4. 150
5. 216
6. 600
7. 52
8. 150
9. 108
10. 136
11. 152
12. 294
13. 138
14. 256
15. 228
16. 700
17. 6
18. 64
19. 600
20. 350
21. $384\ \text{in}^2$
22. $1300\ \text{cm}^2$
23. $1440\ \text{in}^2$
24. $150\ \text{mm}^2$

Step-by-Step Explanations

1. A cube has 6 square faces: $6 \times 2^2 = 6 \times 4 = 24$.
2. $6 \times 3^2 = 6 \times 9 = 54$.
3. $6 \times 4^2 = 6 \times 16 = 96$.
4. $6 \times 5^2 = 6 \times 25 = 150$.
5. $6 \times 6^2 = 6 \times 36 = 216$.
6. $6 \times 10^2 = 6 \times 100 = 600$.
7. $2(2 \cdot 3 + 2 \cdot 4 + 3 \cdot 4) = 2(6 + 8 + 12) = 2 \times 26 = 52$.
8. $2(25 + 25 + 25) = 2 \times 75 = 150$.
9. $2(24 + 18 + 12) = 2 \times 54 = 108$.
10. $2(20 + 40 + 8) = 2 \times 68 = 136$.
11. $2(48 + 16 + 12) = 2 \times 76 = 152$.
12. $2(49 + 49 + 49) = 2 \times 147 = 294$.
13. $2(9 + 30 + 30) = 2 \times 69 = 138$.
14. $2(60 + 48 + 20) = 2 \times 128 = 256$.
15. $2(36 + 54 + 24) = 2 \times 114 = 228$.
16. $2(150 + 120 + 80) = 2 \times 350 = 700$.
17. $6 \times 1^2 = 6 \times 1 = 6$.
18. $2(16 + 8 + 8) = 2 \times 32 = 64$.
19. $2(100 + 100 + 100) = 2 \times 300 = 600$.
20. $2(100 + 60 + 15) = 2 \times 175 = 350$.
21. A cube has 6 identical faces: $SA = 6 \times 8^2 = 6 \times 64 = 384$ square inches.
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.
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.
24. A cube has 6 square faces: $SA = 6 \times 5^2 = 6 \times 25 = 150$ square millimeters.

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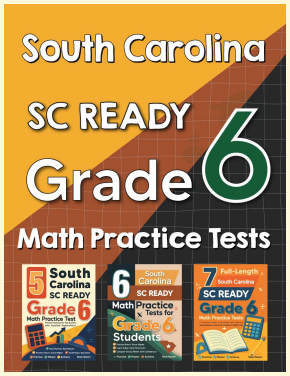

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