Surface Area of Spheres

Name: _____ Date: _____ Score: _____ / 24

Quick Review

A **sphere** is a perfectly round solid — every point on its surface is the same distance, the **radius** r, from the center. The **surface area** of a sphere is $SA = 4\pi r^2$. A handy way to remember it: a sphere's surface area is exactly four times the area of a flat circle with the same radius. If you're given the *diameter*, cut it in half first to get the radius. Keep π in your answer unless you're told to use $\pi \approx 3.14$, and remember surface area uses *square* units.

◇ **Example:** Find the surface area of a sphere with radius 5 cm. Leave your answer in terms of π.
⇒ The surface area formula for a sphere is $SA = 4\pi r^2$. Here the radius is 5, so first square it: $5^2 = 25$. Then multiply by 4: $4 \times 25 = 100$. So the surface area is 100π square centimeters. Leaving the π gives the exact value.

Answer: $SA = 100\pi$ cm^2

PRACTICE

Find the surface area of each sphere. Leave π in unless noted.

1. Sphere: $r = 3$ _____
2. Sphere: $r = 5$ _____
3. Sphere: $r = 7$ _____
4. Sphere: $r = 10$ _____
5. Sphere: $r = 2$ _____
6. Sphere: $r = 6$ _____
7. Sphere: $r = 1$ _____
8. Sphere: $r = 4$ _____
9. Sphere: $r = 8$ _____
10. Sphere: $r = 9$ _____
11. Sphere: $r = 12$ _____
12. Sphere: $d = 6$ _____
13. Sphere: $d = 10$ _____
14. Sphere: $d = 14$ _____
15. Sphere: $d = 20$ _____
16. Sphere: $d = 4$ _____
17. Sphere: $r = 11$ _____
18. Sphere: $r = 15$ _____
19. Sphere: $r = 5$, use $\pi \approx 3.14$ _____
20. Sphere: $r = 10$, use $\pi \approx 3.14$ _____

Word Problems

21. A globe has a radius of 7 inches. What is its surface area? Leave your answer in terms of π. _____
22. A spherical balloon has a diameter of 10 cm. Find the surface area of the balloon in terms of π. _____
23. A spherical water tank has a radius of 5 m. Using $\pi \approx 3.14$, how many square meters of paint are needed to coat its outside surface? _____
24. A sphere has radius 3 m and another sphere has radius 6 m. How many times larger is the surface area of the bigger sphere? _____

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Answer Keys

1. 36π
2. 100π
3. 196π
4. 400π
5. 16π
6. 144π
7. 4π
8. 64π
9. 256π
10. 324π
11. 576π
12. 36π
13. 100π
14. 196π
15. 400π
16. 16π
17. 484π
18. 900π
19. 314
20. 1256
21. 196π in^2
22. 100π cm^2
23. 314 m^2
24. 4 times larger

Step-by-Step Explanations

1. $SA = 4\pi r^2 = 4\pi(9) = 36\pi$.
2. $SA = 4\pi(25) = 100\pi$.
3. $SA = 4\pi(49) = 196\pi$.
4. $SA = 4\pi(100) = 400\pi$.
5. $SA = 4\pi(4) = 16\pi$.
6. $SA = 4\pi(36) = 144\pi$.
7. $SA = 4\pi(1) = 4\pi$.
8. $SA = 4\pi(16) = 64\pi$.
9. $SA = 4\pi(64) = 256\pi$.
10. $SA = 4\pi(81) = 324\pi$.
11. $SA = 4\pi(144) = 576\pi$.
12. Radius is 3, so $SA = 4\pi(9) = 36\pi$.
13. Radius is 5, so $SA = 4\pi(25) = 100\pi$.
14. Radius is 7, so $SA = 4\pi(49) = 196\pi$.
15. Radius is 10, so $SA = 4\pi(100) = 400\pi$.
16. Radius is 2, so $SA = 4\pi(4) = 16\pi$.
17. $SA = 4\pi(121) = 484\pi$.
18. $SA = 4\pi(225) = 900\pi$.
19. $SA = 4(3.14)(25) = 314$.
20. $SA = 4(3.14)(100) = 1256$.
21. Use $SA = 4\pi r^2 = 4\pi(7^2) = 4\pi(49) = 196\pi$ square inches.
22. The radius is half the diameter: $r = 5$ cm. Then $SA = 4\pi(5^2) = 4\pi(25) = 100\pi$ square centimeters.
23. $SA = 4\pi r^2 \approx 4(3.14)(5^2) = 4(3.14)(25) = 314$ square meters.
24. Small sphere: $SA = 4\pi(9) = 36\pi$. Big sphere: $SA = 4\pi(36) = 144\pi$. The ratio is $144\pi \div 36\pi = 4$, so it is 4 times larger.

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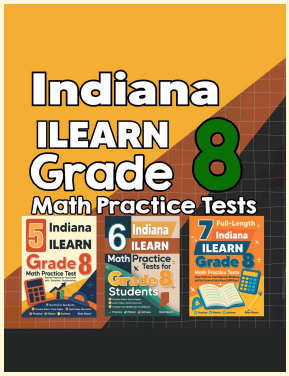

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