Pi-Related Practice Questions

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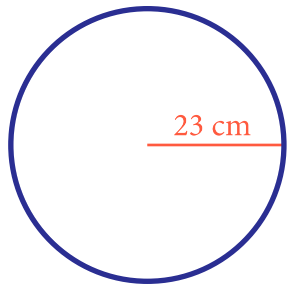
For High School Math Students

Short Answer: Write the formulas used to find the circumference and area of a circle, respectively.

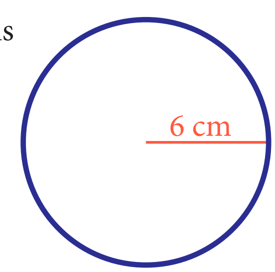
1. A circle has a radius of 23 cm. Which of the following is the best estimate for the circumference of the circle?
   a. 71.76 cm
   b. 143.52 cm
   c. 144.44 cm
   d. 72.22 cm



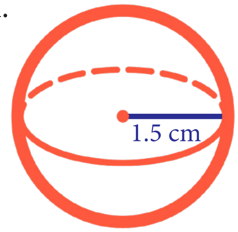
2. A pothole has a radius of 9 inches. Which of the following best represents the distance around the pothole?
   a. 14.13 inches
   b. 28.26 inches
   c. 42.39 inches

3. Which of the following values is closest to the diameter of a circle with an area of 314 square inches?
   a. 20 inches
   b. 10 inches
   c. 100 inches
   d. 31.4 inches

4. The radius of a circle is 6 inches. What is the area?
   a. 18.84 in^2
   b. 37.68 in^2
   c. 87.98 in^2
   d. 113.04 in^2

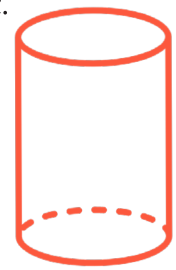


5. Find the surface area of a sphere with the radius of 1.5 cm.



a. 28.26 cm^2
b. 7.065 cm^2
c. 18.84 cm^2
d. 14.13 cm^2

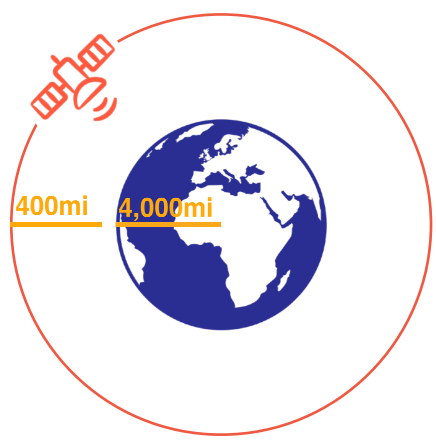
6. A cylindrical oatmeal canister has a diameter of 4 inches and a height of 10 inches. The manufacturing company wants to package the oatmeal in square containers to cut back on wasted storage space. If the new carton has a square base with 4 inch sides, what is the minimum height it must have, to the nearest ¼ inch, to hold the same volume of oatmeal? Use 3.14 for the value of π.



a. 7 ¾ inches
b. 8 inches
c. 8 1/4 inches
d. 8 ½ inches
e. 8 ¾ inches

7. A satellite in a circular orbit rotates around the Earth every 120 minutes. If the Earth's radius is 4000 miles at sea level, and the satellite's orbit is 400 miles above sea level, approximately what distance does the satellite travel in 40 minutes?

a. 1400 miles
b. 9210 miles
c. 4400 miles
d. 4120 miles
e. 8000 miles



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Pi-Related • Practice Questions • Answer Key

Short Answer: The formula used to find the circumference, C, of a circle is $C = 2\pi r$ or $C = \pi d$, where r is the radius of the circle and d its diameter. The formula used to find the area, A, of a circle is $A = \pi r^2$, where r is the radius of the circle.

1. C: The circumference of a circle can be determined by using the formula $C = \pi d$. A radius of 23 cm indicates a diameter of 46 cm, or twice that length. Substitution of 46 cm for d and 3.14 for π gives the following: $C = 3.14 \bullet 46$, which equals 144.44. Thus, the circumference of the circle is approximately 144.44 cm.

2. D: The distance around the pothole indicates the circumference of the pothole. The circumference of a circle can be determined by using the formula $C = \pi d$, where C represents the circumference and d represents the diameter. The diameter of the pothole is 18 inches (9 × 2). Substituting a diameter of 18 inches and 3.14 for the value of pi gives the following: C = 3.14(18), or 56.52. Thus, the distance around the pothole is equal to 56.52 inches.

3. A: The area A of a circle is given by $A = \pi(r^2)$, where r is the radius. Since π is approximately 3.14, we can solve for $r=\sqrt{A/\pi} = \sqrt{314/3.14} = \sqrt{100} = 10$. Now, the diameter d is twice the radius, or d = 2 x 10 = 20.

4. D: The formula for the area of a circle is $A = \pi r^2$.

$A = \pi \bullet r \bullet r$

$A = 3.14 \bullet (6\text{ in}) \bullet (6\text{in})$

$A = 3.14 \bullet (36\text{ in}^2)$

$A = 113.04\text{ in}^2$

5. A: The formula for the surface area of a sphere is $A = 4\pi r^2$.

$A = 4 \bullet \Pi \bullet r \bullet r$

$A = 4 \bullet 3.14 \bullet (1.5\text{ cm}) \bullet (1.5\text{ cm})$

$A = 12.56 \bullet (2.25\text{ cm}^2)$

$A = 28.26\text{ cm}^2$

6. B: Start by finding the volume of the existing oatmeal canister. The formula for the volume of a container is to multiply the area of the base times the height. In this case, the base is a circle with diameter of 4. This makes the radius 2, and the area of the base $A = \pi r^2 \rightarrow A = \pi \rightarrow (2)^2 \rightarrow A = 4\pi$.
The height was given as 10, so the total volume of the canister is $4\pi \times 10 = 40\pi$. The area of the base of the new container is $A = s^2 \rightarrow A = 4^2 \rightarrow A = 16$. To find the minimum height of the new container, divide the total volume of the original container by the area of the base of the new container. Remember that π = 3.14 for the purposes of this problem. $(40 \bullet \pi) \div 16 = (40 \bullet 3.14) \div 16 = 125.6/16 = 7.85$ This is more than 7¾ but less than 8. We round to the nearest ¼, so the minimum height of the new container is 8.

7. D: The radius, R, of the satellite's orbit is the sum of the Earth's radius plus the satellite's orbital altitude, or R = 4400 miles. The circumference of the circular orbit is therefore $C = 2\pi r = 2\pi(4400) = 8800\pi$ miles. Since 40 minutes is one third of the satellite's 120-minute orbital time, it traverses one third of this distance in that time. So, the distance, $D = 40/120\ 2\pi 4400 = 9210.66$ miles, using 3.14 for π.