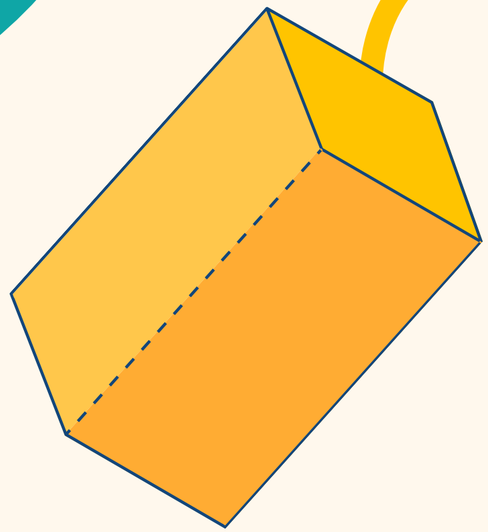
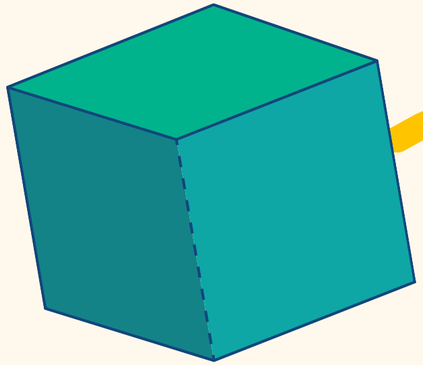




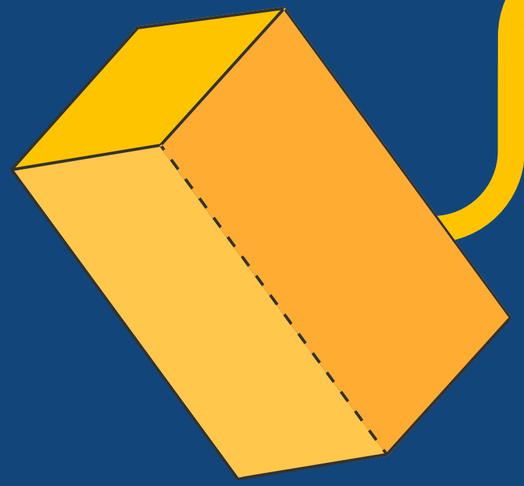
Surface Area

The sum of the areas of the base and the lateral faces of space figures.

INSPIRED BY mathspace

Lesson Outline

- Surface area of a triangular prism
- Surface area of a cylinder
- Surface area of a pyramid
- Surface area of a cone
- Surface area of a sphere



Surface Area of a Triangular Prism

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To find the surface area of a triangular prism, $bh + (a + b + c)H = (2A + PH)$

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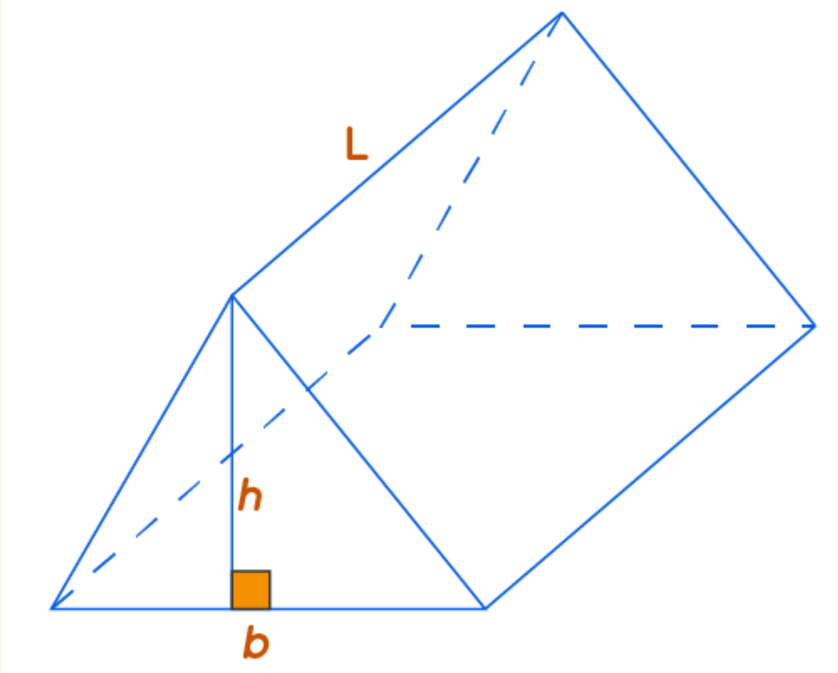

Trangular Prism

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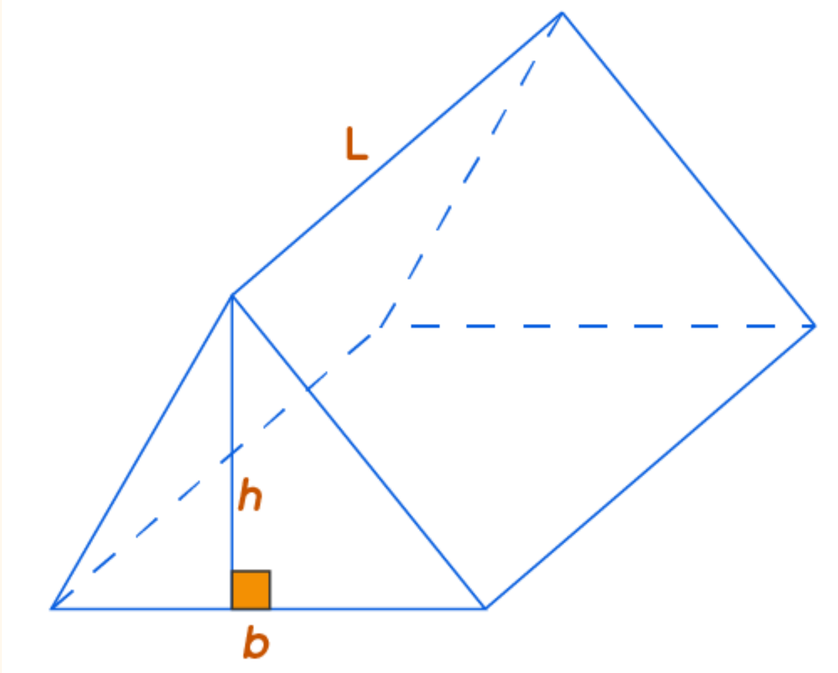

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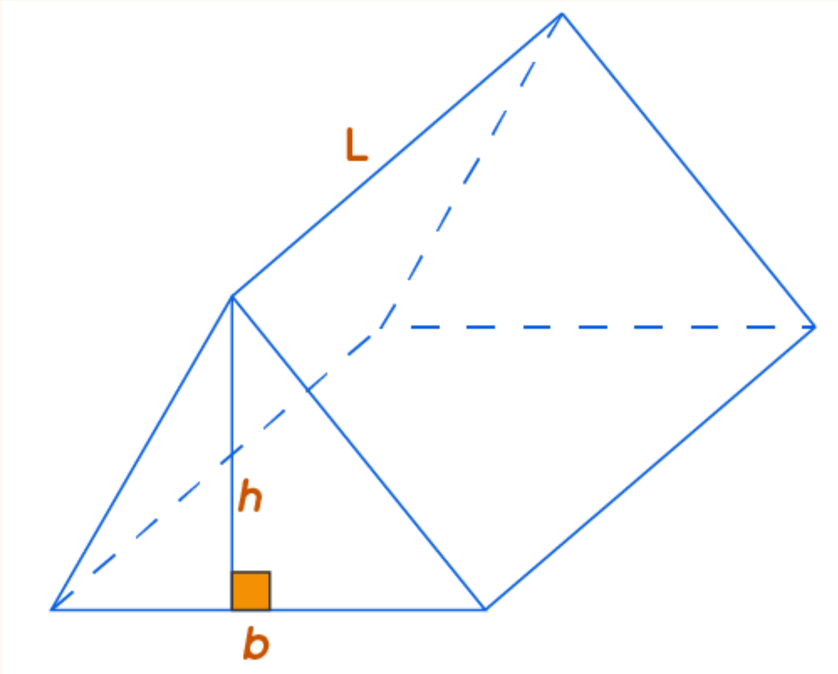


Trangular Prism

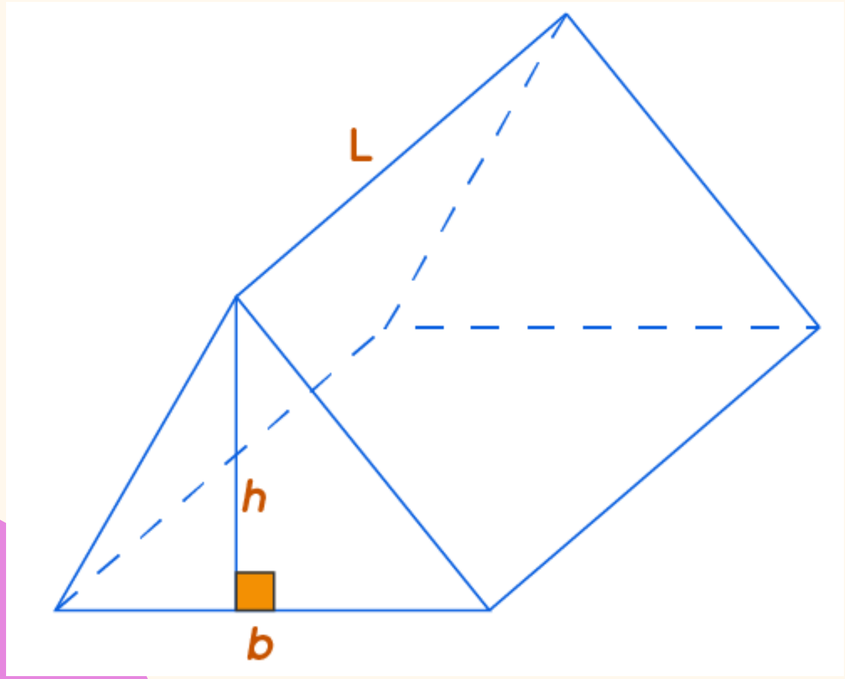
bh + (a + b + c) H (2A + PH)

(2A + PH)

Surface Area of a Triangular Prism

Example:

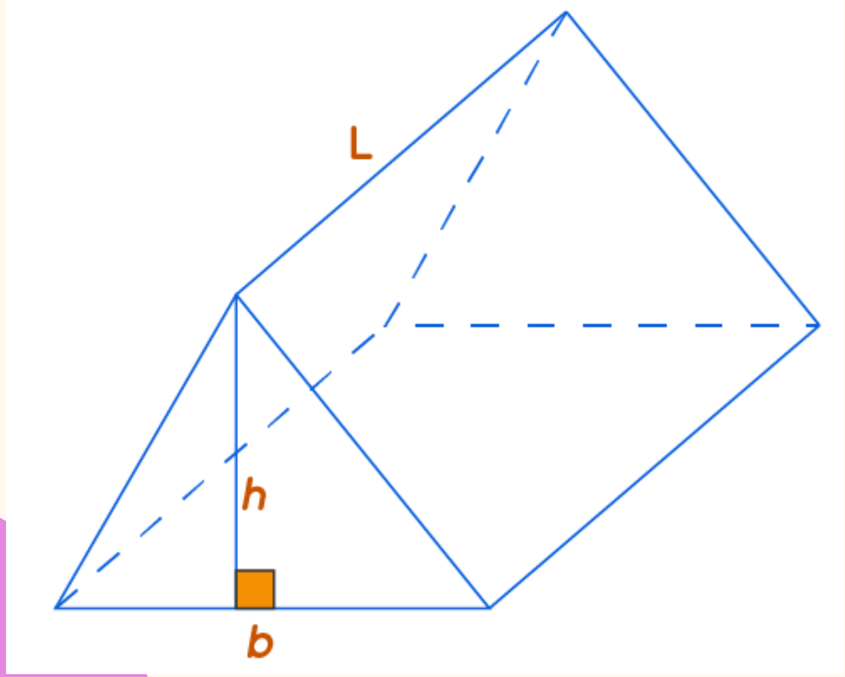
$bh + (a + b + c)H = (2B + PH)$



Find the surface area of a prism given above whose base area is 10 square units, the base perimeter is 20 units and the height of the prism is 6 units.

Surface Area of a Triangular Prism

Example:

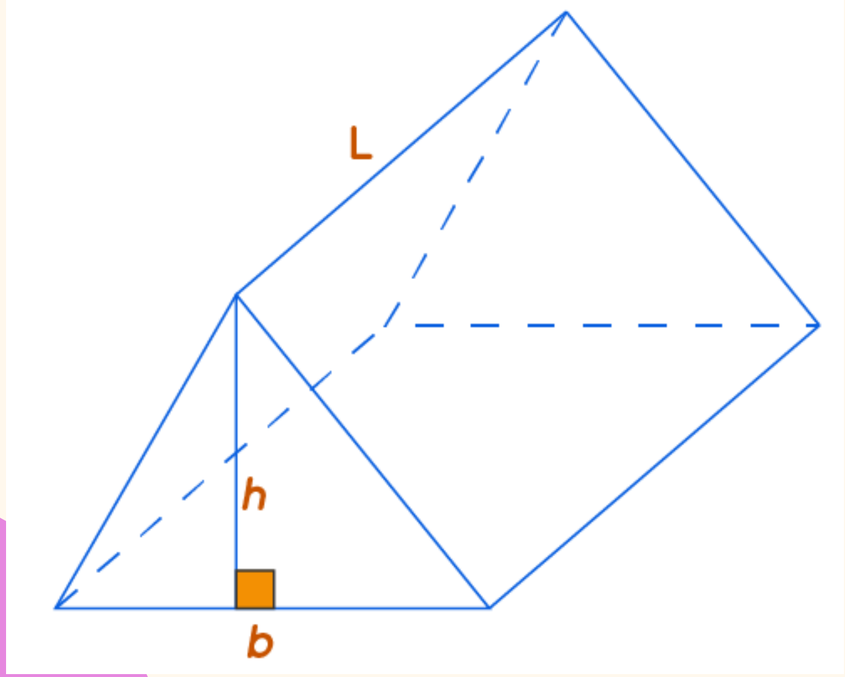


Surface Area of Prism = (2 × Base Area) + (Base perimeter × height)

Base area = 10 square units
Base perimeter = 20 units
Height of the prism = 6 units

Surface Area of a Triangular Prism

Example:



Surface Area of Prism = (2 × Base Area) + (Base perimeter × height)

Surface Area of Prism = (2 × 10) + (20 × 6)

∴ The surface area of prism is 140 square units.

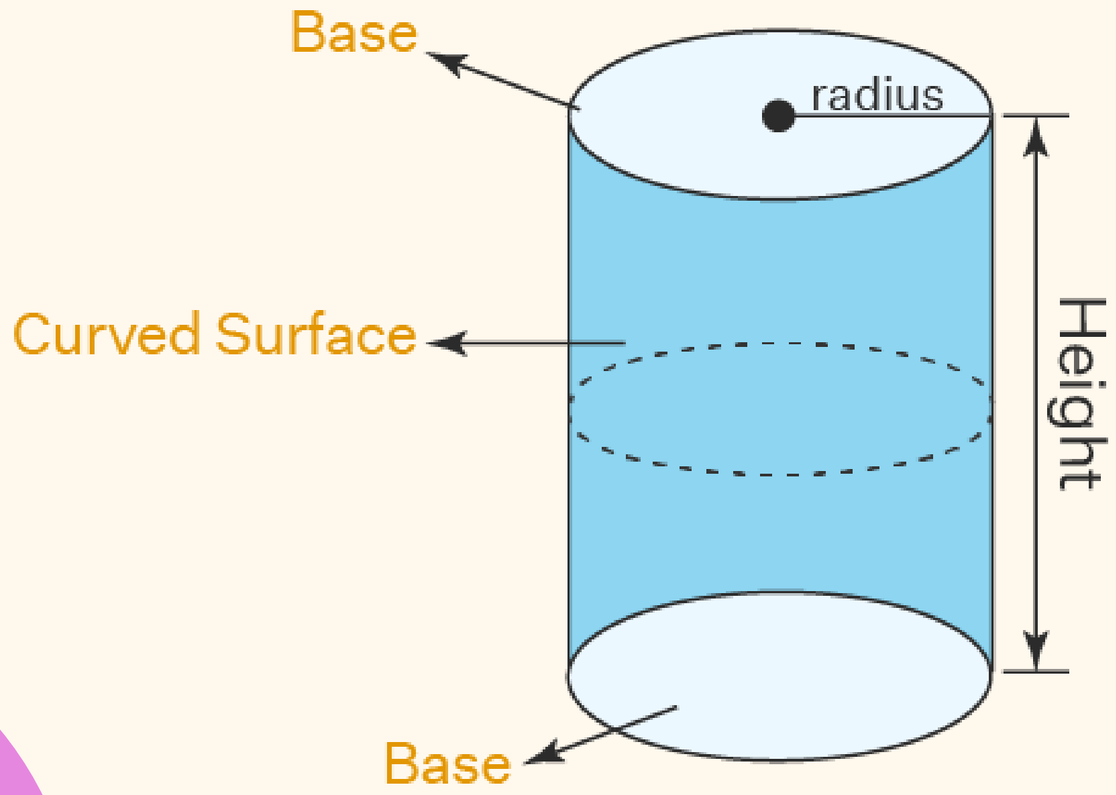
Try This!

What will be the surface area of the triangular prism if the base and height of a triangular prism are 8 units and 14 units respectively along with the height of the equilateral triangular bases being 9 units?

Surface Area of a Cylinder

Surface Area of a Cylinder

To find the surface area of a cylinder, 2πrh



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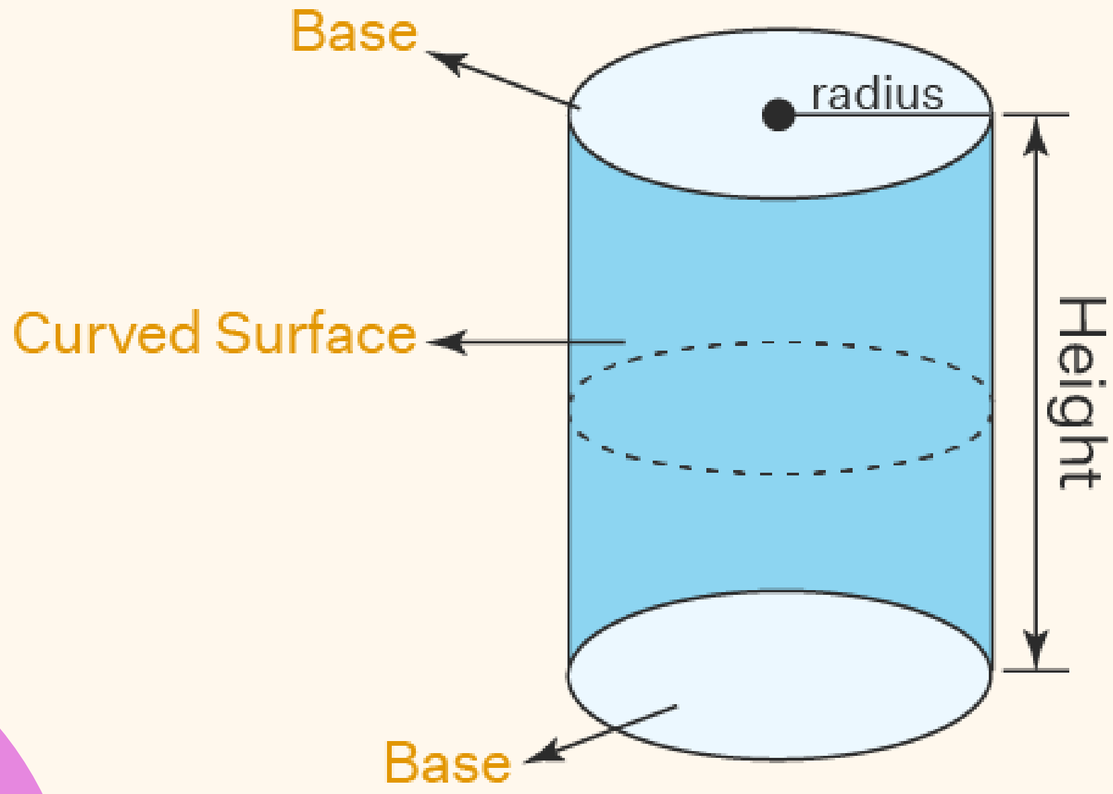


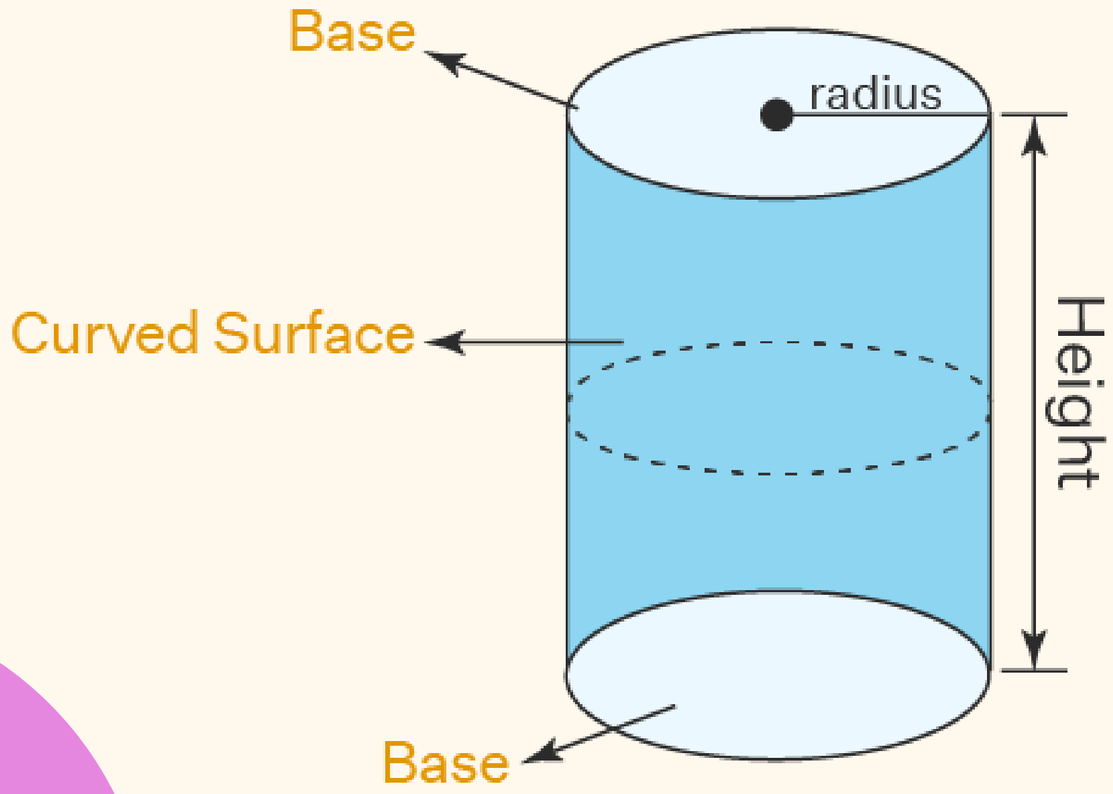
r = radius of the cylinder

h = height of cylinder

π = 22/7 or 3.14

Surface Area of a Cylinder

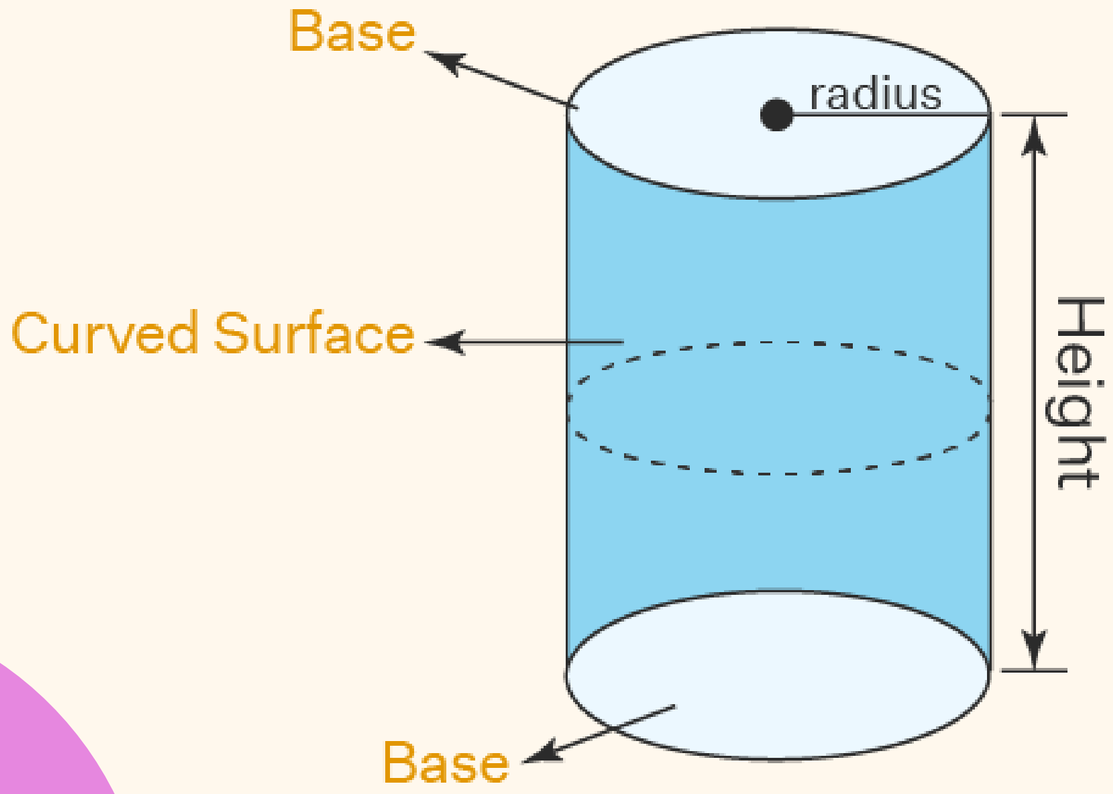
To find the surface area of a cylinder, 2πrh



Find the curved surface area of a cylinder of radius 9 cm and height 17 cm.

Surface Area of a Cylinder

To find the surface area of a cylinder, 2πrh

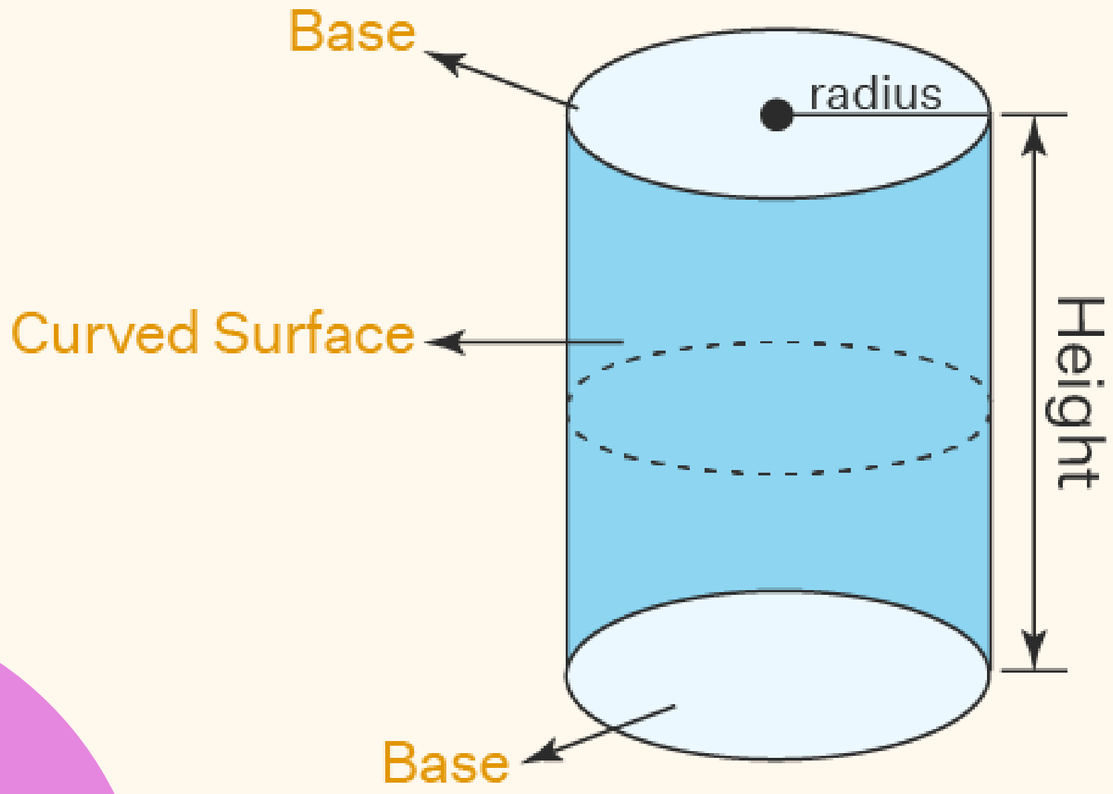


Find the curved surface area of a cylinder of radius 9 cm and height 17 cm.

Solution: The curved surface area of a cylinder can be calculated using the formula, CSA = 2πrh.

Surface Area of a Cylinder

To find the surface area of a cylinder, 2πrh



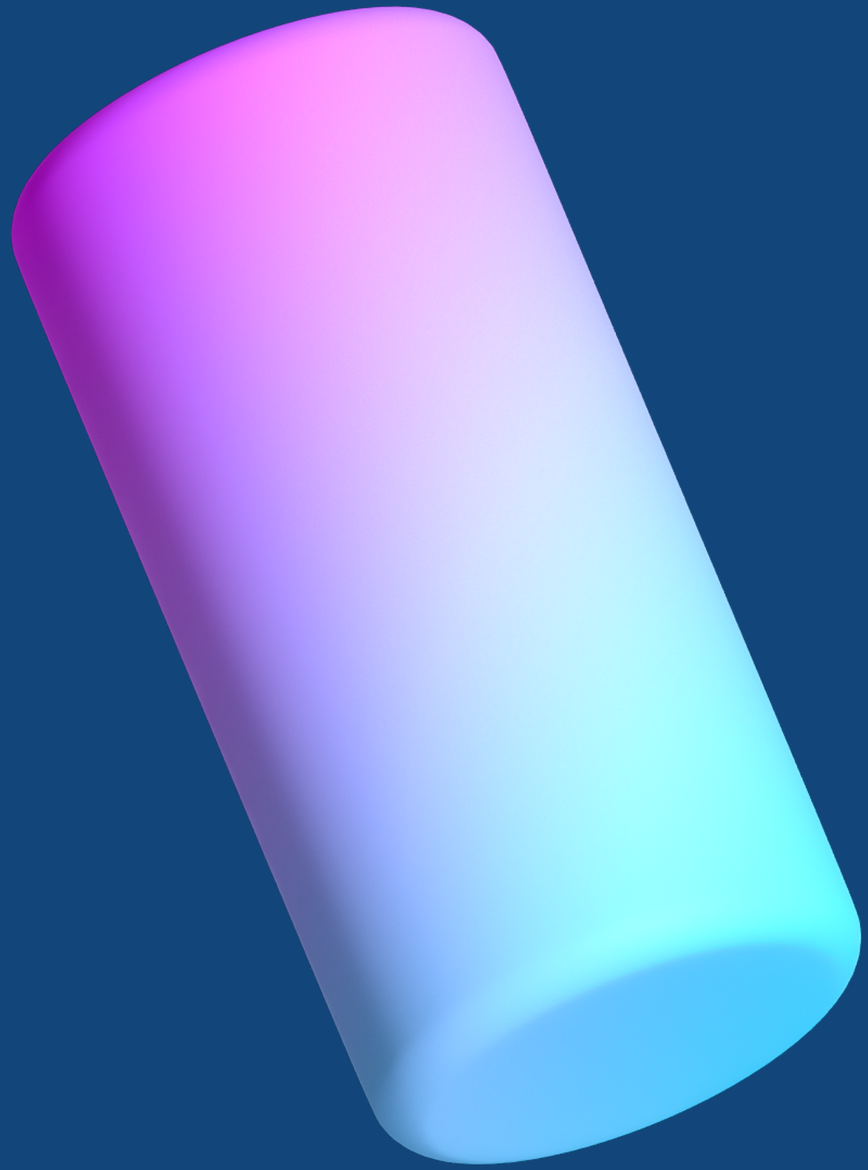
Find the curved surface area of a cylinder of radius 9 cm and height 17 cm.

Solution: The curved surface area of a cylinder can be calculated using the formula, CSA = 2πrh.

By substituting the values of r = 9, h = 17, we get: CSA = 2πrh = 2 × 3.14 × 9 × 17 = 960.8 cm^2.

Try This!

Find the curved surface area of a cylinder of radius 7 cm and height 14 cm.



Surface Area of a Pyramid

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To find the surface area of a pyramid,
Lateral surface area (LSA) = 1/2π and Total Surface Area = 1/2π + B

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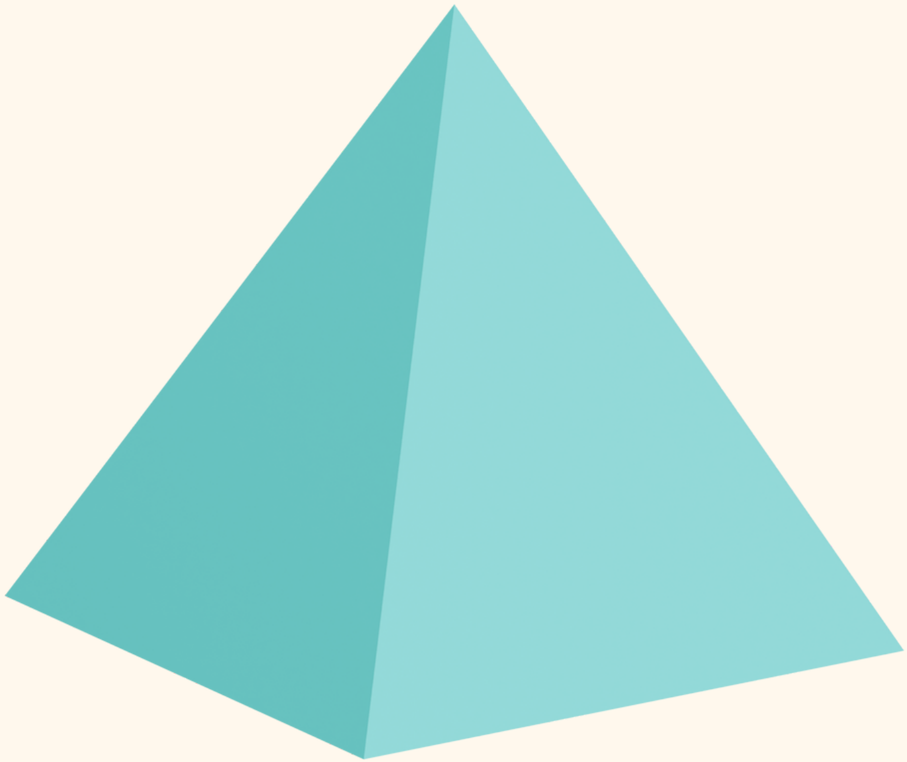
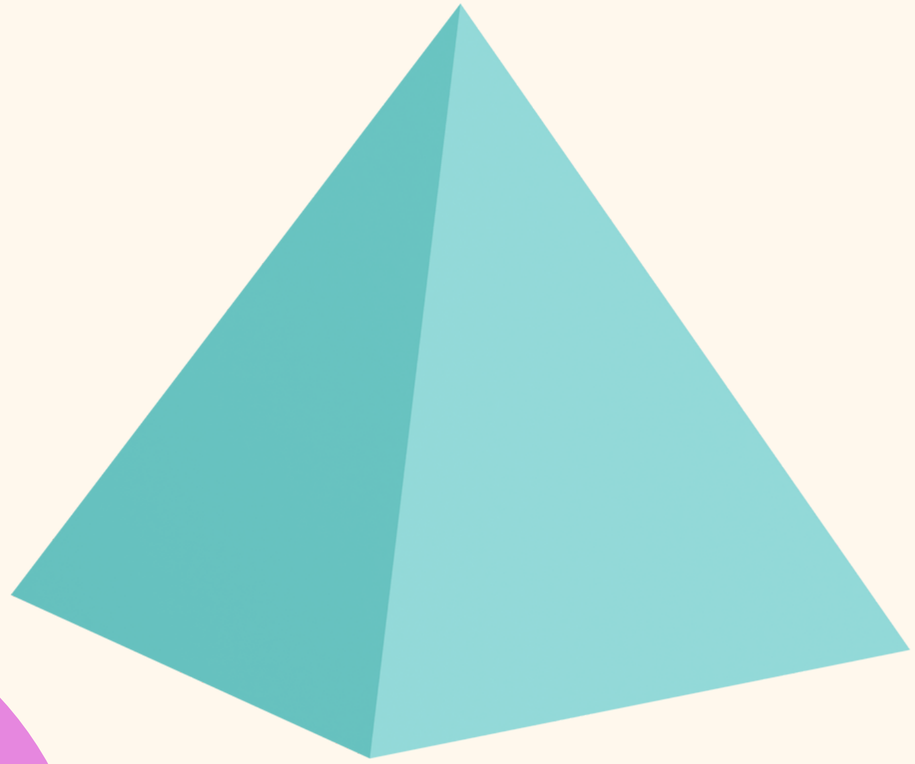


Surface Area of a Pyramid

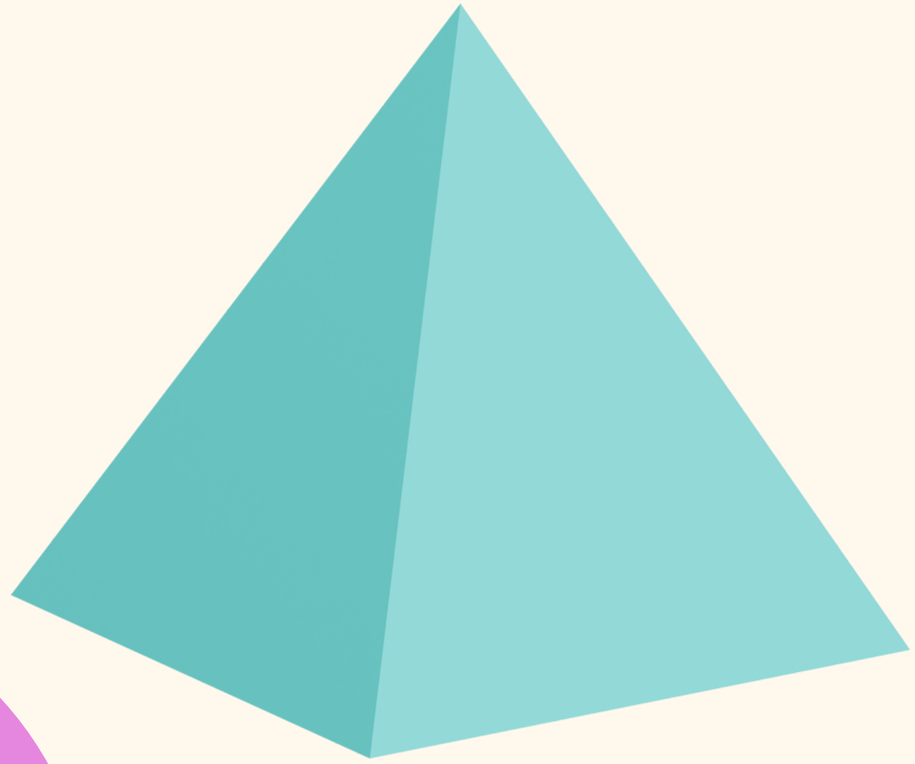
Example



Calculate the lateral surface area of a square pyramid if the side length of the base is 18 inches and the slant height of the pyramid is 22 inches.

Surface Area of a Pyramid

Example

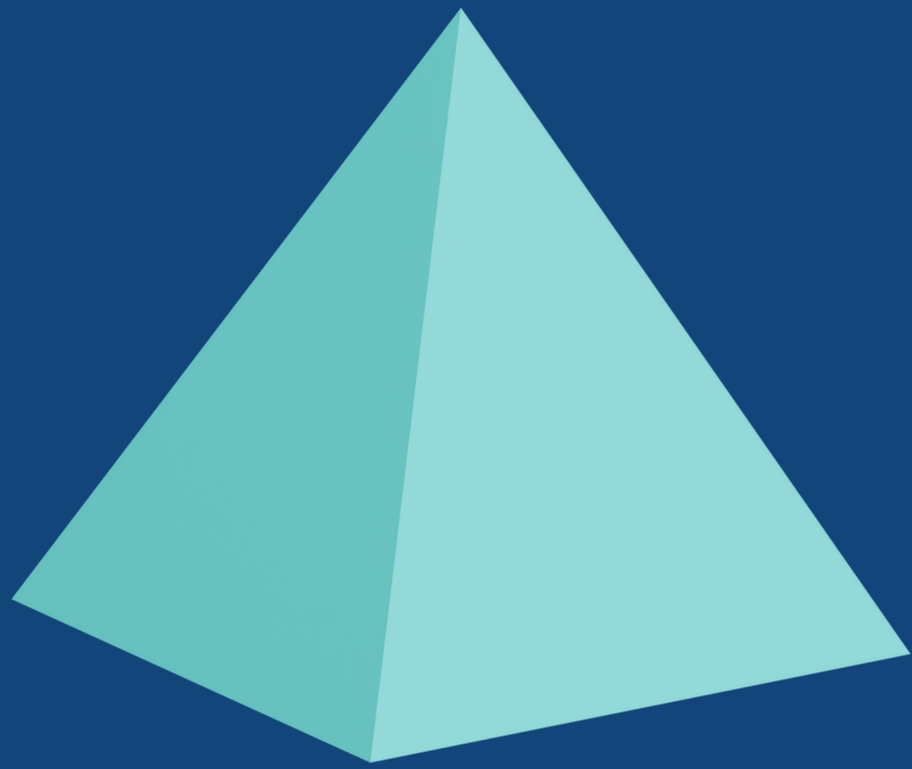


Calculate the lateral surface area of a square pyramid if the side length of the base is 18 inches and the slant height of the pyramid is 22 inches.

The side length of the base, a = 18 inches
Then, the perimeter of the base (square) is, P = 4a = 4(18) = 72 inches.
Slant height, l = 22 inches
The lateral surface area of a square pyramid is,
Lateral surface area (LSA) = (1/2) Pl
(LSA)= (1/2) × (72) × 22 = 792 inches squared

Try This!

Calculate the lateral surface area of a square pyramid if the side length of the base is 14 inches and the slant height of the pyramid is 20 inches.



Surface Area of a Cone

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Total surface area of cone = $\pi r (r + l)$

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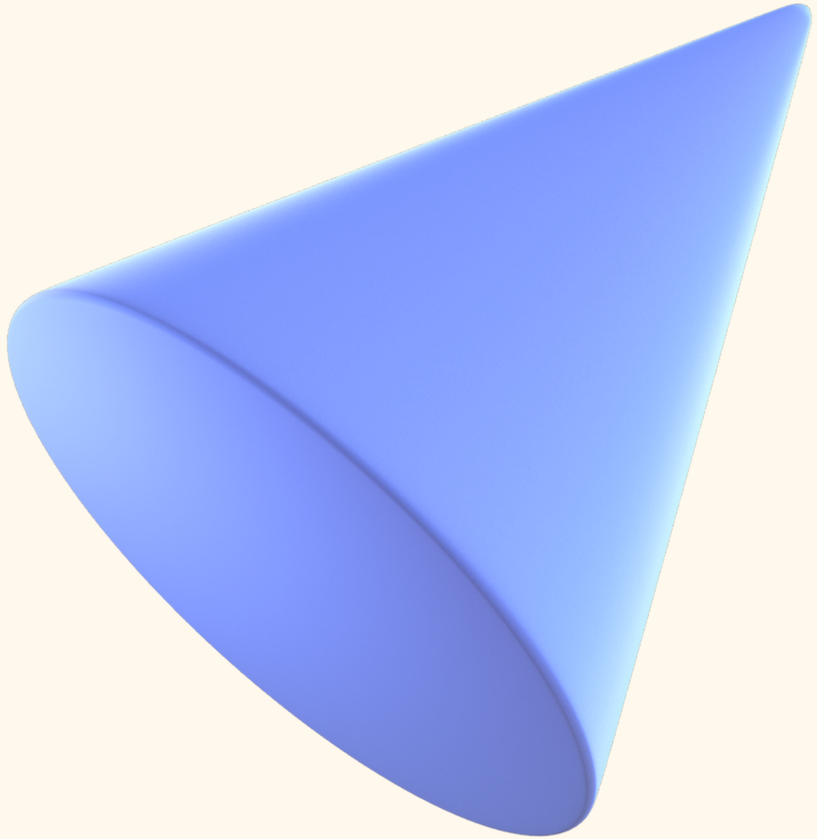


Surface Area of a Cone

Total surface area of cone = $\pi r (r + l)$

What is the slant height of the cone if the total surface area of the cone is 616in^2 and the radius is 7 inches?

Surface Area of a Cone

Total surface area of cone = πr (r + l)

What is the slant height of the cone if the total surface area of the cone is 616in^2 and the radius is 7 inches?

Total surface area of cone = πr (r + l) = (22/7) × 7 × (7 + x) = 616

⇒ 22 × (7 + x) = 616

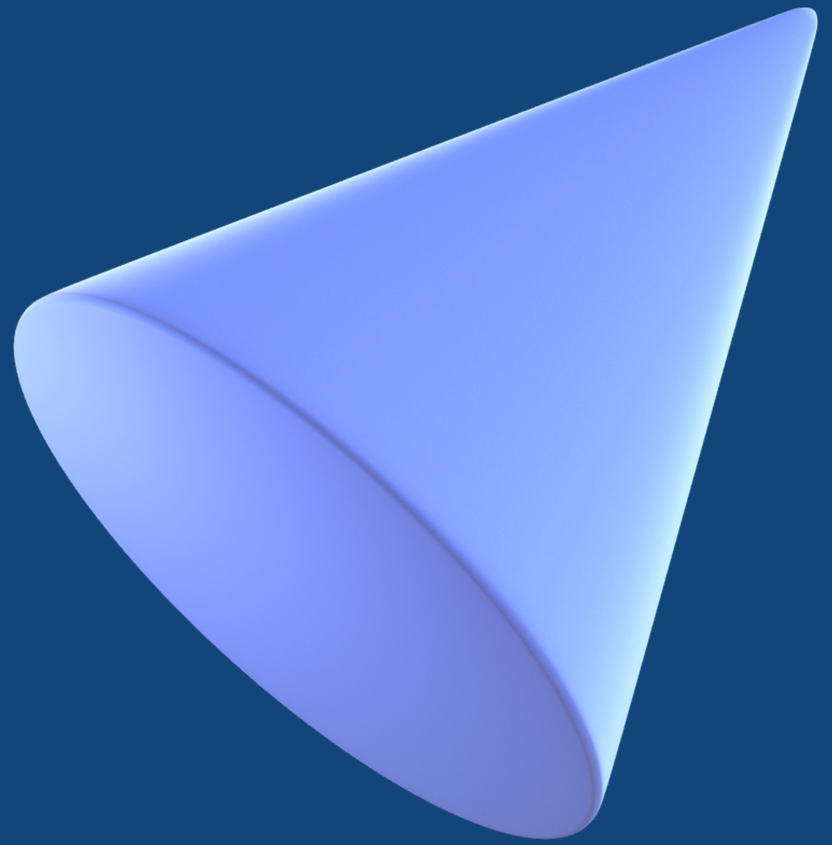
⇒ 7 + x = 28

⇒ x = 21 inches

Answer: The slant height of the cone is 21 inches.

Try This!

What is the height of a cone whose radius is 7 inches and curved surface area is 550 in^2? (Use π = 22/7)



Surface Area of a Sphere

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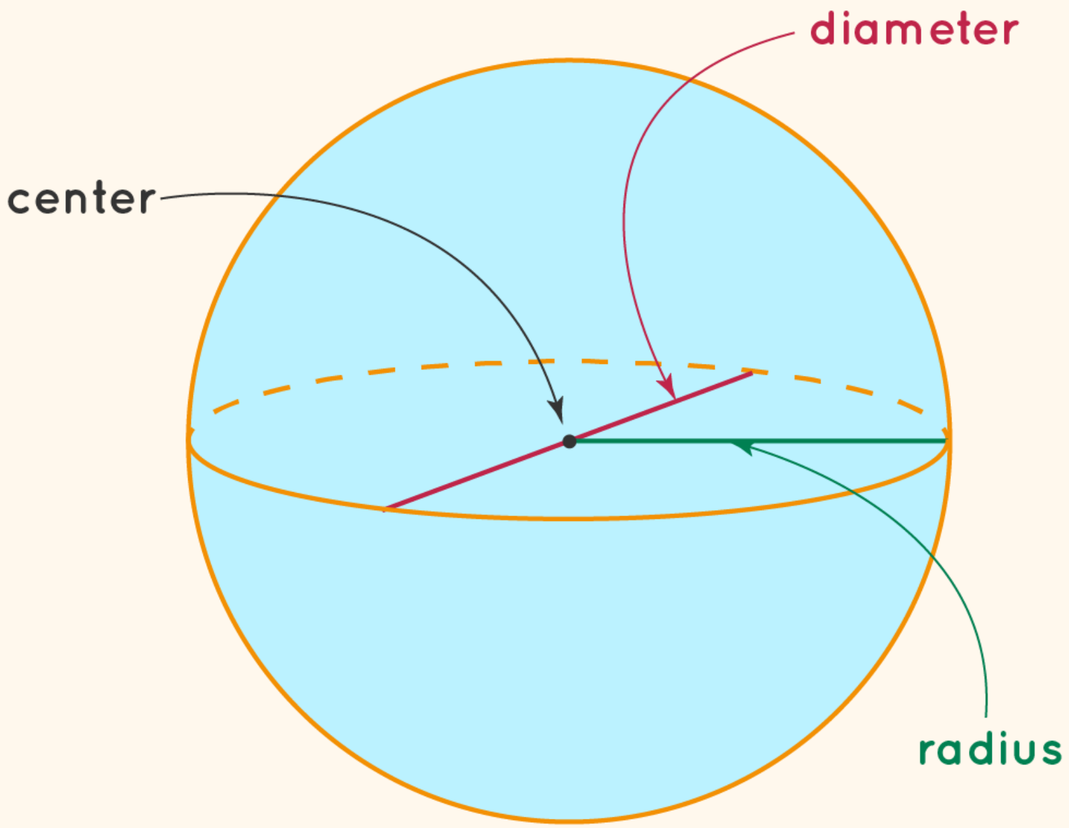
Total surface area of Sphere = $4\pi r^2$

Surface Area of a Sphere

Total surface area of Sphere = 4πr^2



Surface Area of a Sphere

Total surface area of Sphere = 4πr^2

If the radius of a sphere is 20 feet, find its surface area. (Use π = 3.14).

Surface Area of a Sphere

Total surface area of Sphere = $4\pi r^2$

If the radius of a sphere is 20 feet, find its surface area. (Use $\pi = 3.14$).

The surface area of the sphere = $4\pi r^2 = 4 \times \pi \times 202 = 5024$ feet^2

$\therefore$ The surface area of the sphere is 5024 feet^2

Try This!

Find the surface area of a sphere if its radius is given as 6 units.