

EXPLORING AREA AND SURFACE AREA

Area is the amount of surface a shape covers. Area is measured in square units, whether the units are inches, feet, meters or centimeters.

- The area formula for a **triangle** is: $A = \frac{1}{2} \cdot b \cdot h$, where **b** is the base and **h** is the height.
- The area formula for a **circle** is: $A = \pi \cdot r^2$, where π is usually **3.14** and **r** is the radius of the circle.
- The area formula for a **parallelogram** is: $A = b \cdot h$, where **b** is the base and **h** is the height.
- The area of a **trapezoid** is: $A = \frac{1}{2}(b_1 + b_2) \cdot h$, where **b₁** is one base and **b₂** is the other base and **h** is the height.


Surface area

• The surface area of a rectangular prism is $2lw + 2lh + 2wh$.

• The surface area of a cylinder is $2\pi r^2 + 2\pi rh$.

• The surface area of a **cylinder** is: $SA = 2\pi r \cdot h + 2\pi r^2$. The surface area of a **sphere** is: $SA = 4\pi r^2$. For the surface area of a cylinder and a sphere, π is usually **3.14**.

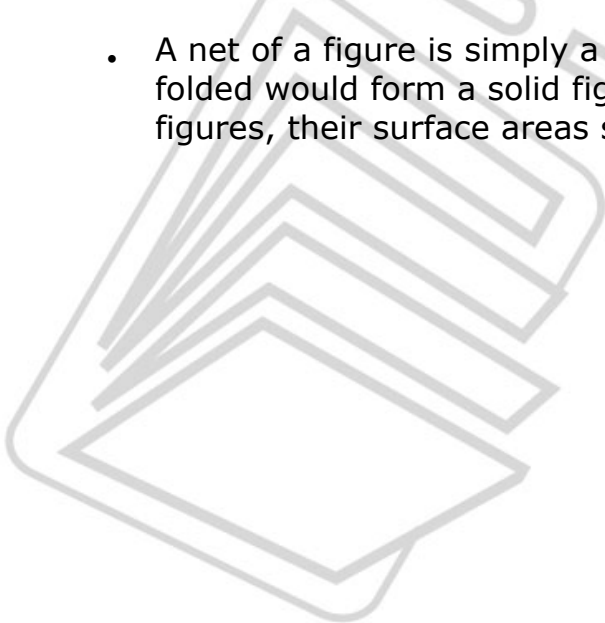
• A net of a figure is simply a flat pattern of the figure that when folded would form a solid figure. When comparing two similar figures, their surface areas should be in proportion to each other.



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How to use exploring area and surface area

The **area** of any figure can be found if given the appropriate dimensions.

- For example, to find the area of a triangle, use the formula $A = 1/2 \cdot b \cdot h$, and fill in the base and the height. Then multiply the base and height together and divide by two to find the area.
- If the area of a triangle and one side of the triangle is given, the missing side can be found by using the same formula. This time the area will be filled in as well as either the base or the height, depending on what is given.
- By performing the operations, the result will be the missing side. Finding a missing side or diameter can be done with any shape and the area formulas for that shape.
- For example, what is the radius of a circle with an area of 78.5 units²?



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Ex.

Area = 78.5 units²

$A = \pi \cdot r^2$

$$\frac{78.5}{3.14} = \frac{3.14}{3.14} \cdot r^2$$

$$25 = r^2$$

$$5 = r$$

The **surface area** of any figure can be found using the appropriate formulas. For example, what is the surface area of a sphere with a radius of 5 inches?

Ex.

$$\begin{aligned} SA_{\text{sphere}} &= 4\pi r^2 \\ &= (4)(3.14)(5^2) \\ &= (4)(3.14)(25) = \mathbf{314 \text{ inches}^2} \end{aligned}$$

If the surface area and all other dimensions are given except one dimension, the missing dimension can be found by plugging in the surface area and given dimensions and solving for the missing dimension.

Try This!

1. What is the **area** of a rectangle with a base of 3 m and a height of 5 m?



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2. What is the **area** of a rectangle with a base of 12 cm and a height of 8 cm?

3. What is the **area** of the circle with a diameter of 14 inches?

4. What is the **area** of a trapezoid with bases, 2 ft and 4 ft, and a height of 5 ft?

5. What is the missing side of a rectangle with an area of 64 m^2 and a base of 4m ?

6. What is the base of a triangle with an area of 39 m^2 and a height of 13 m ?

7. What is the radius of a circle with an area of 28.26 cm^2 ?

8. What is the radius of a circle with a circumference of 25.12 cm , a width of 2 cm , a



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9. What is the **surface area** of a cylinder with a radius of 12 in. and a height of 24 in. ?

10. What is the **surface area** of a sphere with a diameter of 10 ft ?