

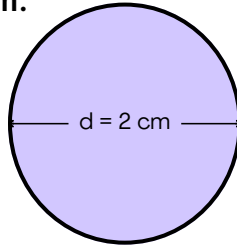
Perimeter of 2-D Figures

Answer

- ★ The circumference of a circle with a diameter of 2 cm is 2π cm.

$$C = \pi \times \text{diameter (d)}$$

$$C = \pi \times 2$$



- ★ The perimeter of a rhombus is 36 cm. Its side length is 9 cm.

$$P = 4 \times \text{side length (s)}$$

$$s = P \div 4$$

$$= 36 \div 4$$

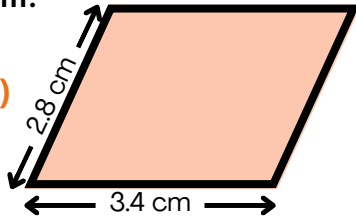
$$= 9$$

- ★ The perimeter of the parallelogram in the figure is 12.4 cm.

$$P = 2 \times (\text{side}_1 + \text{side}_2)$$

$$= 2 \times (3.4 + 2.8)$$

$$= 12.4$$



- ★ A rectangle has a length of 3.2 cm, and its width is half of the length. The perimeter of the rectangle is 9.6 cm.

$$\text{width} = 3.2 \div 2 = 1.6$$

$$P = 2 \times (\text{length} + \text{width})$$

$$= 2 \times (3.2 + 1.6)$$

$$= 9.6$$

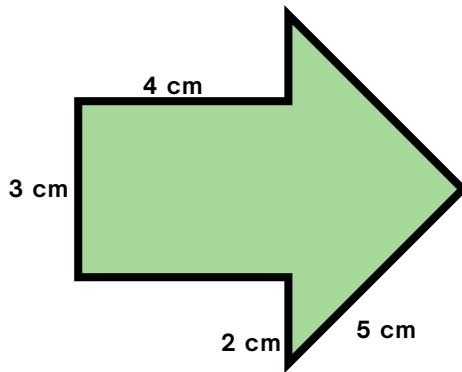
Perimeter of Combined Shape

- ★ The perimeter of the road sign is 25 cm.

$$P = (2 \times 4) + (2 \times 2) + (2 \times 5) + 3$$

$$= 8 + 4 + 10 + 3$$

$$= 25$$

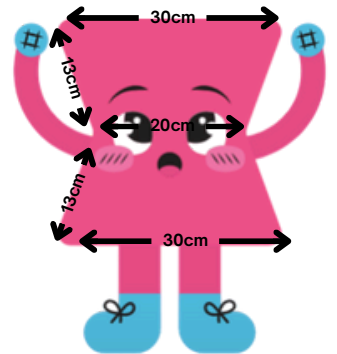


- ★ A robot's head is composed of two trapezoids. Each trapezoid has a top base of 20 cm, a bottom base of 30 cm, and both legs are 13 cm long. The perimeter of the robot's head is 112 cm.

$$P = (13 \times 4) + (30 \times 2)$$

$$= 52 + 60$$

$$= 112$$



Challenge

- ★ A toy truck is shown as in the figure. The red trapezoid has a top base of 6 cm, a bottom base of 14 cm, a height of 6 cm, and a slanted side of 10 cm. The rectangle has a length of 18 cm, and the radius of the circles is 3 cm. The perimeter of the truck is 1.0968 m. ($\pi = 3.14$)

$$P = (18 \times 2) + 6 + 10 + 14 + 6 + (2 \times 2 \times 3 \times \pi)$$

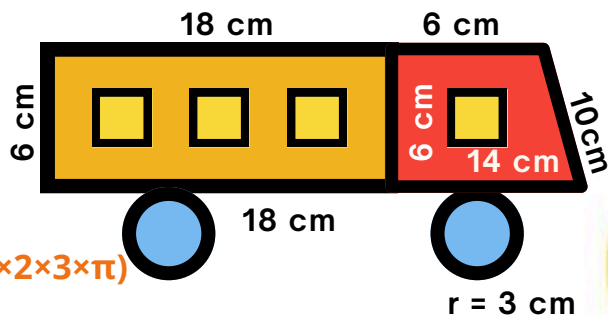
$$= 36 + 36 + 12\pi$$

$$= 72 + 12\pi$$

$$= 72 + 12 \times 3.14$$

$$= 109.68 \text{ (cm)}$$

$$109.68 \text{ cm} = 1.0968 \text{ m}$$



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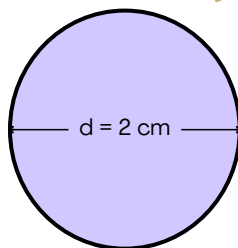


Area of 2-D Figures

Answer

- ★ The area of a circle with a diameter of 2 cm is π cm². π or 3.14

$$\begin{aligned} A &= \pi (d \div 2)^2 \\ &= \pi \times 1^2 \\ &= \pi \end{aligned}$$

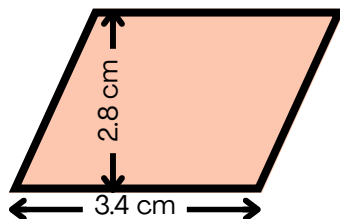


- ★ A rhombus has diagonals of 5 cm and 6 cm. Its area is 15 cm².

$$\begin{aligned} A &= (5 \times 6) \div 2 \\ &= 15 \end{aligned}$$

- ★ The area of the parallelogram in the figure is 9.52 cm².

$$\begin{aligned} A &= 3.4 \times 2.8 \\ &= 9.52 \end{aligned}$$



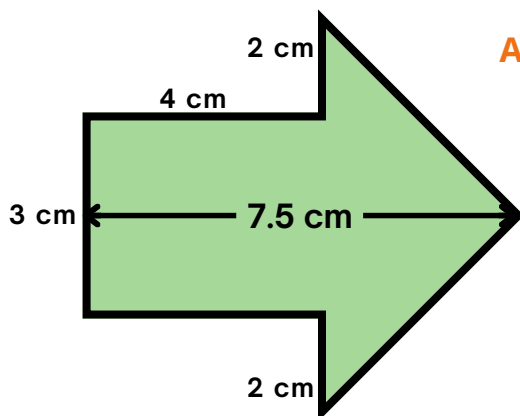
- ★ A rectangle has a length of 3.2 cm, and its width is half of the length. The area of the rectangle is 5.12 cm².

$$\begin{aligned} A &= 3.2 \times (3.2 \div 2) \\ &= 3.2 \times 1.6 \\ &= 5.12 \end{aligned}$$

Area of Combined Shape

- ★ The area of the road sign is 24.25 cm².

$$\begin{aligned} A &= (3 \times 4) + (2 + 3 + 2) \times (7.5 - 4) \div 2 \\ &= 12 + 12.25 \\ &= 24.25 \end{aligned}$$



$$\begin{aligned} A &= [(30 + 20) \times (24 \div 2) \div 2] \times 2 \\ &= 600 \end{aligned}$$

- ★ A robot's head is composed of two trapezoids. Each trapezoid has a top base of 20 cm and a bottom base of 30 cm. The height of the robot's head is 24 cm. The area of the robot's head is 600 cm².



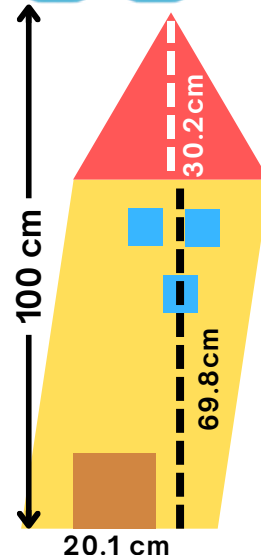
Challenge

As shown in the figure, building blocks are stacked to form a house resembling the Leaning Tower of Pisa. The base of the triangle is 20.1 cm, and its height is 30.2 cm. The total height of the figure is 1 meter. The area of the house is 1706.49 cm².

$$\begin{aligned} A_1 &= 20.1 \times 30.2 \div 2 \\ &= 303.51 \end{aligned}$$

$$\begin{aligned} A_2 &= (100 - 30.2) \times 20.1 \\ &= 69.8 \times 20.1 \\ &= 1402.98 \end{aligned}$$

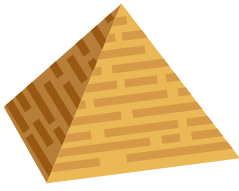
$$\begin{aligned} A_1 + A_2 &= 303.51 + 1402.98 \\ &= 1706.49 \end{aligned}$$



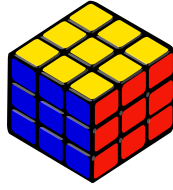
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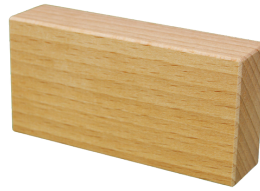
Surface Area of 3-D Figures

 Classification-Name the Shape


Rectangular Pyramid



Cube



Cuboid



Sphere/Ball



Cylinder



Cone



Cube



Triangular Prism

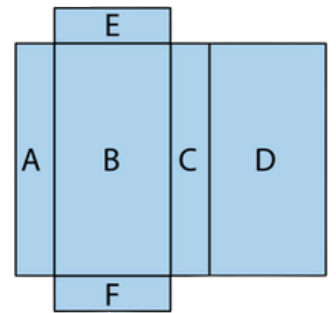
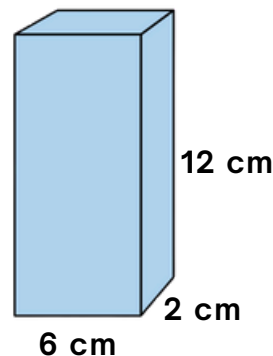
 Calculate the Surface Area

★ The rectangular prism below has a length of 6 cm, a width of 2 cm, and a height of 12 cm.
 The area of A = the area of C = 24 cm²
 The area of B = the area of D = 72 cm²
 The area of E = the area of F = 12 cm²

$$A=C=12 \times 2=24$$

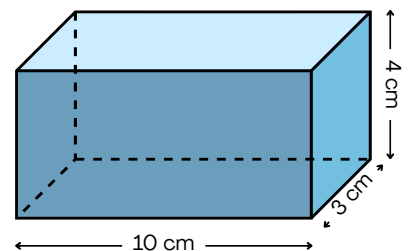
$$B=D=6 \times 12=72$$

$$E=F=6 \times 2=12$$



★ The surface area of the rectangular prism is 164 cm².

$$\begin{aligned} A &= 2 \times ((10 \times 3) + (3 \times 4) + (10 \times 4)) \\ &= 2 \times (30 + 12 + 40) \\ &= 2 \times 82 \\ &= 164 \end{aligned}$$



★ The surface area of a cube is 8.64 cm². Its edge length is 1.2 cm.

$$L^2 = 8.64 \div 6 = 1.44$$

$$L = 1.2$$

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PreA Teacher Jia Ming
Insightful & Dynamic

Surface Area of 3-D Figures

- ★ The diameter of the base of a cylinder is 5.5 cm and its height is 16 cm. Its surface area is 323.81 cm². ($\pi = 3.14$; round your answer to two decimal places.)

$$S = 2\pi r^2 + 2\pi rh$$

$$R = 5.5/2 = 2.75$$

$$H = 16$$

$$S = [2\pi \times (2.75)^2] + (2\pi \times 2.75 \times 16)$$

$$= 15.125\pi + 88\pi$$

$$= 103.125\pi$$

$$S = [2\pi \times (2.75)^2] + (2\pi \times 2.75 \times 16)$$

$$= 15.125\pi + 88\pi$$

$$= 103.125\pi$$

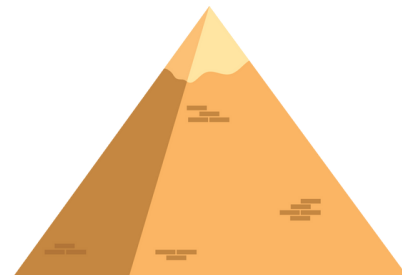
$$= 323.81$$

- ★ An artist builds a sculpture shaped like a regular square pyramid. The base edge is 24 cm and the height of the lateral face is 13 cm. The surface area of the sculpture is 1200 cm².

$$\text{Base area} = 24 \times 24 = 576$$

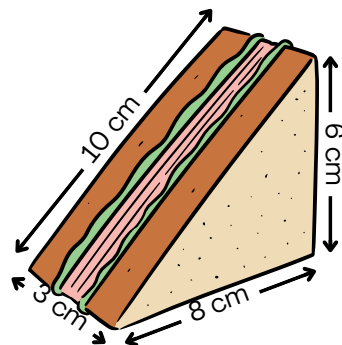
$$\text{Lateral area} = 4 \times \frac{1}{2} \times 24 \times 13 = 624$$

$$\text{Surface area} = \text{Base area} + \text{Lateral area} = 576 \text{ cm}^2 + 624 \text{ cm}^2 = 1200 \text{ cm}^2$$



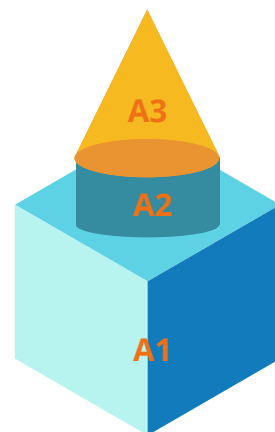
- ★ A sandwich is cut into a shape like a triangular prism. The ends are triangles with side lengths 6 cm, 8 cm, and 10 cm, with the 6 cm and 8 cm sides perpendicular to each other. The sandwich is 3 cm long. The surface area of the sandwich is 120 cm².

$$\begin{aligned} \text{Total surface area} &= \text{Area of bases} + \text{Area of sides} \\ &= (\frac{1}{2} \times 8 \times 6) \times 2 + 3 \times (6 + 8 + 10) \\ &= 120 \text{ (cm}^2\text{)} \end{aligned}$$



Challenge

- ★ Mia is building a colorful block tower with her favorite toy blocks. She uses three different shapes: a cube at the bottom, a cylinder in the middle, and a cone on top. The cube has an edge length of 8 cm. The cylinder's base has a radius of 4 cm and a height of 6 cm, and it sits perfectly on top of the cube. The cone has the same base as the cylinder, and its slant height is 10 cm. The cone is placed exactly on top of the cylinder. The total surface area of the tower is 610.08 (or 384+72π) cm². ($\pi = 3.14$)



$$A1 = (6 \times 8 \times 8) - (\pi \times 4^2) = 384 - 16\pi \approx 333.76$$

$$A2 = (\pi \times 8) \times 6 = 48\pi \approx 150.72$$

$$A3 = 4\pi \times 10 = 40\pi \approx 125.6$$

$$\text{Total} = 333.76 + 150.72 + 125.6 = 610.08$$

$$\text{Or total} = (384 - 16\pi) + 48\pi + 40\pi = 384 + 72\pi$$

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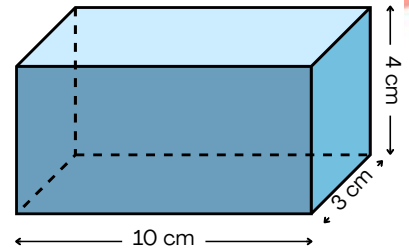


Volume of 3-D Figures

 Calculate the Volume

★ The volume of the rectangular prism is 120 cm^3 .

$$P = 10 \times 3 \times 4 = 120$$



★ The volume of a cube is 27 cm^3 . Its edge length is 3 cm.

$$l^3 = 27$$

$$l = 3$$

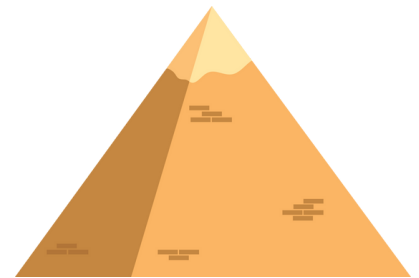
★ The diameter of the base of a cylinder is 5.5 cm and its height is 16 cm. Its volume is 379.94 cm^3 . ($\pi = 3.14$)

$$V = 3.14 \times (5.5 \div 2) \times (5.5 \div 2) \times 16 = 379.94$$

★ An artist builds a sculpture shaped like a regular square pyramid. The length of the base edge is 24 cm and the height of the sculpture is 13 cm. The volume of the sculpture is 2496 cm^3 .

$$A = 24 \times 24 = 576$$

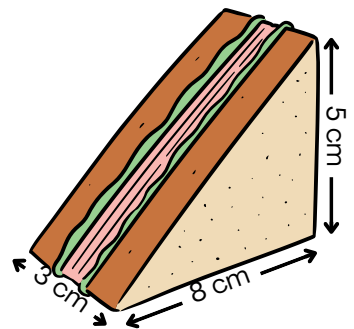
$$V = (576 \times 13) \div 3 = 2496$$



★ A sandwich is cut into a shape like a triangular prism. The ends are triangles with base 8 cm and height 5 cm, and the sandwich is 3 cm long. The volume of the sandwich is 60 cm^3 .

$$A = (8 \times 5) \div 2 = 20$$

$$V = 20 \times 3 = 60$$



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PreA Teacher Alice Li
Supportive & Responsible

Volume of 3-D Figures

- ★ The radius of a sphere is 2.5 cm. Its volume is 65.42 cm^3 . ($\pi = 3.14$, Round to two decimal places)

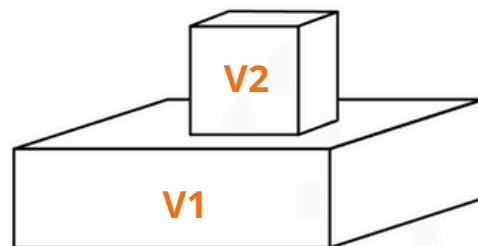
$$V = (4/3) \times 3.14 \times 2.5^3 = 65.42$$

- ★ Emma built a block sculpture using her favorite toy blocks. She stacked a small cube on top of a larger rectangular cuboid. The rectangular cuboid at the bottom has a length of 12 cm, a width of 8 cm, and a height of 5 cm. The cube on top has an edge length of 4 cm and sits perfectly on the center of the cuboid. The total volume of Emma's block sculpture is 544 cm^3 .

$$V1 = 12 \times 8 \times 5 = 480$$

$$V2 = 4 \times 4 \times 4 = 64$$

$$V1 + V2 = 480 + 64 = 544$$

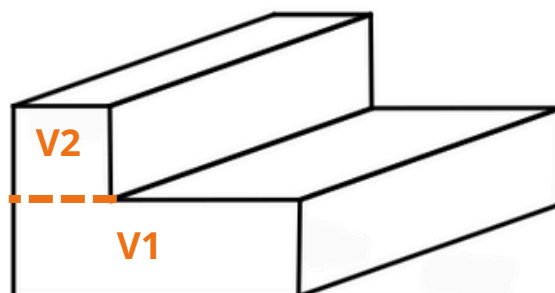


- ★ Olivia built a stepped block structure using her toy blocks. The structure consists of two rectangular cuboids stacked in a stair-like shape. The lower cuboid has a length of 14 cm, a width of 6 cm, and a height of 4 cm. The upper cuboid has the same length (14 cm) and height (4 cm) as the lower cuboid, but its width is 2 cm. The total volume of Olivia's block structure is 448 cm^3 .

$$V1 = 14 \times 6 \times 4 = 336$$

$$V2 = 14 \times 2 \times 4 = 112$$

$$V1 + V2 = 336 + 112 = 448$$



Challenge

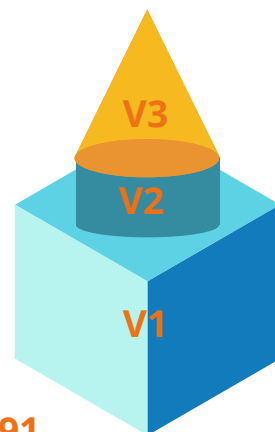
- ★ Mia is building a colorful block tower with her favorite toy blocks. She uses three different shapes: a cube at the bottom, a cylinder in the middle, and a cone on top. The cube has an edge length of 8 cm. The cylinder's base has a radius of 4 cm and a height of 6 cm, and it sits perfectly on top of the cube. The cone has the same base as the cylinder, and its height is 10 cm. The cone is placed exactly on top of the cylinder. The volume of the tower is 980.91 cm^3 . ($\pi = 3.14$, Round to two decimal places)

$$V1 = 8 \times 8 \times 8 = 512$$

$$V2 = 3.14 \times 4 \times 4 \times 6 = 301.44$$

$$V3 = (3.14 \times 4 \times 4 \times 10) \div 3 = 167.47$$

$$V1 + V2 + V3 = 512 + 301.44 + 167.47 = 980.91$$



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PreATeacher Regina
Passionate & Responsible

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