

Circles, Area, Surface Area and Volume: math practice, Grade 7 – download the PDF

22 problems graded by difficulty (★ easy, ★★ medium, ★★★ hard). Try first, without looking at the solutions!

1 Radius or diameter?



Complete each statement.

- a. A circle has a diameter of 14 cm, so its radius is ____.
- b. A circle has a radius of 2.5 in, so its diameter is ____.
- c. A circle has a diameter of 9 ft, so its radius is ____.

2 Fencing a pond



A circular pond has a diameter of 12 m. A fence will go all the way around it. How long is the fence? Use $\pi \approx 3.14$.

3 A small circle



Find the area of a circle with a radius of 5 cm. Use $\pi \approx 3.14$.

4 Triangle and parallelogram



- a. A triangle has a base of 14 in and a height of 9 in. Find its area.
- b. A parallelogram has a base of 11 cm and a height of 6 cm. Find its area.

5 True or false?



Say whether each statement is true or false, and justify your answer.

- a. If you double the radius of a circle, its area is doubled. (Test with $r = 3$ and $r = 6$, using $\pi \approx 3.14$.)
- b. The circumference of a circle is a little more than three times its diameter.
- c. The diameter of a circle is half of its radius.

6 Aquarium volume



A rectangular aquarium is 24 in long, 10 in wide and 12 in tall. What is its volume?

7 Wrapping a cube



A gift box is a cube with edges of 5 cm. How much wrapping paper is needed to cover it exactly, with no overlap?

8 Trapezoid garden bed



A garden bed is a trapezoid. Its parallel sides measure 7 m and 13 m, and the distance between them is 5 m. Find its area.

9

Bicycle wheel

The wheel of a bicycle has a diameter of 26 in. How far does the bike travel when the wheel makes 50 full turns? Give the answer in inches and in feet, to the nearest tenth. Use $\pi \approx 3.14$.

10

From circumference to radius

A circular table has a circumference of 47.1 cm in a scale model. Find its diameter and its radius. Use $\pi \approx 3.14$.

11

Which pizza deal?

A pizzeria sells one 12-inch pizza, or two 8-inch pizzas for the same price. (The size is the diameter.) Which choice gives more pizza? By how much? Use $\pi \approx 3.14$.

12

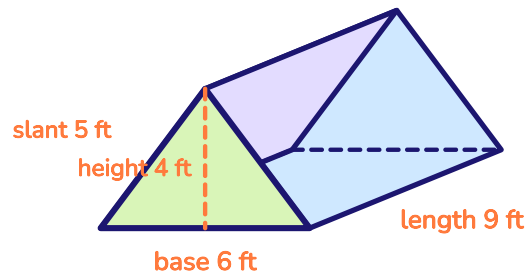
Garden with a pond

A rectangular garden is 15 m long and 8 m wide. A circular pond of radius 2 m is in the middle of it. How much of the garden is not covered by the pond? Use $\pi \approx 3.14$.

13 Tent fabric



A tent is a right triangular prism lying on one of its rectangular faces. Each triangular end has a base of 6 ft and a height of 4 ft, and its two slanted sides measure 5 ft each. The tent is 9 ft long. The floor is also made of fabric. How many square feet of fabric are needed in all?



14 Volume of a ramp



A wooden ramp is a right prism whose base is a triangle with a base of 10 cm and a height of 6 cm. The prism is 15 cm tall. Find its volume.

15 A pyramid-shaped box



A square pyramid has a base side of 10 cm and a slant height of 13 cm. Find its surface area.

16 Find the missing measurement

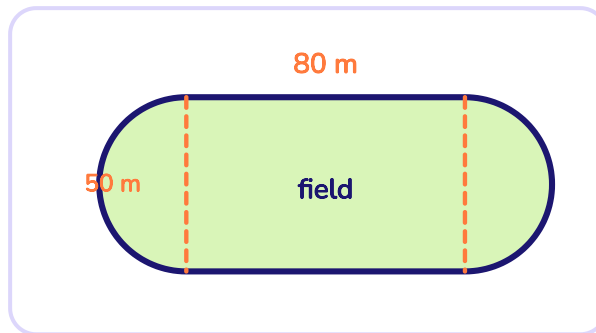


- A parallelogram has an area of 84 cm^2 and a base of 12 cm. Find its height.
- A triangle has an area of 45 in^2 and a height of 9 in. Find its base.

17 The sports field

★★★

A sports field is a rectangle 80 m long and 50 m wide with a semicircle added at each short end (the diameter of each semicircle is the 50 m side). Use $\pi \approx 3.14$.



- Find the distance around the field.
- Find the area of the field.
- A runner jogs 3 times around the field. How far does the runner go?

18 Path around a fountain

★★★

A round fountain has a radius of 4 m. A circular stone path 1.5 m wide goes all the way around it. Find the area of the path to the nearest tenth of a square meter. Use $\pi \approx 3.14$.

19 Filling a water tank

★★★

A rectangular water tank is 2 m long, 1.5 m wide and 1.2 m tall. A pump fills it at 45 liters per minute, starting from empty. (Recall $1 \text{ m}^3 = 1,000 \text{ L}$.)

- Find the volume of the tank in cubic meters.
- How many liters does it hold?
- How many minutes does the pump need to fill it?

20 A box without a lid

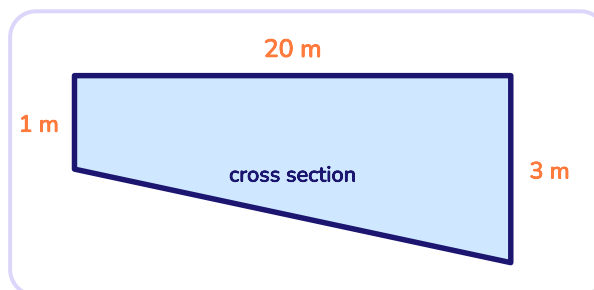
★★★

A cardboard storage box is a rectangular prism 30 cm long, 20 cm wide and 15 cm tall. It has a bottom but **no lid**. How much cardboard is used? Show every face you count.

21 Swimming pool

★★★

The cross section of a pool is the trapezoid below. The pool is 20 m wide, 1 m deep at the shallow end and 3 m deep at the deep end. The pool is 10 m long, so it is a right prism whose bases are the trapezoids.



- Find the area of the trapezoid.
- Find the volume of the pool.
- How many liters of water does it hold when full? ($1 \text{ m}^3 = 1,000 \text{ L}$)

22 Find the error

★★★

A student must find the area of a circle with a diameter of 10 cm. The student writes:

$$A = 3.14 \times 10^2 = 314 \text{ cm}^2.$$

- Explain the mistake.
- Give the correct area.
- By what factor was the student's answer too large?



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