[5th Kyu] Section 2: Application Test

1 Kevin weighs 52.5 kg.

(1) Kevin's brother weighs 1.2 times more than Kevin. Find Kevin's brother's weight, in kg. Include units in your answer.

(2) Kevin's sister weighs 42 kg. How many times heavier is Kevin's sister than Kevin?

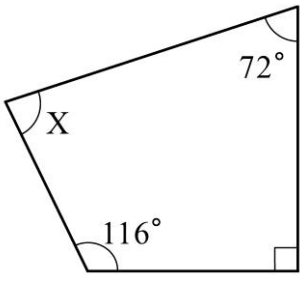
2 There are 80 students in Jim's grade.

(3) 36 students in Jim's grade are girls. What percent of students in Jim's grade are girls?

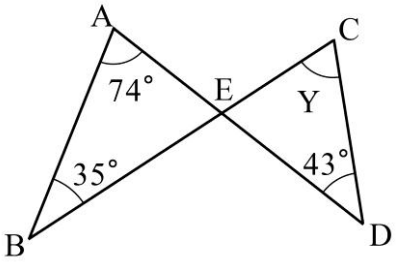
(4) In Jim's grade, 15 % of students belong to a soccer club. How many students belong to the soccer club?

3 In the following figures, find angles X and Y by calculating. Include units in your answer.

(5) Quadrilateral

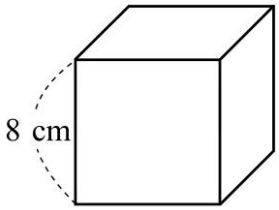


(6) Line segments AD and BC cross at E

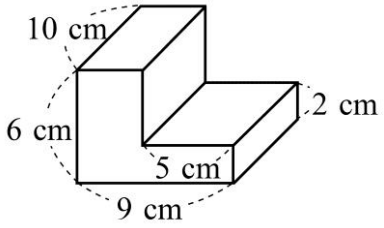


4 Find the volume, in cm^3, of each of the following figures. Include units in your answer.

(7) Cube



(8) Solid made up of rectangular prisms



5 Researchers made a guideline for physical activities using two measurements.
The metabolic equivalent of task (MET) is used as a unit expressing the intensity of physical activities as multiples of resting metabolic rate. The exercise (Ex) is used as a unit expressing the quantities of physical activities. The relationship between MET and Ex is

$$1\,\text{Ex} = 1\,\text{MET} \times 1\,\text{hour}.$$

Doing physical activities with 23 Exs or more in a week is thought to be good for health. For example, if you do physical activities of 4 METs for 2 hours, the Exs you consume is calculated by

$$4\,\text{METs} \times 2\,\text{hour} = 8\,\text{Exs}.$$

The table on the right shows the relationship between various physical activities and the corresponding physical intensity (MET). Physical activities are divided into two parts, sports and life activities.

METs	Physical activities	
	Sports	Life activities
3	Bowling	Walking
4	Ping-pong	Cycling
5	Baseball	Playing with animals (running)
6	Basketball	Moving furniture
7	Tennis	
8	Swimming	Going up stairs

(9) How many Exs do you consume when you move furniture for 2 hours?

(10) Linda swims for 1 hour and plays basketball for 5 hours in a week. Find the total amount, in Exs, of physical activities she consumes in a week from the two activities.

(11) Emily planned to consume 23 Exs in a week by playing tennis and ping-pong. If she plays tennis for 1 hour in a week, at least how many hours does she have to play ping-pong for in a week? Include units in your answer.

6 There are several identical nails in a box. 50 nails weigh 140 g.

(12) Find the weight, in g, of 200 nails. Include units in your answer.

(13) The total weight of all the nails in the box is 2800 g. How many nails are in the box? Write the steps leading to your answer.

7 Charlie gives candies to his friends. When he gives 8 candies to each of them, 11 candies are left over. Let x be the number of friends he has.

(14) Express the total number of candies using x. (*Expression skill*)

(15) When he gives 8 candies to each of his friends, 11 candies are left over. When he gives 10 candies to each of his friends, he is 5 candies short. Write the equation using x. (*Expression skill*)

(16) Find the number of friends he has.

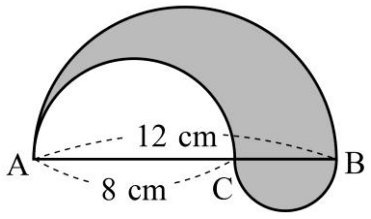
8 In the diagram on the right, each number from 1 to 16 is assigned to each of the 16 squares so that the sum of the 4 numbers in any row, column or diagonal is the same. (This kind of square is called a magic square) Seven numbers are already assigned. (*Organizing skill*)

a	14	15	b
12	c	6	d
e	f	10	g
h	i	3	16

(17) Find the sum of four numbers in a row, column or diagonal.

(18) Find the numbers for a and h.

9 In the diagram on the right, point C lies on segment AB such that $AB = 12\,\text{cm}$ and $AC = 8\,\text{cm}$. There are three semicircles whose diameters are segments AB, AC and BC, respectively. Include units in your answer and use π for the ratio of the circumference of a circle to its diameter.



(19) Find the area, in cm^2, of the semicircle of diameter 12 cm.

(20) Find the area, in cm^2, of the shaded part. Write the steps leading to your answer.