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Note : Do NOT fill anything above this line.

Examinee's Number					
Name					

2023 General Admission Examination
period I , method A , version 2
(Arithmetic)
<Question Paper>

***** Precaution *****

1. Do NOT open this Question paper until the examiner has announced the start of the examination.
2. This Question paper contains questions 1 to 8. There is also one Answer Sheet on a separate sheet. If the printout is unclear or any pages are missing , please raise your hand to inform the examiner.
3. Please write your Examinee's Number and Name in the designated boxes on the Answer Sheet and on this cover sheet.

1 Fill in the blanks.

$$(1) 4 \times 3 \times 3 \times 3 + 324 \times 3 - 72 \times 3 \times 3 = \square$$

$$(2) \frac{3}{10} \times \frac{2}{9} \times \frac{1}{8} + \frac{3}{10} \times \frac{7}{9} \times \frac{2}{8} + \frac{7}{10} \times \frac{3}{9} \times \frac{2}{8} + \frac{7}{10} \times \frac{6}{9} \times \frac{3}{8} = \square$$

$$(3) \left(\frac{22}{7} - \frac{157}{50} \right) - \left(\frac{223}{71} - \frac{157}{50} \right) = \square$$

$$(4) \frac{1}{7} + \frac{1}{17} + \frac{2}{289} = \square$$

$$(5) \left(2 - \square \right) \div (2 \div 3) = \frac{5}{6}$$

$$(6) \square \text{ kg} - 3000 \text{ mg} = 2.7 \text{ g}$$

2 Fill in the blanks.

(1) When the earth makes exactly one rotation per day, it rotates degrees per minute.

(2) Travelling from the school to the station at 40 km/h and back from the station to the school on the same road at 60 km/h took a total of 10 minutes. The distance from the station to the school is meters.

(3) When the distance between point A and point B is 16 cm on a 1 : 25,000 map, the actual distance is km.

(4) When calculating the 100th power of 2, the number in the first place is .

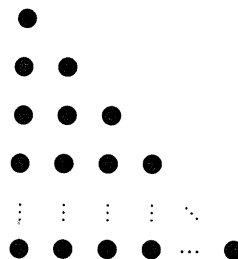
(5) Mr. A took the Japanese, Math, Science and Social Studies test. The average score for Japanese and math was 84, for math and science was 93, for science and social studies was 87, and for social studies and Japanese was 78. In this case, the average score for Japanese, math, science, and social studies is points.

(6) There are 4 types of sandwiches and 7 types of beverages. When choosing 1 type of sandwich and 1 type of beverage, there are ways to choose.

(7) When a salt solution with a concentration of % and a salt solution with a concentration of 8 % are mixed in the ratio of 1 : 2, a 6 % salt solution is produced.

(8) Stones are arranged in a triangle as shown in the figure. When 27 stones are lined up around the perimeter of the triangle, the total number of stones is .

< Figure >

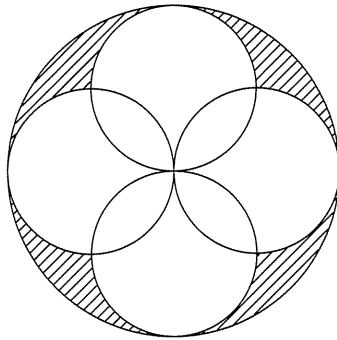


3 (1) From the sentences ① to ⑤, choose all the sentences that are correct.

- ① Pi is the ratio of the circumference of a circle to its diameter.
- ② The circumference of a circle is directly proportional to its diameter.
- ③ The area of a circle is directly proportional to its radius.
- ④ When the radius of a circle doubles, its circumference doubles.
- ⑤ When the radius of a circle doubles, its area doubles.

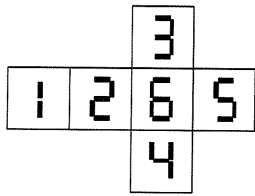
(2) As shown in the figure below, there are four circles of radius 1 cm inside a circle of radius 2 cm, and these four circles intersect at the center of the circle of radius 2 cm. Find the shaded areas. Assume that pi is 3.14.

< Figure >

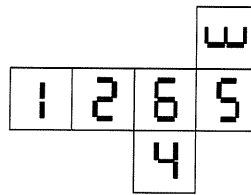


4 (1) Of the following four cubic nets, only one is different from the other three. Answer which one it is.

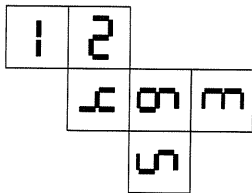
①



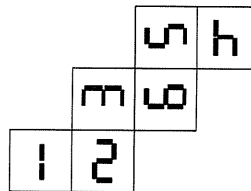
②



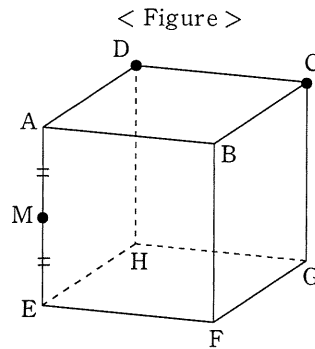
③



④



(2) In the cube shown in the figure, point M is the midpoint of side AE. What figure is made by the plane passing through points C, D, and M?



5 The maximum weight (in grams) of water vapor contained in one cubic meter of air varies with the temperature (in degrees Celsius) as shown in the table below.

Temperature	0	10	20	30	40
Maximum weight of water vapor	4.9	9.4	17.3	30.4	51.2

In addition, "humidity", which expresses the degree of moisture in the air at a given temperature, can be obtained using the following equation.

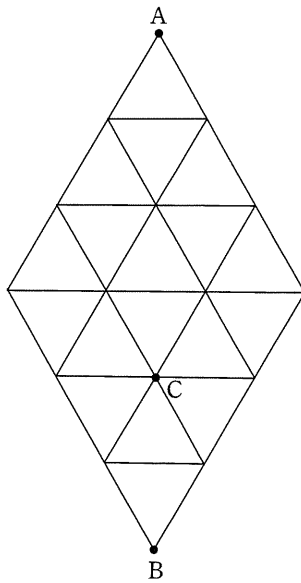
$$\text{Humidity(\%)} = \frac{\text{Weight of water vapor contained in 1 m}^3 \text{ of air(g)}}{\text{Maximum weight of water vapor(g)}} \times 100$$

- (1) How many grams of water vapor are contained in one cubic meter of air when the temperature is 10°C and the humidity is 30%?
- (2) The temperature is 30°C and the humidity is 40%. If the temperature is lowered to 20°C without changing the amount of water vapor in the air, what is the humidity? Answer correct to one decimal place.

6 The path is shown in the figure below. All paths are sides of an equilateral triangle. Answer the following questions.

- (1) How many shortest distances are there in total to go from point A to B?
- (2) How many shortest distances are there in total to go from point A to B without passing point C?

<Figure>



7 The following numbers are in sequence.

1, 1.5, 2, 2.25, 2.5, 2.75, 3, 3.125, 3.25, 3.375, 3.5, 3.625, 3.75, 3.875, 4, ...

Fill in the blanks.

(1) The number "6" appears as the th number counting from the left.

(2) The sum of the numbers greater than "5" and less than "6" is .

8 Explain why the sum of three consecutive integers (e.g., 1, 2, 3, etc.) is a multiple of 3.