Ritsumeikan Uji Junior High School IP Course Diagnostic Exam – Year 1

Introduction

Students come into the IP Course from all parts of the world, at all levels of English, as well as at various levels of mathematics proficiency. Rather than picking any country's standard of math at this grade level, the IPC Mathematics department has decided to test on the content that is most relevant to students entering the IP Course. That content is outlined in the following pages and there are example problems for each topic tested.

In addition, examinees are responsible for interpreting mathematical symbols and units where notation and measurements may be different from standards students are used to. Some examples of different issues students may encounter include:

- Comma usage, or their absence, for large numbers, e.g.,
  $$1\ 000\ 000 = 1000000 = 1{,}000{,}000$$
- Period usage and leading zeroes for decimals, e.g., $0.01 = .01$
- Units and their abbreviations ("kilograms" becomes "kg", "centimeters" becomes "cm", etc). Understanding the units will generally not affect whether the student can answer the problem.

Furthermore, effort is made to try and simplify the vocabulary used in word problems, but students are expected to understand mathematical vocabulary appropriate of this grade level. Many of the examples below illustrate this point.

Last, the exam is 16 two-mark questions and 6 three-mark questions, totaling to 50 marks. Students have 25 minutes to finish the math portion of the IPC diagnostic exams, averaging to a little over 1 minute per question. If a student finds themselves spending too much time on one question, they are encouraged to skip it and come back to it later provided there is time remaining.

Topic 1 – Fractions, Decimals, and Percentages

This is the largest section of the test, making up roughly 40% of the exam. Students should be able to convert between the three systems titled above and be able to evaluate operations with numbers in any of the forms.

Example problems:

1) What percent of the rectangle below is shaded?

2) Evaluate the following:

   a) $8.1 \div \frac{9}{100}$ b) $\frac{1}{2} + \frac{2}{3} \times \frac{5}{6}$ c) 9.99×5.0

3) Find 50% of $\frac{5}{7}$. Write your answer as a fraction.

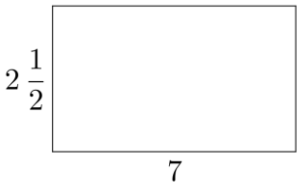
4) Order the numbers from least to greatest: 50%, 0.51, $\frac{49}{1000}$

Topic 2 – Geometry

The geometry section is a relatively small portion of the test, covering roughly 10% of the exam, and will test on area, surface area, perimeter, and volume of simple shapes.

Example problems:

1) Find the perimeter and area of the rectangle below:



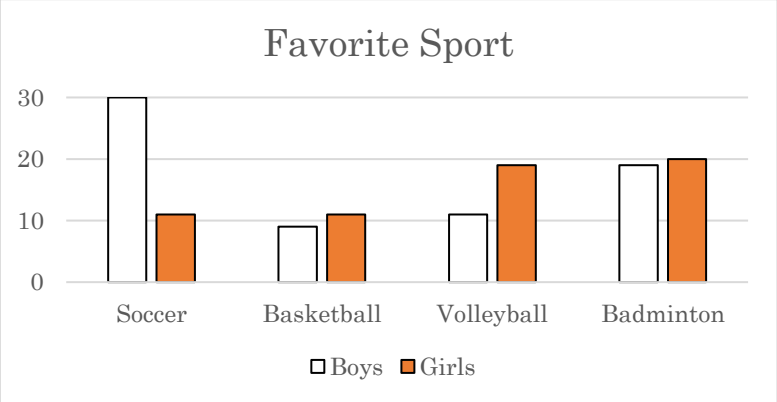
2) If a die has a side length of 1 cm then what is the surface area and volume of the die?

Topic 3 – Statistics and Probability

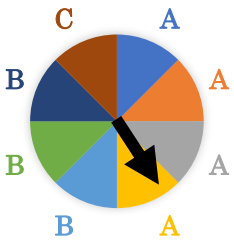
This section is also a relatively small portion of the test, covering roughly 15% of the exam, and focuses on reading charts, reading data sets, and simple probability.

Example problems:

1) *Approximately* how many students participated in the survey given below?



2) Given the spinner pictured to the right, find the probability that the spinner lands on a space with the letter A. Note that each space of the spinner is equal in shape and size. Simplify your answer if written as a fraction.



Topic 4 – Number Systems and Patterns

The last topic the test covers is on number systems and patterns. This is the second largest section of the test, making up roughly 35% of the exam. It is comprised of problems that deal with the four basic operators, put into the form of word problems, as well as patterns problems.

Example problems:

1) Find the next number in the pattern: $1, 1, 2, 3, 5, 8, \_\_\_\_$.
2) Given a starting number of 2 and a rule of "multiply by 2", write the first three numbers in the sequence.
3) If you add the same number together three times and then multiply that sum by 3, you get 36. What is the original number?
4) A box of chocolate has 4 chocolate pieces, and Sally bought 12 boxes. If she has 8 classmates she is giving the chocolate to, and she gives the chocolate out equally, how many pieces of chocolate will each classmate receive?

Solutions

Topic 1

1. 70%
2. A) 90 B) $\frac{19}{18}$ or $1\frac{1}{18}$ or $1.0\overline{5}$ C) 49.95
3. $\frac{5}{14}$
4. $\frac{49}{1000}$, 50%, 0.51 or $0.049, 0.5, 0.51$

Examiner's note: credit will be given for any form of an answer (decimal, fraction, percentage, or mixed number), unless directed to answer in a specific form.

Topic 2

1. $P = 19$ and $A = 17.5$
2. $SA = 6$ and $V = 1$

Examiner's note: the answer sheets will already include the correct units for any problems that have them, so students do not need to concern themselves with that aspect of the problem.

Topic 3

1. 130
2. $\frac{1}{2}$ or 50% or 0.5

Examiner's note: students may be asked to simplify an answer, and if given that direction no credit will be awarded otherwise.

Topic 4

1. 13
2. $2, 4, 8$
3. 4
4. 6