



These questions are for students in **Year 10**

Please ensure you have the right question booklet for your year level.

INSTRUCTIONS TO CANDIDATES

Please read the following Instructions carefully before you begin.

1. You have a maximum of **fifty minutes** to attempt any number of the questions in this booklet.
2. Each question is worth 1 mark. You will NOT be penalised for incorrect answers.
3. Your answer for each question should be recorded on the provided form. Answers not put onto this form will **not be marked**.
4. Please ensure your name, year, and school are recorded on the provided form.
5. Calculators and scrap paper are permitted, but textbooks are NOT allowed. Otherwise normal examination conditions apply.
6. Diagrams are not necessarily to scale nor accurate.

Note: There are **4** pages in this question booklet — this instruction page and **3** pages of questions.

DEFINITIONS

- A prime number has exactly two factors: itself and 1. The first ten prime numbers are 2, 3, 5, 7, 11, 13, 17, 19, 23, and 29.
- A number greater than 1 that is not a prime number is a composite number.

An online stationery store sells pencils, pens, erasers and notebooks. The price of each item is stored in the following table:

Item	Sale Price
Pencil	10c
Pen	15c
Eraser	20c
Notebook	\$1.50

(1) Deborah buys one of each item. How much does she spend?

- (A) \$1.25 (B) \$1.60 (C) \$1.95 (D) \$2.10

(2) Liam spends \$2.10 on some pens and pencils. He buys four times as many pens as he does pencils. How many pencils does Liam buy?

- (A) 3 (B) 4 (C) 6 (D) 12

(3) The store is considering increasing the price of notebooks by 10%. Assuming they sell 6 notebooks per day, how much more money would they make in May, June, and July if they made this change at the start of 2026?

- (A) \$82.80 (B) \$96.00 (C) \$124.20 (D) \$240.50

(4) What is the value of $\frac{1+2+3+4}{5+6+7+8}$ as a simplified fraction?

- (A) $\frac{5}{8}$ (B) $\frac{2}{13}$ (C) $\frac{10}{26}$ (D) $\frac{5}{13}$

(5) What is the value of $\frac{1}{5} + \frac{2}{6} + \frac{3}{7} + \frac{4}{8}$ as a simplified fraction?

- (A) $\frac{307}{210}$ (B) $\frac{28}{31}$ (C) $\frac{333}{280}$ (D) $\frac{39}{28}$

Seventeen students taking a high school maths test have the following scores: 18, 18, 34, 37, 40, 48, 48, 48, 58, 59, 68, 68, 73, 73, 78, 82, 85

(6) Which of the following is the median of the students' test scores?

- (A) 48 (B) 58 (C) 59 (D) 62

(7) Which of the following is the mode of the students' test scores?

- (A) 18 (B) 48 (C) 55 (D) 68

(8) What was the mean test score?

- (A) 55 (B) 58 (C) 62 (D) 65

(9) A student taking the test late increases the mean test score by 1 point. What score did this student get?

- (A) 56 (B) 62 (C) 68 (D) 73

In physics, the half life of a decaying substance is the time it takes to reduce to half its initial quantity. A certain radioactive substance, Zn-71, has a half-life of 2.4 minutes.

(10) How much of a 100 g initial sample of Zn-71 would be left after 7.2 minutes?

- (A) 25 g (B) 12.5 g (C) 10 g (D) 6.25 g

(11) How long would it take for a 48 g sample of Zn-71 to decay to 3 g?

- (A) 4.8 minutes (B) 7.2 minutes (C) 9.6 minutes (D) 12 minutes

(12) An unknown quantity of the Zn-71 is placed in a box for 12 minutes. Afterwards, the remaining quantity of Zn-71 is found to weigh 5 g. How much Zn-71 was there when it was initially placed in the box?

- (A) 100 g (B) 160 g (C) 320 g (D) 400 g

Jenny is making a patchwork quilt out of blocks of fabric. She has a central piece that is 80 cm wide and 100 cm long. She wants to surround the central piece with a border of fabric squares which are each 20 cm wide.

(13) What is the area of the central piece in m^2 ?

- (A) $0.08 m^2$ (B) $0.8 m^2$ (C) $8 m^2$ (D) $8000 m^2$

(14) How many square blocks does Jenny need to make her border?

- (A) 18 (B) 20 (C) 22 (D) 24

Jenny wants to sew a piece of fabric to the back of the quilt that is exactly the same size as her design, including the border.

(15) What area will her piece of fabric need to be, in cm^2 ?

- (A) 8400 cm^2 (B) 9600 cm^2 (C) 12000 cm^2 (D) 16800 cm^2

Jed is running on a treadmill. He starts by walking at 6 km/h. After 20 minutes, he increases his speed to 12 km/h and runs for another 40 minutes.

(16) What distance did Jed travel on the treadmill in total?

- (A) 10 km (B) 12 km (C) 12.8 km (D) 14 km

(17) What was Jed's average speed in kilometres per hour (km/h)?

- (A) 8 km/h (B) 9 km/h (C) 10 km/h (D) 11 km/h

Daniel is also running on a treadmill. He runs at a constant speed of 8 km/h, then slows down to a speed of 4 km/h. He runs for a total of 36 minutes, and completes a total distance of 4 km.

(18) For how long did Daniel run at 8 km/h?

- (A) 12 minutes (B) 18 minutes (C) 24 minutes (D) 30 minutes

(19) Daniel wants to run 2026 kilometres in 2026. He goes to the gym four times a week, and runs the same number of kilometres each time. How many kilometres should he run each time he goes to the gym if he wants to achieve his goal? Round your answer to one decimal place.

- (A) 6.2 km (B) 7.3 km (C) 8.4 km (D) 9.7 km

Here are a few ways of determining if a number is composite:

- Any even number that is not 2 is composite.
- Any number ending in 5 that is not 5 is composite.
- If the digits of a number greater than 3 add to a multiple of 3, that number must also be a multiple of 3, and thus is composite.

(20) Which of the following numbers is a multiple of 3?

- (A) 31 (B) 36 (C) 41 (D) 46

(21) Which of the following numbers is a multiple of 3?

- (A) 3210 (B) 2468 (C) 1234 (D) 2345

(22) Which of the following numbers is a multiple of 6?

- (A) 2173 (B) 4918 (C) 5034 (D) 6183

(23) One of the following numbers is prime. Which one is it?

- (A) 111 (B) 113 (C) 115 (D) 117

A number is **polite** if it is equal to the sum of two or more consecutive positive integers. A number that cannot be written in this way is called **impolite**. For example, 3 is a polite number because it is the sum of 1 and 2, while 4 is an impolite number because it is not equal to $1 + 2$, $2 + 3$, or $1 + 2 + 3$.

The **politeness** of a number is the number of ways it can be expressed as the sum of two or more consecutive positive integers. For our examples above, 3 has a politeness of 1, while 4 has a politeness of 0.

(24) Which of the following numbers is impolite?

- (A) 5 (B) 6 (C) 7 (D) 8

(25) What is the politeness of 9?

- (A) 0 (B) 1 (C) 2 (D) 3

(26) Which of the following numbers has the largest politeness?

- (A) 26 (B) 27 (C) 28 (D) 29

A cylindrical water tank is leaking water at a constant rate. In two minutes, the height of the water in the tank drops by 15 cm. In the same amount of time, the water that escaped exactly fills a 50 L container. (1 L = 1000 cm³.)

(27) What is the rate of decrease of the height of the water in meters per second? Give your answer to the nearest 2 significant figures.

- (A) 0.15 m/s (B) 0.0125 m/s (C) 0.013 m/s (D) 0.0013 m/s

(28) What is the rate of flow of the water out of the tank in cm³/s? Give your answer to the nearest 2 significant figures.

- (A) 430 cm³/s (B) 420 cm³/s (C) 416 cm³/s (D) 410 cm³/s

(29) What is the radius of the tank in cm? Give your answer to the nearest 2 significant figures.

- (A) 33 cm (B) 32 cm (C) 28 cm (D) 25 cm

(30) The tank is 120 cm tall. What is the total capacity of the tank?

- (A) 150 L (B) 200 L (C) 300 L (D) 400 L

(31) What is the probability that the sum of two six-sided dice rolls is exactly 4?

- (A) $\frac{1}{12}$ (B) $\frac{1}{9}$ (C) $\frac{1}{6}$ (D) $\frac{1}{3}$

(32) What is the probability that after three six-sided dice rolls neither a 2 nor a 6 is rolled?

- (A) $\frac{64}{216}$ (B) $\frac{125}{216}$ (C) $\frac{152}{216}$ (D) $\frac{91}{216}$

(33) Three consecutive one digit integers are a perfect square, a perfect cube and a prime (not necessarily in that order). What is the product of these three integers?

- (A) 60 (B) 210 (C) 336 (D) 504

(34) What is $\frac{2^8}{8^2}$ equal to?

- (A) 2 (B) 4 (C) 16 (D) 64

(35) What is half of 4^{2026} ?

- (A) 2^{2026} (B) 4^{1013} (C) 2^{4051} (D) 2^{1013}

(36) What is the last digit of 3^{2026} ?

- (A) 1 (B) 3 (C) 7 (D) 9

(37) If the side length of an equilateral triangle is r , what is its height?

- (A) $\frac{r}{\sqrt{2}}$ (B) $\frac{\sqrt{3}r}{2}$ (C) $\sqrt{3}r$ (D) $\sqrt{2}r$

(38) What is the external angle of a regular octagon?

- (A) 36° (B) 45° (C) 60° (D) 72°

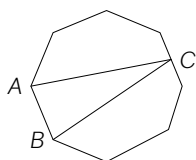


Figure 1

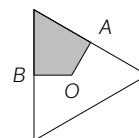


Figure 2

(39) In Figure 1 an isosceles triangle $\triangle ABC$ is constructed inside a regular octagon with a side length of 2 cm, such that A and B form one of the sides of the octagon and C is the middle of the side of the octagon opposite to AB . Which of the following is the closest to the area of $\triangle ABC$?

- (A) 3.73 cm² (B) 4.23 cm² (C) 4.83 cm² (D) 5.14 cm²

(40) In the equilateral triangle seen in Figure 2, A and B represent the midpoints of two sides, while O represents the triangle centre. If the side length of the triangle is 3 cm, which of the following is closest to the area of the shaded region within the triangle?

- (A) 2.60 cm² (B) 1.06 cm² (C) 1.30 cm² (D) 3.62 cm²

(END OF COMPETITION)