INSTRUCTIONS AND INFORMATION

GENERAL
1. Do not open the booklet until told to do so by your teacher.
2. NO calculators, maths stencils, mobile phones or other calculating aids are permitted. Scribbling paper, graph paper, ruler and compasses are permitted, but are not essential.
3. Diagrams are NOT drawn to scale. They are intended only as aids.
4. There are 25 multiple-choice questions, each with 5 possible answers given and 5 questions that require a whole number answer between 0 and 999. The questions generally get harder as you work through the paper. There is no penalty for an incorrect response.
5. This is a competition not a test; do not expect to answer all questions. You are only competing against your own year in your own country/Australian state so different years doing the same paper are not compared.
6. Read the instructions on the answer sheet carefully. Ensure your name, school name and school year are entered. It is your responsibility to correctly code your answer sheet.
7. When your teacher gives the signal, begin working on the problems.

THE ANSWER SHEET
1. Use only lead pencil.
2. Record your answers on the reverse of the answer sheet (not on the question paper) by FULLY colouring the circle matching your answer.
3. Your answer sheet will be scanned. The optical scanner will attempt to read all markings even if they are in the wrong places, so please be careful not to doodle or write anything extra on the answer sheet. If you want to change an answer or remove any marks, use a plastic eraser and be sure to remove all marks and smudges.

INTEGRITY OF THE COMPETITION
The AMT reserves the right to re-examine students before deciding whether to grant official status to their score.
Junior Division

Questions 1 to 10, 3 marks each

1. 2015 + 201.5 equals
   (A) 2036.5  (B) 2116.5  (C) 2225.5  (D) 2216.5  (E) 2115.5

2. The value of $x$ in the diagram is
   \[ \begin{array}{ccc}
   (A) & 100^\circ & (B) 130^\circ \\
   (D) & 120^\circ & (E) 90^\circ
   \end{array} \]
   \[ \begin{array}{ccc}
   (C) & 110^\circ & 30^\circ \ \\
   & & x \ \\
   & & 40^\circ
   \end{array} \]

3. The trip to school takes 23 minutes. I need to be at school at 9:05 am. The latest I can leave home is
   (A) 8:46 am  (B) 8:37 am  (C) 8:52 am  (D) 8:42 am  (E) 8:48 am

4. What is the value of 100 twenty-cent coins?
   (A) $20  (B) $10  (C) $200  (D) $2  (E) $100

5. What is the area of this triangle in square centimetres?
   \[ \begin{array}{ccc}
   (A) & 10 & (B) 12 \\
   (C) & 14 & (D) 7 \\
   & (E) 6
   \end{array} \]

6. When the bell rang, there were 3 teachers and 6 students in the classroom. Several students arrived after the bell. Once everyone had arrived, there were 4 students for every teacher. How many students arrived after the bell?
   (A) 18  (B) 12  (C) 6  (D) 3  (E) 9

7. A movie lasts for $2\frac{1}{3}$ hours. The movie is shown in two equal sessions. For how many minutes does each session last?
   (A) 85  (B) 70  (C) 80  (D) 65  (E) 75
8. Four unit squares are laid out in five different arrangements as shown below. Which one has the largest perimeter?

(A) \hspace{1cm} (B) \hspace{1cm} (C) \hspace{1cm} (D) \hspace{1cm} (E)

9. Ari, Bryce, Cy and Eric are members of our school’s basketball team. Ari is 186 cm tall. He is 14 cm taller than Bryce who in turn is 6 cm shorter than Cy. Eric is 11 cm taller than Cy.

Eric’s height is

(A) 183 cm \hspace{1cm} (B) 205 cm \hspace{1cm} (C) 178 cm
(D) 189 cm \hspace{1cm} (E) 177 cm

10. Ana, Ben, Con, Dan and Eve are sitting around a table in that order. Ana calls out the number 1, then Ben calls out the number 2, then Con calls out the number 3, and so on. After a person calls out a number, the next person around the table calls out the next number.

Anyone who calls out a multiple of 7 must immediately leave the table.

Who is the last person remaining at the table?

(A) Ana \hspace{1cm} (B) Ben \hspace{1cm} (C) Con
(D) Dan \hspace{1cm} (E) Eve

Questions 11 to 20, 4 marks each

11. \( \frac{5}{19} \) of 38 is equal to

(A) 76 \hspace{1cm} (B) 19 \hspace{1cm} (C) \( \frac{2}{5} \) \hspace{1cm} (D) \( 2\frac{1}{2} \) \hspace{1cm} (E) 10
12. The diagram shows a circle and a square with the same centre. What fraction of the circle is shaded?

(A) $\frac{5}{8}$  (B) $\frac{4}{7}$  (C) $\frac{3}{5}$  (D) $\frac{6}{11}$  (E) $\frac{2}{3}$

13. In the addition below $x$, $y$ and $z$ represent three different digits.

\[
\begin{array}{c}
4 \quad x \\
\hline
x \quad 4 \\
\hline
z \quad y \quad z
\end{array}
\]

What is the value of $x + y + z$?

(A) 9  (B) 8  (C) 10  (D) 7  (E) 6

14. A cube has the letters A, C, M, T, H and S on its six faces. Here are two views of this cube.

Which one of the following could be a third view of the same cube?

(A)  (B)  (C)  (D)  (E)

15. Five students are to be photographed in a row with the tallest in the centre and the shortest two at the ends. If no two students are the same height, how many different arrangements are possible?

(A) 6  (B) 2  (C) 10  (D) 5  (E) 4
16. Three boys and three girls all celebrate their birthday today, but they are each different ages. The youngest is 1 year old. The sum of the ages of the three girls is the same as the sum of the ages of the three boys. What is the smallest possible total of all six ages?

(A) 22  (B) 24  (C) 28  (D) 21  (E) 26

17. Jenna measures three sides of a rectangle and gets a total of 80 cm. Dylan measures three sides of the same rectangle and gets a total of 88 cm. What is the perimeter of the rectangle?

(A) 112 cm  (B) 132 cm  (C) 96 cm  (D) 168 cm  (E) 156 cm

18. Jim is running five laps of the school oval. When he is \( \frac{3}{4} \) of the way round his fourth lap, what fraction of his run has he completed?

(A) \( \frac{2}{3} \)  (B) \( \frac{1}{2} \)  (C) \( \frac{3}{4} \)  

(D) \( \frac{4}{5} \)  (E) \( \frac{5}{6} \)

19. How many two-digit numbers have the property that the sum of the digits is a perfect square?

(A) 15  (B) 18  (C) 13  (D) 19  (E) 17

20. On this cube, opposite faces add to the same sum and all faces are prime numbers. (Note that 1 is not prime.) What is the smallest possible total of the faces which cannot be seen?

(A) 41  (B) 35  (C) 45  

(D) 47  (E) 37
Questions 21 to 25, 5 marks each

21. A recipe requires 2 kg sugar, 4 kg butter, and 6 kg flour to make 8 cakes. How many cakes can you make if you have 9 kg sugar, 17 kg butter and 28 kg flour?

(A) 40  (B) 34  (C) 37
(D) 32  (E) 36

22. Two ordinary dice are rolled. The two resulting numbers are multiplied together to create a score. The probability of rolling a score that is a multiple of six is

(A) $\frac{1}{6}$  (B) $\frac{5}{12}$  (C) $\frac{1}{4}$  (D) $\frac{1}{3}$  (E) $\frac{1}{2}$

23. Jill and Jack are exercising at a beach. They both start from the car park at one end of the beach. Jill runs at a constant speed and Jack walks at a constant speed. When Jill turns at the end of the beach to run back, she notices that Jack is then halfway along the beach. How far along the beach will Jack be when Jill next passes him?

(A) Two-thirds of the way  (B) Five-sixths of the way
(C) Three-quarters of the way  (D) Five-eighths of the way
(E) Seven-eighths of the way

24. The country of Numismatica has six coins of the following denominations: 1 cent, 2 cents, 4 cents, 10 cents, 20 cents and 40 cents.
Using the coins in my pocket, I can pay exactly for any amount up to and including 200 cents.
What is the smallest number of coins I could have?

(A) 12  (B) 10  (C) 11  (D) 9  (E) 8

25. In the diagram, $PT = TS = SQ = QR$, $\angle PQR = 90^\circ$ and $\angle QPR = x^\circ$.
Then $x$ is equal to

(A) 20  (B) 25  (C) 27.5
(D) 22.5  (E) 30
For questions 26 to 30, shade the answer as an integer from 0 to 999 in the space provided on the answer sheet.

Question 26 is 6 marks, question 27 is 7 marks, question 28 is 8 marks, question 29 is 9 marks and question 30 is 10 marks.

26. I write down three different positive whole numbers that add to 96. The sum of any two is divisible by the third. What is the largest of these three numbers?

27. At a football match, one-third of spectators support the Reds and the rest support the Blues. At half-time 345 Blues supporters leave because their team is losing, and the remaining Blues supporters now make up one-third of the total. How many Reds supporters are there?

28. A $3 \times 2$ flag is divided into six squares, as shown. Each square is to be coloured green or blue, so that every square shares at least one edge with another square of the same colour. In how many different ways can this be done?

29. Zoltan has a list of whole numbers, all larger than 0 but smaller than 1000. He notices that every number in his list is either one-third of another number in the list or three times another number in the list. What is the largest number of different whole numbers that can be on Zoltan’s list?

30. In a stack of logs, each row has exactly one fewer log than the row below. With 9 logs, the tallest possible stack is shown.

With 2015 logs, how many rows are there in the tallest possible stack?

The questions are grouped by topic and ranked in order of difficulty. These books contain a broad range of mathematics problems and are a powerful tool for motivating and challenging secondary school students of all levels.

Buy the full set at a discount price or order individual volumes through our online bookshop.

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