NAME: _____

TIME ALLOWED: 60 minutes

INSTRUCTIONS AND INFORMATION

General

1   Do not open the booklet until told to do so by your teacher.

2   You may use any teaching aids normally available in your classroom, such as MAB blocks, counters, currency, calculators, play money etc. You are allowed to work on scrap paper and teachers may explain the meaning of words in the paper. Mobile phones are not permitted.

3   Diagrams are NOT drawn to scale. They are intended only as aids.

4   There are 25 multiple-choice questions, each requiring a single answer, 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.

Reminder: You may sit this competition once, in one division only, or risk no score.
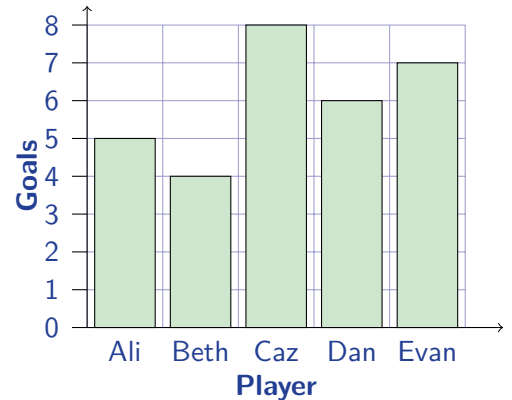
Upper Primary Division

Questions 1 to 10, 3 marks each

1. $201 - 9 =$

(A) 111   (B) 182   (C) 188   (D) 192   (E) 198

2. A *Runnyball* team has 5 players. This graph shows the number of goals each player scored in a tournament. Who scored the second-highest number of goals?
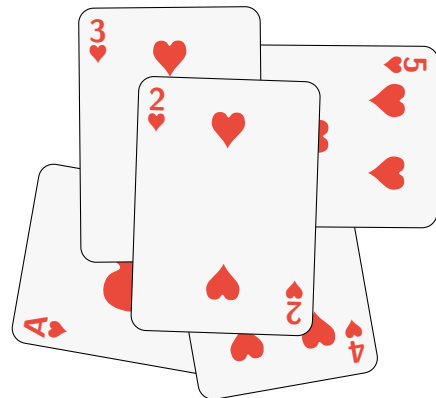
(A) Ali   (B) Beth   (C) Caz

     (D) Dan   (E) Evan

3. Six million two hundred and three thousand and six would be written as

(A) 62036   (B) 6 230 006   (C) 6 203 006   (D) 6 203 600   (E) 6 200 306

4. These cards were dropped on the table, one at a time.

In which order were they dropped?

(A) 4♥ A♥ 5♥ 3♥ 2♥

(B) A♥ 4♥ 5♥ 3♥ 2♥

(C) 2♥ 4♥ A♥ 3♥ 5♥

(D) A♥ 2♥ 3♥ 4♥ 5♥

(E) 2♥ 3♥ 4♥ 5♥ A♥

5. Sophia is at the corner of 1st Street and 1st Avenue. Her school is at the corner of 4th Street and 3rd Avenue.
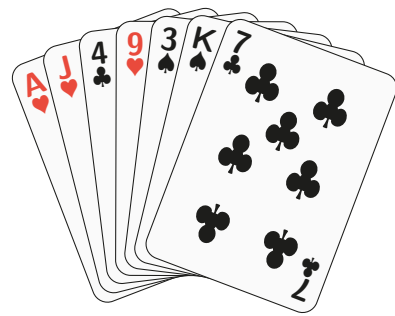
To get there, she walks

(A) 4 blocks east, 3 blocks north

(B) 3 blocks west, 4 blocks north

(C) 4 blocks west, 2 blocks north

(D) 3 blocks east, 2 blocks north

(E) 2 blocks north, 2 blocks south

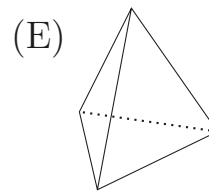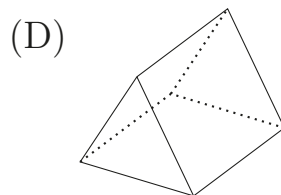

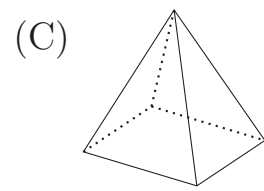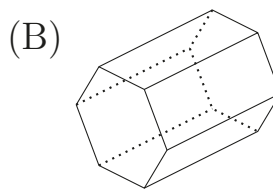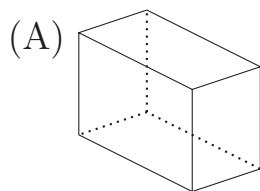**6.** Jake is playing a card game, and these are his cards.

Elena chooses one card from Jake at random.

Which of the following is Elena most likely to choose?

(A) a heart (♥) (B) a diamond (♦) (C) a spade (♠)

(D) a picture card (J, Q or K) (E) an even-numbered card

7. Which 3D shape below has 5 faces and 9 edges?

(A)   (B)   (C)

(D)   (E)

8. We're driving from Elizabeth to Renmark, and as we leave we see this sign.

We want to stop at a town for lunch and a break, approximately halfway to Renmark. Which town is the best place to stop?

(A) Gawler   (B) Nuriootpa   (C) Truro

(D) Blanchetown   (E) Waikerie

A20	
Main North Rd	
Gawler	15
Nuriootpa	47
Truro	60
Blanchetown	106
Waikerie	148
Renmark	230

9. What is the difference between the heights of the two flagpoles, in metres?

(A) 16.25   (B) 16.75   (C) 17.25

(D) 17.75   (E) 33.25

25 m

8.25 m
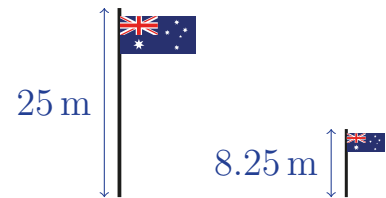
10. Most of the numbers on this scale are missing.

24   P 42

Which number should be at position P?

(A) 18   (B) 33   (C) 34   (D) 36   (E) 42

Questions 11 to 20, 4 marks each

11. In a game, two ten-sided dice each marked 0 to 9 are rolled and the two uppermost numbers are added.

For example, with the dice as shown, $0+9=9$.

How many different results can be obtained?

(A) 17   (B) 18   (C) 19   (D) 20   (E) 21

12. Every row and every column of this 3×3 square must contain each of the numbers 1, 2 and 3. What is the value of $N + M$?

1		
	2	N
		M

(A) 2   (B) 3   (C) 4   (D) 5   (E) 6

13. Ada Lovelace and Charles Babbage were pioneering researchers into early mechanical computers. They were born 24 years apart.

Ada Lovelace
December 1815–November 1852

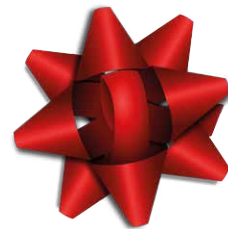Charles Babbage
December 1791–October 1871

To the nearest year, how much longer did Charles Babbage live than Ada Lovelace?

(A) 29   (B) 32   (C) 35   (D) 37   (E) 43

14. You have 12 metres of ribbon. Each decoration needs $\frac{2}{5}$ of a metre of ribbon.

How many decorations can you make?

(A) 6   (B) 7   (C) 10   (D) 24   (E) 30

15. Andrew and Bernadette are clearing leaves from their backyard. Bernadette can rake the backyard in 60 minutes, while Andrew can do it in 30 minutes with the vacuum setting on the leaf blower.
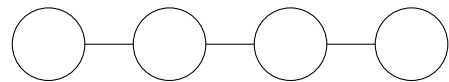
If they work together, how many minutes will it take?

(A) 10   (B) 20   (C) 24   (D) 30   (E) 45

16. A carpet tile measures 50 cm by 50 cm. How many of these tiles would be needed to cover the floor of a room 6 m long and 4 m wide?

(A) 24 (B) 20 (C) 40 (D) 48 (E) 96

17. In how many different ways can you place the numbers 1 to 4 in these four circles so that no two consecutive numbers are side by side?


(A) 2 (B) 4 (C) 6 (D) 8 (E) 12

18. John, Chris, Anne, Holly and Mike are seated around a round table, each with a card with a number on it in front of them.

Each person can see the numbers in front of their two neighbours. Each person calls out the sum of the two numbers in front of their neighbours. John says 30, Chris says 33, Anne says 31, Holly says 38 and Mike says 36.

Holly has the number 21 in front of her. What number does Anne have in front of her?

John 30

Chris 33

Mike 36

Anne 31

21

Holly 38
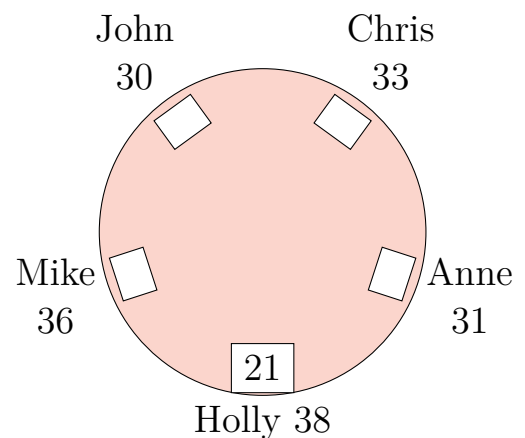
(A) 9 (B) 13 (C) 15 (D) 18 (E) 19

19. Annabel has 2 identical equilateral triangles. Each has an area of $9\,\text{cm}^2$. She places one triangle on top of the other as shown to form a star, as shown. What is the area of the star in square centimetres?
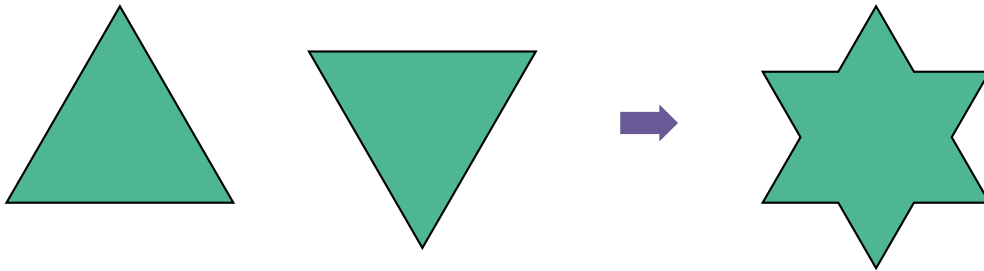
(A) 10   (B) 12   (C) 14   (D) 16   (E) 18

20. Lola went on a train trip.

During her journey she slept for $\frac{3}{4}$ of an hour and stayed awake for $\frac{3}{4}$ of the journey.

How long did the trip take?

(A) 1 hour   (B) 2 hours   (C) $2\frac{1}{2}$ hours   (D) 3 hours   (E) 4 hours

Questions 21 to 25, 5 marks each

21. My sister and I are playing a game where she picks two counting numbers and I have to guess them. When I tell her a number, she multiplies my number by her first number and then adds her second number.

When I say 15, she says 50. When I say 2, she says 11.
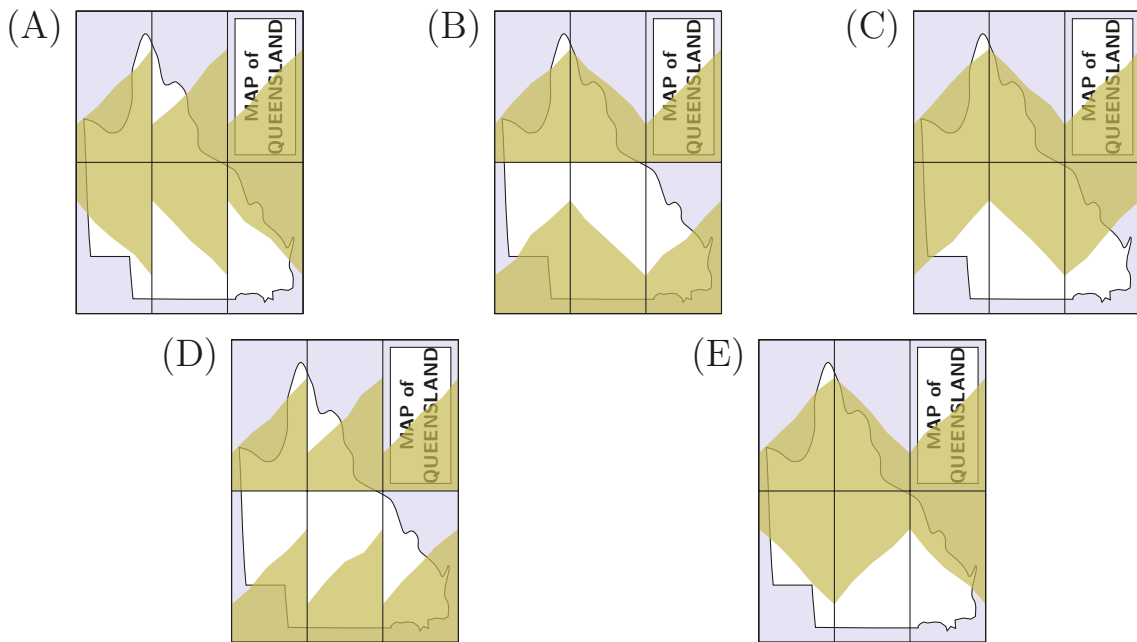
If I say 6, what should she say?

(A) 23   (B) 27   (C) 35   (D) 41   (E) 61

22. Once the muddy water from the 2018 Ingham floods had drained from Harry's house, he found this folded map that had been standing in the floodwater at an angle.

He unfolded it and laid it out to dry, but it was still mud-stained.

What could it look like now?

(A)

(B)

(C)

(D)

(E)

23. A tower is built from exactly 2019 equal rods.

Starting with 3 rods as a triangular base, more rods are added to form a regular octahedron with this base as one of its faces. The top face is then the base of the next octahedron.

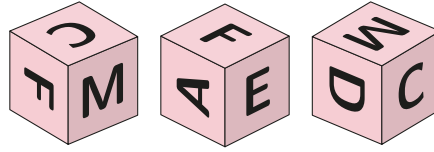The diagram shows the construction of the first three octahedra.

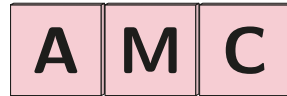How many octahedra are in the tower when it is finished?
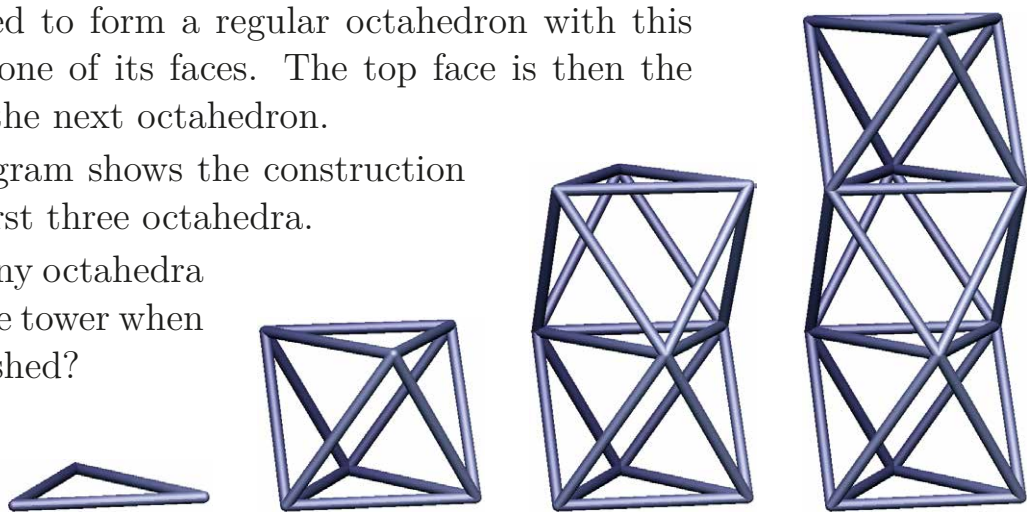
(A) 2016   (B) 1008   (C) 336   (D) 224   (E) 168

24. These three cubes are labelled in exactly the same way, with the 6 letters A, M, C, D, E and F on their 6 faces:

The cubes are now placed in a row so that the front looks like this:

When we look at the cubes from the opposite side, we will see

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

25. Points are awarded for the first four places at the swimming carnival as shown in the table.

Aalia competed in the freestyle, backstroke and breaststroke races and scored a total of 11 points.

In how many different ways could she have done this?

✹	1st place	7 points
✹	2nd place	5 points
✹	3rd place	3 points
✹	4th place	1 point

(A) 6   (B) 9   (C) 12   (D) 18   (E) 24

For questions 26 to 30, shade the answer as a whole number from 0 to 999 in the space provided on the answer sheet.

Questions 26–30 are worth 6, 7, 8, 9 and 10 marks, respectively.

26. Warren and Naida make a list of numbers. They start with 0, then Warren adds 20, then Naida subtracts 1, then Warren adds 19, then Naida subtracts 2.

$$0, 20, 19, 38, 36, \ldots$$

This pattern continues until Warren adds 1 and Naida subtracts 20, which ends up back at 0. What is the largest number in their list?

27. Different numbers can be made using the digits 1, 5, 6, 8 and a decimal point. How many possibilities are there if each digit must be used exactly once and the decimal point must lie between two digits?

28. John is one year older than his wife Mary. They have three children, whose ages are two years apart.

The product of John and Mary's ages is less than 2019. The product of the three children's ages is also less than 2019.

Next year both these products will be greater than 2020.
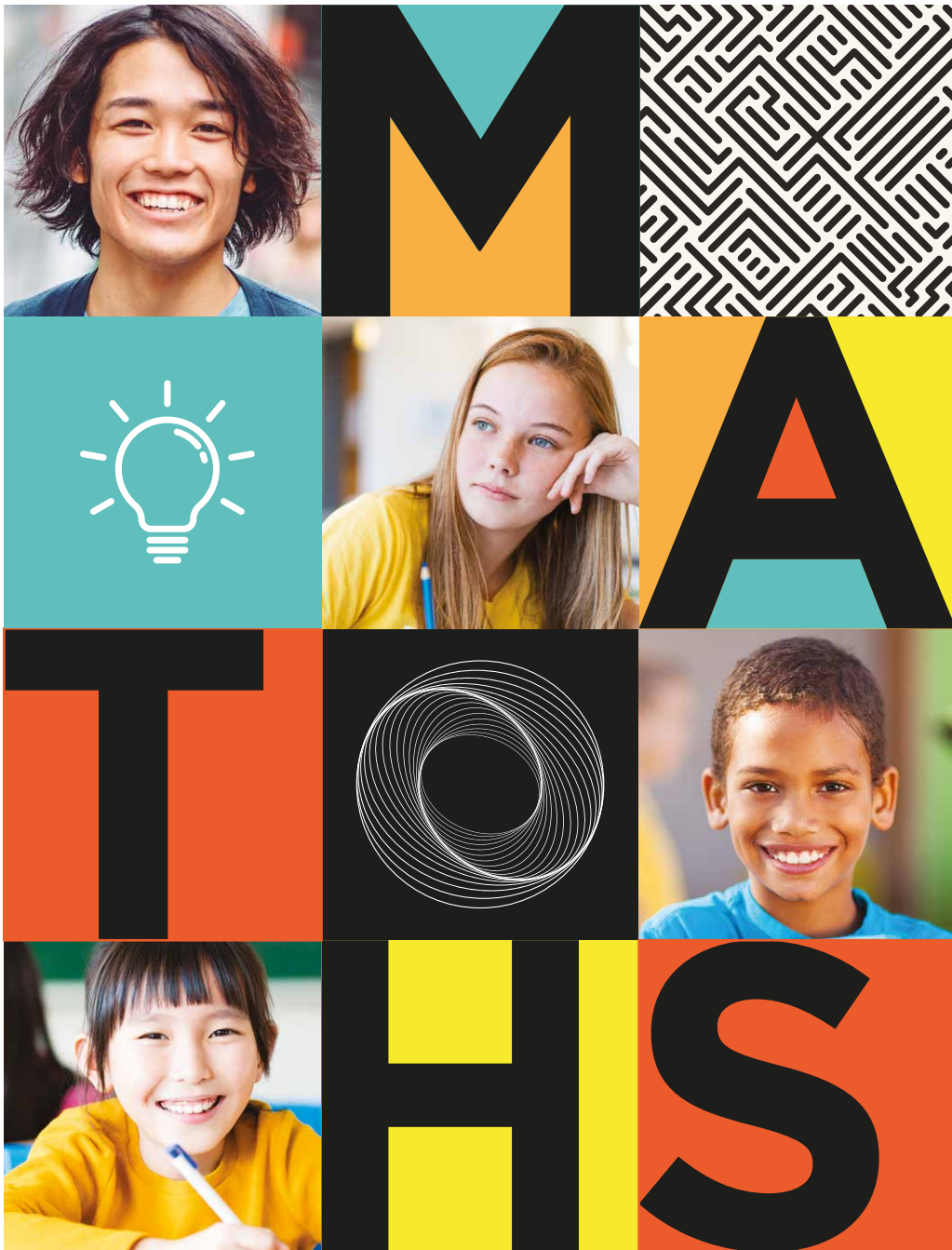
This year, what is the sum of all five ages?

29. A seven-digit number is in the form $20AMC19$, with all digits different. It is divisible by 9.

What is the value of $A + M + C$?

30. I have five children and want to place them in a line for a photograph. However, Hugh refuses to stand anywhere in between Louise and Richard. How many ways are there to place the children in a line and still keep Hugh happy?

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Problems are part of life and we've made it our mission to equip young students with the skills to solve more of them. Problem solving is a life skill and by developing it, students can create more choices for themselves and the future.

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