

2021

# AUSTRALIAN MATHEMATICS COMPETITION



**AMT.**  
AUSTRALIAN  
MATHS TRUST

Upper  
Primary  
Years 5-7\*

(AUSTRALIAN  
SCHOOL YEARS,  
\*SOME STATES ONLY)

## 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.

DATE

**4-6 August**

TIME ALLOWED

**60 minutes**



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## Upper Primary Division

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### Questions 1 to 10, 3 marks each

1. This Nigerian flag is white and green.

What fraction of it is green?

- (A) one-third (B) one-quarter (C) one-half  
(D) two-fifths (E) two-thirds



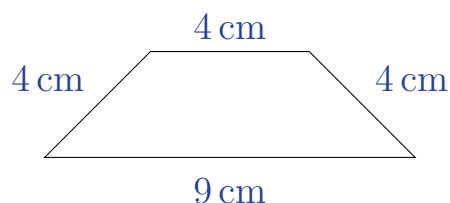
- 
2. Which number makes this number sentence true?

$$\square - 5 = 9$$

- (A) 0 (B) 4 (C) 12 (D) 9 (E) 14
- 

3. What is the perimeter of the quadrilateral shown?

- (A) 13 cm (B) 15 cm (C) 17 cm  
(D) 19 cm (E) 21 cm



- 
4. Which of the following decimal numbers has the smallest value?

- (A) 0.0002 (B) 0.002 (C) 0.02 (D) 0.2 (E) 2.0
- 

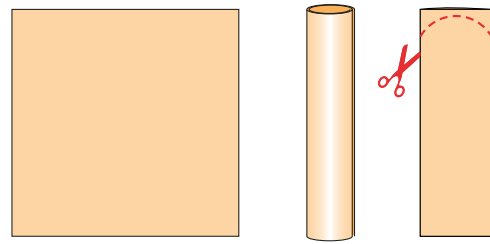
5.  $\frac{1}{2} + \frac{2}{4} - \frac{4}{8} =$

- (A)  $\frac{1}{2}$  (B) 1 (C)  $1\frac{1}{2}$  (D) 2 (E) 4
- 

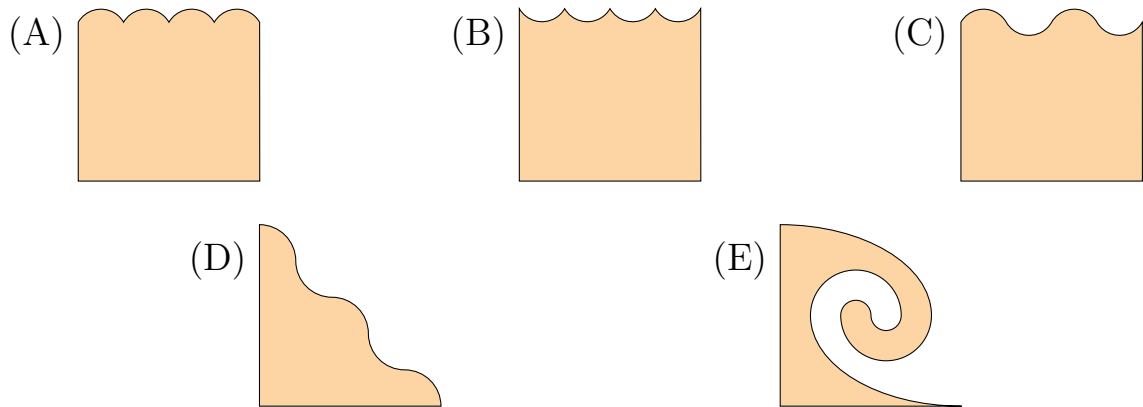
6. Suri has a number of 20-cent and 50-cent coins. Which of the following amounts of money is it **NOT** possible for her to make?

- (A) 50 cents (B) 60 cents (C) 80 cents (D) 30 cents (E) 70 cents
-

7. A square of paper is rolled up, pressed flat, and then cut as shown.

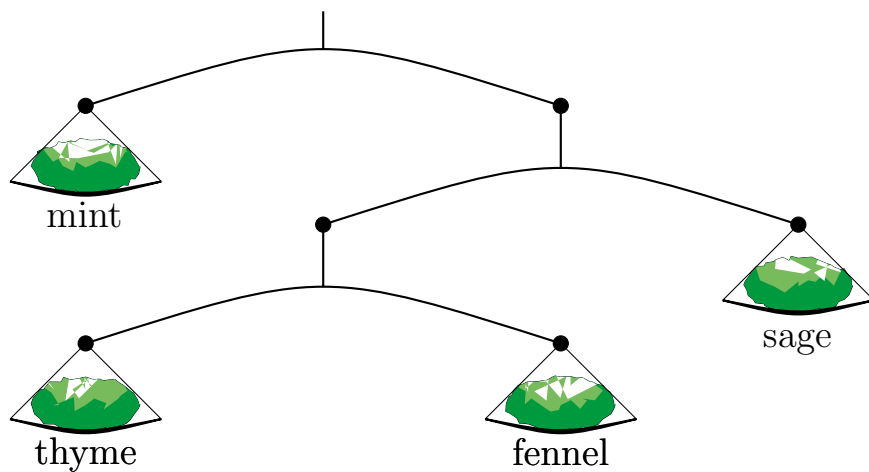


What could the sheet of paper look like when unrolled and laid flat?



8. Leo is waiting in line at school. There are four students ahead of him and twice as many behind him. How many students are in this line?
- (A) 4            (B) 8            (C) 9            (D) 12            (E) 13

9. Cassandra makes a healing potion from a mixture of herbs. She uses this balance to weigh out the herbs. If she uses 5 grams of fennel, how many grams of mint will she need?



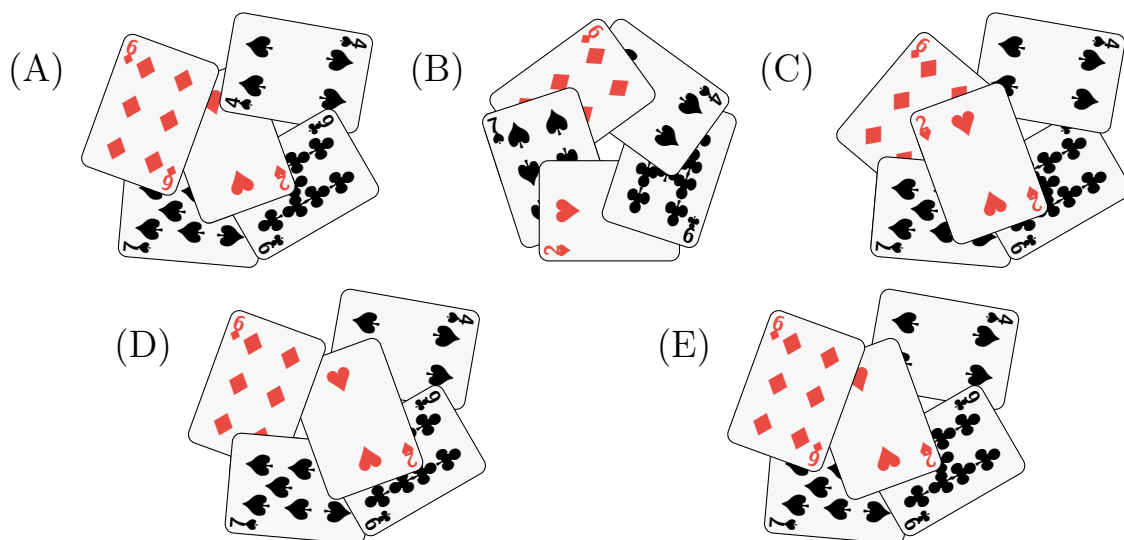
- (A) 5            (B) 10            (C) 15            (D) 20            (E) 40

10. There are 14 pieces of fruit in a bowl. There are twice as many nectarines as pears, and half as many nectarines as apples. There are no other types of fruit. How many apples are there?
- (A) 2                      (B) 4                      (C) 6                      (D) 8                      (E) 10
- 

Questions 11 to 20, 4 marks each

11. I am shuffling a deck of cards but I accidentally drop a card on the ground every now and then. After a while, I notice that I have dropped five cards.

From above, the five cards look like one of the following pictures. Which picture could it be?



12. This rectangle has been made by joining two squares together.

Each square has an area of  $25 \text{ cm}^2$ .

What is the perimeter of the rectangle?



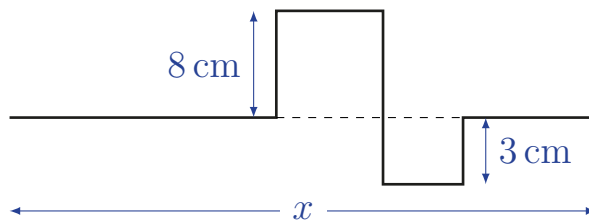
- (A) 18 cm                      (B) 20 cm                      (C) 26 cm                      (D) 30 cm                      (E) 50 cm
-

13. A kangaroo is chasing a wallaby that is 42 metres ahead. For every 4-metre hop the kangaroo makes, the wallaby makes a 1-metre hop. How many hops will the kangaroo have to make to catch up with the wallaby?



- (A) 8            (B) 10            (C) 11            (D) 14            (E) 21
- 

14. A piece of straight wire is 50 cm long. Six right-angled bends are made in the wire, so that it ends up looking like the diagram shown:



The lengths of two sections are shown. What is the length marked  $x$ ?

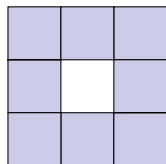
- (A) 28 cm      (B) 31 cm      (C) 34 cm      (D) 36 cm      (E) 39 cm
- 

15. Margie and Rosie both live near Lawson train station. Each plans to catch the 10 am train. Margie thinks her watch is 10 minutes fast, but in fact it is 10 minutes slow. Rosie thinks her watch is 10 minutes slow, but in fact it is 5 minutes fast. Each of them leaves home to catch the train without having to wait on the platform. Who misses the train, and by how much?

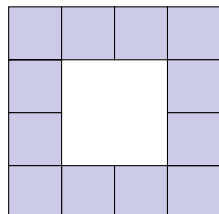
- (A) Margie by 10 minutes                      (B) Margie by 20 minutes  
(C) Rosie by 5 minutes                         (D) Rosie by 15 minutes  
(E) Neither of them
-

16. Sally was playing with block patterns and came up with this one she called *Hollow Squares*. They all follow the same pattern.

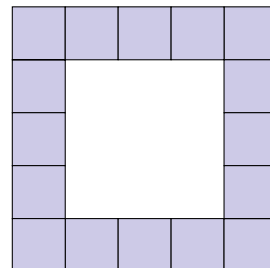
Hollow Square 1



Hollow Square 2



Hollow Square 3



How many blocks would she need to make Hollow Square 7?

- (A) 28            (B) 30            (C) 32            (D) 34            (E) 53
- 
17. I have a jug containing 100 mL of liquid, which is half vinegar and half olive oil. How much vinegar must I add to make a mixture which is one-third olive oil?
- (A) 30 mL    (B) 40 mL    (C) 50 mL    (D) 60 mL    (E) 100 mL

18. It is 10 am now. What time will it be in 2021 hours time?
- (A) 11 am    (B) 1 pm    (C) 3 pm    (D) 4 pm    (E) 5 pm

19. Alexander's pen leaked on his addition homework, covering up three of the digits in the calculation shown. How many different possibilities are there for the correct working?

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



20. Our school is organising a quiz night. They are expecting from 25 to 35 people to come. The people will be arranged in teams of 6 to 8 people.

What is the range of possible numbers of teams to expect?

- (A) 4 to 5      (B) 4 to 6      (C) 5 to 6      (D) 3 to 6      (E) 3 to 5
- 

**Questions 21 to 25, 5 marks each**

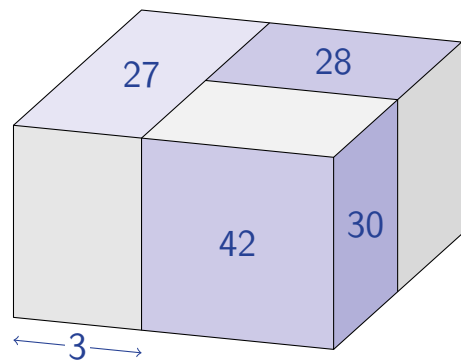
21. In an election for school captain, there were 4 candidates and 453 students each voted for one candidate. The winner's margins over the other candidates were 31, 25 and 19.

How many votes did the winner receive?

- (A) 113      (B) 127      (C) 129      (D) 131      (E) 132
- 

22. Three blocks with rectangular faces are placed together to form a larger rectangular prism.

All blocks have side lengths which are whole numbers of centimetres. The areas of some of the faces are shown, as is the length of one edge. In cubic centimetres, what is the volume of the combined prism?

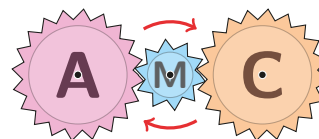


- (A) 360      (B) 540      (C) 600      (D) 720      (E) 900
-



23. Three gears are connected as shown. The two larger gears have 20 teeth each and the smaller gear has 10 teeth.

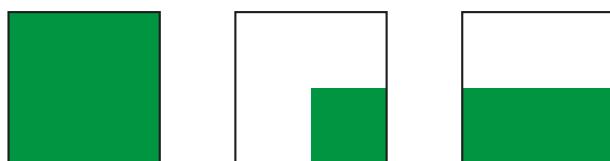
The middle gear is rotated half a turn in the direction of the arrows, turning the M upside down.



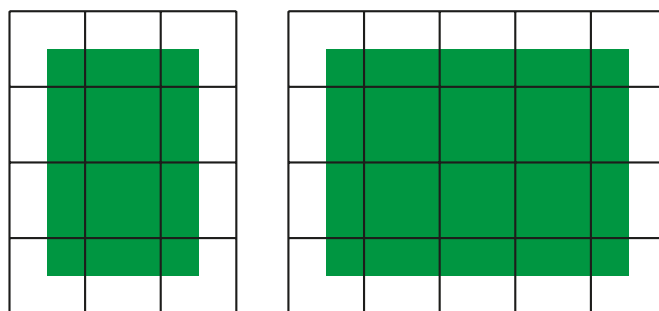
What do the three gears look like after this rotation?

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

24. Anna has a large number of tiles of three types:



She wants to build a green rectangle with a white frame similar to those below.



She builds such a rectangle using as many tiles as possible while using exactly 20 completely green tiles. How many tiles will she use altogether?

- (A) 80      (B) 66      (C) 48      (D) 42      (E) 39

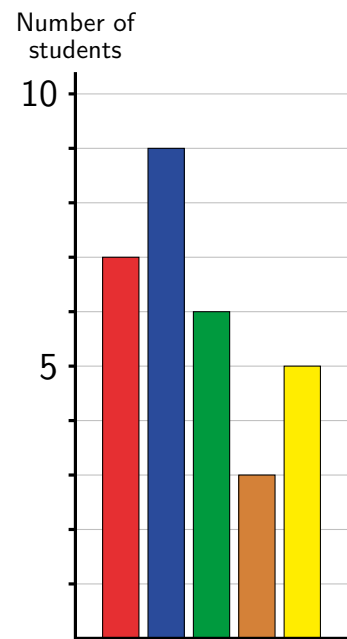
25. In Jeremy's hometown of Windar, people live in either North, East, South, West or Central Windar.

Jeremy is putting together a chart showing where the students in his class live, but unfortunately his dog chewed his survey results before he managed to label the five columns.

He only remembers two things about the survey: South Windar is more common than both East and Central Windar, and the number of students in North and Central Windar combined is the same as the total of the other three regions.

Using only this information, how many columns can Jeremy correctly label with 100% certainty?

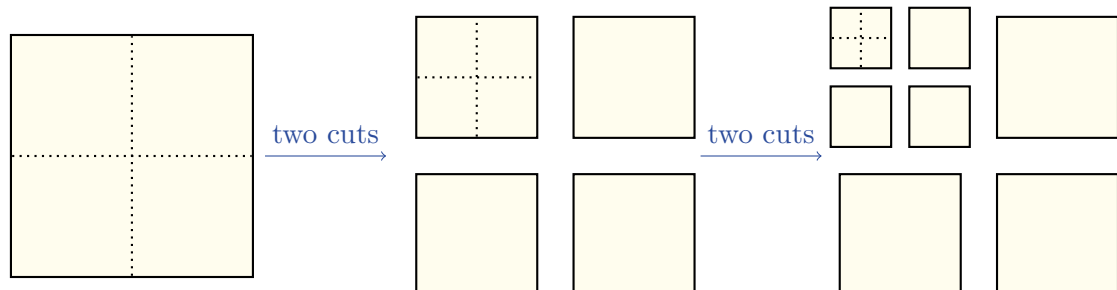
- (A) 0                      (B) 1                      (C) 2                      (D) 3                      (E) 5



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

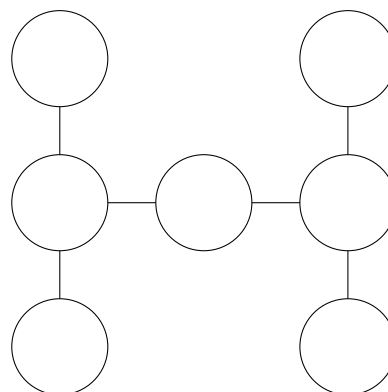
Questions 26–30 are worth 6, 7, 8, 9 and 10 marks, respectively.

26. Pip starts with a large square sheet of paper and makes two straight cuts to form four smaller squares. She then takes one of these smaller squares and makes two more straight cuts to make four even smaller ones, as shown.



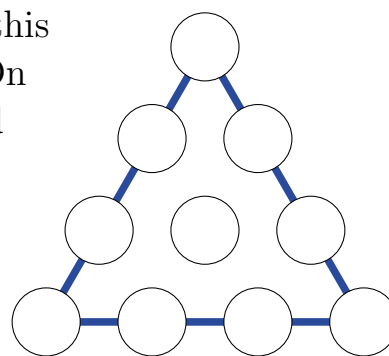
Continuing in this way, how many cuts does Pip need to make to get a total of 1000 squares of various sizes?

27. Seven of the numbers from 1 to 9 are placed in the circles in the diagram in such a way that the products of the numbers in each vertical or horizontal line are the same.  
What is this product?



28. A hare and a tortoise compete in a 10 km race. The hare runs at 30 km/h and the tortoise walks at 3 km/h. Unfortunately, at the start, the hare started running in the opposite direction. After some time, it realised its mistake and turned round, catching the tortoise at the halfway mark.  
For how many minutes did the hare run in the wrong direction?

29. I want to place the numbers 1 to 10 in this diagram, with one number in each circle. On each of the three sides, the four numbers add to a *side total*, and the three side totals are all the same.  
What is the smallest number that this side total could be?



30. The sum of two numbers is 11.63. When adding the numbers together, Oliver accidentally shifted the decimal point in one of the numbers one position to the left. Oliver got an answer of 5.87 instead.  
What is one hundred times the difference between the two original numbers?

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