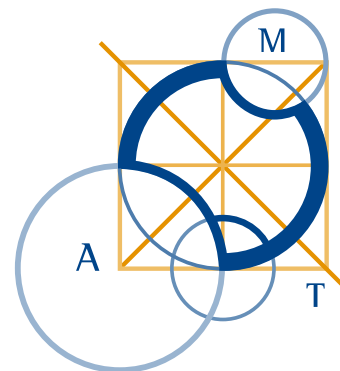




## AUSTRALIAN MATHEMATICS COMPETITION FOR THE WESTPAC AWARDS

AN ACTIVITY OF THE AUSTRALIAN MATHEMATICS TRUST



WEDNESDAY 25 JULY 2007

# UPPER PRIMARY DIVISION COMPETITION PAPER

AUSTRALIAN SCHOOL YEARS 5, 6 AND PRIMARY 7 \*  
TIME ALLOWED: 60 MINUTES

\*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.
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 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 State or Region 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 filled in. It is your responsibility that the Answer Sheet is correctly coded.
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 read by a machine. The machine will see 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 AMC reserves the right to re-examine students before deciding whether to grant official status to their score.

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## Upper Primary Division

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### Questions 1 to 10, 3 marks each

1. Which number is made up with 1 hundred, 4 tens and 3 ones?

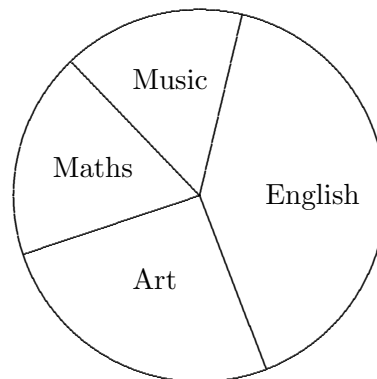
- (A) 413      (B) 143      (C) 341      (D) 1043      (E) 134
- 

2. The missing digit in the following sum is

$$2\square6 + 497 = 703$$

- (A) 0      (B) 1      (C) 3      (D) 7      (E) 9
- 

3. Last Tuesday, a class studied Maths, Music, English and Art in the proportions indicated in the pie chart.



Which of the following statements is true?

- (A) They spent more time on Music than they did on Art.  
(B) They spent more time on Music than they did on English.  
(C) They spent more than half the time on Music and English.  
(D) They spent more than half the time on Maths and Art.  
(E) They spent the same amount of time on Maths as they did at Art.
- 

4. The value of  $14 - 8 \div 2 + 2 \times 3$  is

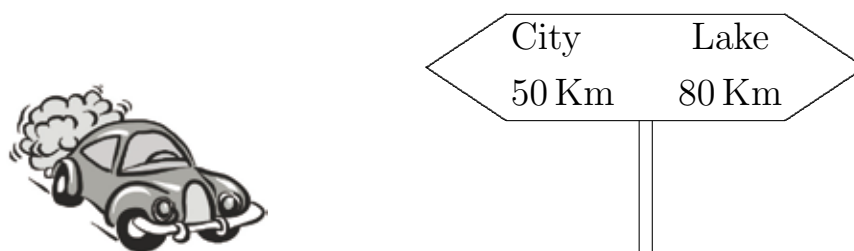
- (A) 16      (B) 15      (C) 36      (D) 9      (E) 4
-

5. Which is the largest of the following numbers?  
(A) thirty hundredths    (B) thirteen hundredths    (C) three tenths  
(D) thirty-one hundredths    (E) three hundredths
- 

6. A pyramid has 12 edges. What is the shape of the base?  
(A) a triangle                      (B) a square                      (C) a pentagon  
(D) a hexagon                      (E) an octagon
- 

7. Ann has a cloth bag with 20 balls, numbered from 1 to 20, in it. She selects a ball from the bag. Which of the following events is the most likely?  
(A) She selects ball number 1.  
(B) She selects an odd-numbered ball.  
(C) She selects a ball with the digit 2 in the number.  
(D) She selects ball 9 or 10.  
(E) She selects ball number 20.
- 

8. While driving from the city to the lake, Karen passes the road sign shown in the diagram.



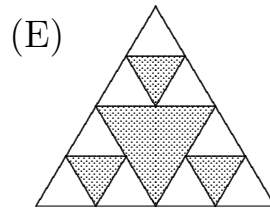
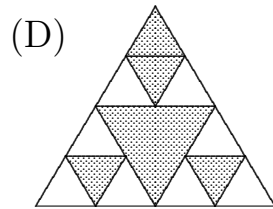
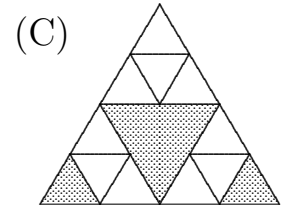
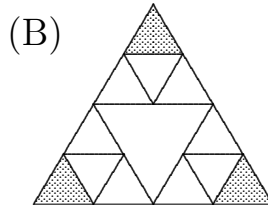
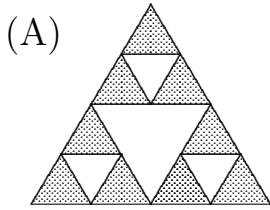
About an hour later she notices a sign indicating she has just 5 km to go to the lake. How far has she travelled from the city?

- (A) 50 km    (B) 80 km    (C) 125 km    (D) 30 km    (E) 65 km
- 
9. At a school, 60% of a Year 6 class were girls. Which of the following number combinations could **not** be this class?  
(A) 6 boys 9 girls    (B) 10 boys 15 girls    (C) 15 boys 10 girls  
(D) 12 boys 18 girls    (E) 12 girls 8 boys
-

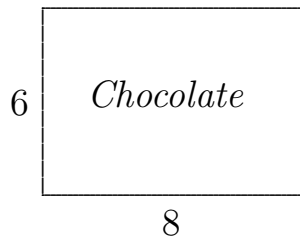
10. It is now 3:00 pm. On a 24-hour clock, what time will it be in 100 hours?
- (A) 7:00 am   (B) 3:00 am   (C) 7:00 pm   (D) 3:00 pm   (E) 11:00 pm
- 

**Questions 11 to 20, 4 marks each**

11. Which of the following shows three-eighths of the figure shaded?



- 
12. Jane is given a large block of chocolate which is made up of square pieces and is 6 pieces wide and 8 pieces long.



She eats all the outside pieces. What fraction of the block is left?

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

13. The game of *Four Tofu* is played on a  $4 \times 4$  grid. When completed, each of the numbers 1, 2, 3 and 4 occurs in each row and column of the  $4 \times 4$  grid and also in each  $2 \times 2$  corner of the grid.

	2		
			1
	1	3	
4			

When the grid shown is completed, the sum of the four numbers in the corners of the  $4 \times 4$  grid is

- (A) 13                      (B) 11                      (C) 15                      (D) 12                      (E) 10
- 

14. Abdul's class has a set of 30 lockers arranged in 3 rows of 10 and numbered from 1 to 30 starting from the top left hand corner and counting across each row from left to right until reaching the bottom right hand corner.

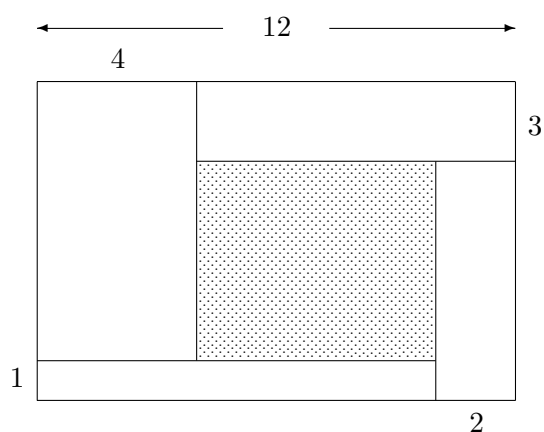

- Abdul has locker No 7.
- Betty's locker is below Abdul's and two to the left.
- Cheung has a locker with a number 6 more than Betty's locker.
- Dilip has a locker two rows above Cheung's.
- Evita's locker is five to the right and one below Dilip's.

Which two students have lockers next to each other?

- (A) Abdul and Betty    (B) Cheung and Evita    (C) Evita and Betty  
 (D) Dilip and Abdul    (E) Abdul and Cheung
-

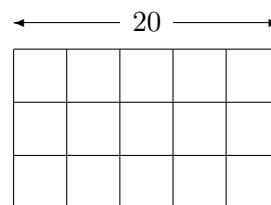
15. What is the largest two-digit prime number whose digits are also prime?
- (A) 73            (B) 77            (C) 83            (D) 91            (E) 97
- 

16. Four rectangular paths of width 1, 2, 3 and 4 metres are arranged as shown in the diagram to form a larger rectangular area, 8 m by 12 m, which borders a smaller internal rectangular lawn.



What is the area, in square metres, of the lawn?

- (A) 12            (B) 16            (C) 18            (D) 20            (E) 24
- 
17. A rectangular wire grid is made up of 15 equal squares as shown. If the length of the grid is 20 cm, what is the total length, in centimetres, of the wire in the grid?



- (A) 144            (B) 150            (C) 152            (D) 164            (E) 170
- 
18. In a survey of 50 students, 42 said that they disliked eating spinach, 37 said that they disliked eating cabbage, 31 students said they disliked both spinach and cabbage. How many students liked eating both spinach and cabbage?
- (A) 6            (B) 5            (C) 4            (D) 3            (E) 2
-

**19.** Mrs Green witnessed a bank robbery and noticed the getaway car's number plate contained the letters M, X and P followed by the digits 1, 2 and 3, but could not remember the order in which they occurred. What is the maximum number of combinations which the police would need to search through?

- (A) 6            (B) 12            (C) 36            (D) 54            (E) 81
- 

**20.** The numbers 1, 2, 3 and 4 are used to make 2 two-digit numbers. If you multiplied these two numbers together, the largest possible result is

- (A) 903            (B) 943            (C) 1302            (D) 1312            (E) 1336
- 

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

**21.** When I opened my new maths book the sum of the two page numbers facing me was 317. What was the number of the next page?

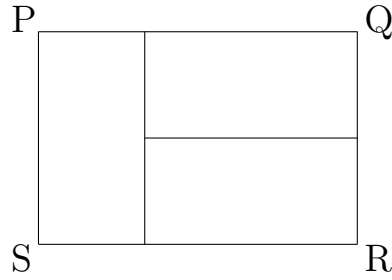
- (A) 158            (B) 159            (C) 160            (D) 261            (E) 328
- 

**22.** How many three-digit numbers greater than 900 are there that satisfy the following conditions?

- The sum of the digits is 14.
- The digits are all different.
- The tens digit is an odd number.

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

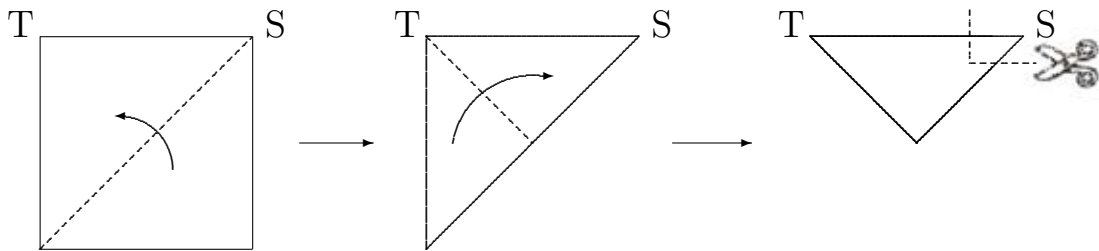
23. The large rectangle  $PQRS$  is made up from 3 identical small rectangles as shown and has area 150 square centimetres.



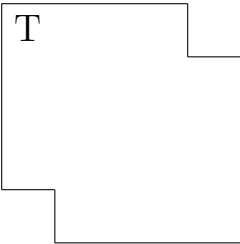
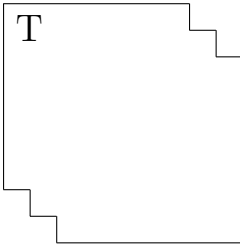
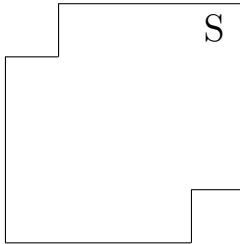
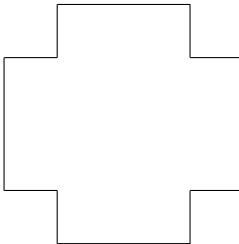
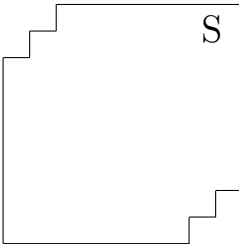
The length, in centimetres, of the shorter side of one of these small rectangles is

- (A) 5      (B)  $7\frac{1}{2}$       (C) 10      (D)  $12\frac{1}{2}$       (E) 15

24. A square piece of paper is folded along its centre line and then folded again as shown.



A cut is made along the dotted line in the third diagram. Which of the following could be the shape of the paper when it is unfolded?

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

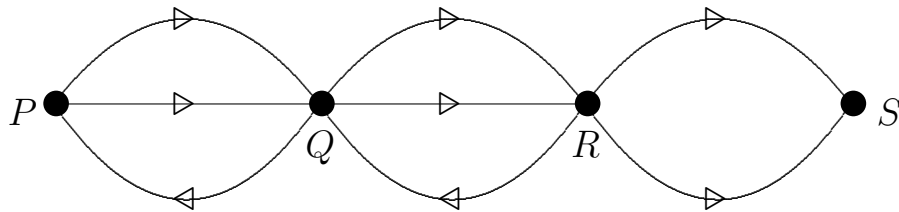


- 25.** Ace, Bea, Cec, Dee, Eve, Fie and Geo are 1, 2, 3, 4, 5, 6 and 7 years old, in some order. Dee is three times as old as Bea. Cec is four years older than Eve. Fie is older than Ace and Ace is older than Geo, but the combined ages of Ace and Geo is greater than the age of Fie. The age of Ace is
- (A) 2                      (B) 3                      (C) 4                      (D) 5                      (E) 6

**For questions 26 to 30, shade the answer as a whole number 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.**

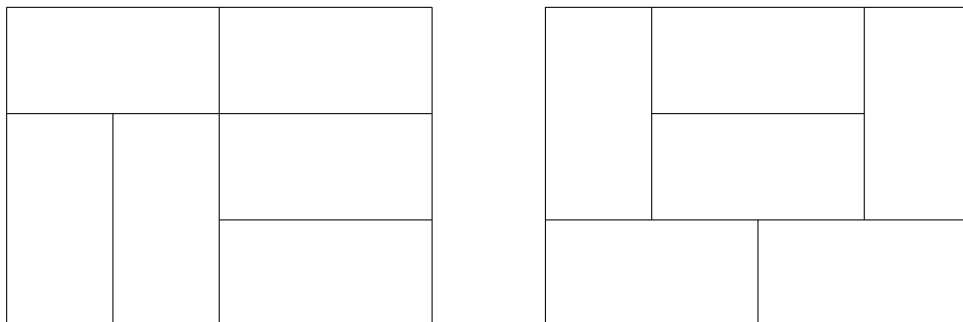
- 26.**  $P$ ,  $Q$ ,  $R$  and  $S$  are towns joined by one way roads as shown in the diagram.



How many routes are there from  $P$  to  $S$ , if no road can be used more than once but towns may be visited more than once?

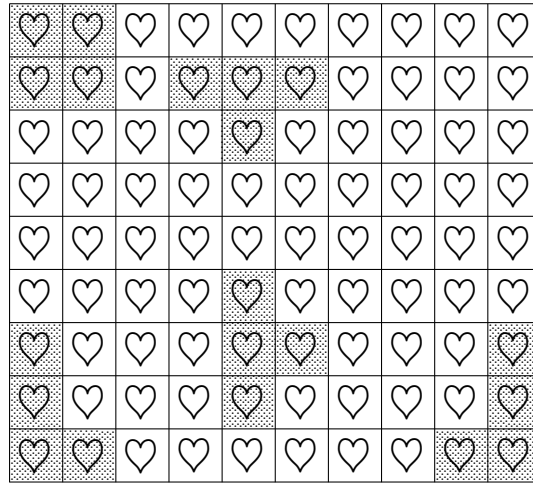
- 27.** Sally found a 2-digit number that, when multiplied by itself, produced a number which ended in her 2-digit number. What is the sum of all the numbers which have this property?

- 28.** A 3 unit by 4 unit area on a wall is to be tiled with 1 unit by 2 unit tiles. The diagram below shows two possible patterns for the tiling.



In how many different ways is it possible to tile the area?

**29.** The diagram below shows five different ways of getting four connected stamps from a sheet of stamps.



In how many different ways is it possible to get four connected stamps from such a sheet of stamps?

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**30.** A teacher provides four special lessons, one each in Maths, Music, English and Science, for some of the children in her class. For the students in these special lessons:

- there are exactly 3 children in each lesson.
- each pair of students attends at least one special lesson together.

What is the largest number of students who can attend these special lessons?

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## What is the AMC?

The AMC is a mathematics competition containing thirty problems that students can attempt to answer in the time allowed. The students use a special answer sheet that is processed and marked by computer.

There are five papers. While each paper is attempted by students from different year levels, each student is assessed only against other students in the same school year and region.

The earliest problems are very easy, then the problems get progressively more difficult until the end when they are challenging to the most gifted student. Students of all standards will progress and find their point of challenge.

We believe this to be the largest event in Australia for which participants pay an entry fee. The AMC has run every year since 1978 and is now a significant international event.

## Benefits to Students

The AMC gives students external recognition of their achievements. All students receive a certificate and a detailed report showing how they went on each problem with comparative statistics.

Prizes will be awarded to the top students.

Unlike formal mathematics testing, many of the problems are set in situations to which students can relate, showing the relevance of mathematics to everyday life. Above all, the AMC is designed to be a fun event removed from the pressures of formal assessment with problems designed to be of sufficient interest to stimulate discussion with friends, parents or in the classroom.

## Australian Mathematics Trust

The AMT is a national non-profit organisation and its Board includes representatives from the Australian Association of Mathematics Teachers, Australian Academy of Science and Australian Mathematical Society. The AMT administers a number of further mathematical activities such as the Mathematics Challenge for Young Australians and the Australian Mathematical Olympiad.

## AMT Publishing

The AMT publishes its own material of national and international significance for those students who seek extra mathematical challenge.

*Problems to Solve in Middle School Mathematics*, is a collection of problems presented in ready to be photocopied format for classroom use with students in Years 5 to 8.

A Primary version of AMC (Australian Mathematics Competition for the Westpac Awards) *Solutions and Statistics* is available for 2004, 2005 and 2006. The 2007 version will be available in early 2008. Each year these books include the questions, full solutions, statistics, information on Australian achievement rates, analyses of the statistics as well as discrimination and difficulty factors for each question. Prize winners are also listed.

These and other titles can be ordered via the internet or by mail.

## Contact

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