Bank of Melbourne

AUSTRALIAN MATHEMATICS COMPETITION
FOR THE BANK OF MELBOURNE AWARDS

AN ACTIVITY OF THE AUSTRALIAN MATHEMATICS TRUST

TUESDAY 3 AUGUST 1999

JUNIOR DIVISION COMPETITION PAPER

SCHOOL YEARS 7 AND 8

INSTRUCTIONS AND INFORMATION

GENERAL

1. Do not open this booklet until told to do so by your teacher.
2. Calculators are not 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. Avoid random guessing as one quarter of the marks assigned for that question will be deducted for an incorrect response.
5. Read the instructions on the answer sheet carefully. It is the student's responsibility that the answer sheet is correctly coded.
6. When your teacher gives the signal, begin working on the problems. You have 1¼ hours working time.

INTEGRITY OF THE COMPETITION

To ensure the integrity of the Competition and to identify the outstanding students the AMC reserves the right to re-examine students before deciding whether to grant official status to their score.

ANSWERS ON THE ANSWER SHEET

1. All answers should be recorded on the answer sheet.
2. Use only B or 2B lead pencil.
3. If a coding error is made, use only a plastic eraser to ensure that all lead marks and smudges are COMPLETELY removed.

JUNIOR DIVISION

Questions 1 - 10, 3 marks each

1. 49 - 18 equals

(A) 67 (B) 31 (C) -29 (D) 21 (E) 41

2. $20 \div 0.2$ equals

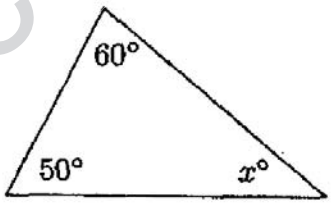
(A) 10 (B) 40 (C) 100 (D) 400 (E) 1000

3. The value of $(46 \times 138) + (54 \times 138)$ is

(A) 6405 (B) 12 696 (C) 7452 (D) 13 800 (E) 6348

4. In the diagram, x equals

(A) 40 (B) 50 (C) 60 (D) 70 (E) 80



5. $\frac{1}{5} + \frac{5}{8}$ equals

(A) $\frac{6}{13}$ (B) 1 (C) $\frac{17}{40}$ (D) $\frac{6}{14}$ (E) $\frac{33}{40}$

6. How many whole numbers can replace the square to give a result between 4 and 16?

$$2 + (3 \times \square)$$

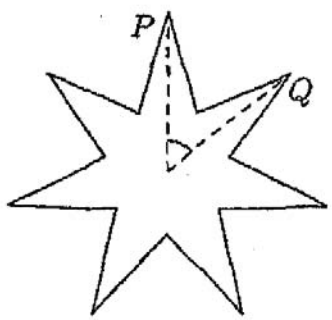
(A) 2 (B) 3 (C) 4 (D) 5 (E) 6

7. Gary needed to multiply a number by 100. Instead, he divided by 100 and got 23. What should the answer have been?

(A) 230 (B) 2300 (C) 23 000 (D) 230 000 (E) 2 300 000

J2

8. The large star on the Australian flag has 7 points, one for each state and one for the territories. The angle between P and Q as seen from the centre of the star is

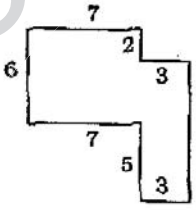


(A) $50°$ (B) $50\frac{3}{7}°$ (C) $51\frac{3}{7}°$ (D) $60°$ (E) $60\frac{3}{7}°$

9. Every week, Kim saves 3/4 of her earnings. If she saves \$60 every week, then the amount she earns each week is

(A) \$20 (B) \$45 (C) \$75 (D) \$80 (E) \$100

10. In the figure, all angles are right angles and all measurements are in metres. What is the area, in square metres, of the figure?



(A) 69 (B) 71 (C) 61 (D) 62 (E) 70

Questions 11 - 20, 4 marks each

11. An early purchase plan for seats at the Sydney Olympic Games offered a seat at 9 events for \$750 deposit and \$228 per month for 12 months. Under this plan, the average cost of a seat at any one of the events is closest to

(A) \$200 (B) \$250 (C) \$300 (D) \$350 (E) \$400

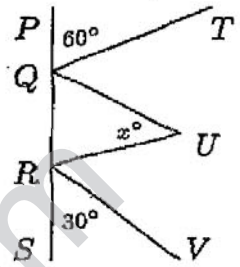
12. When making a milkshake, I use 3 times as much icecream as syrup and $7\frac{1}{2}$ times as much milk as syrup. In my milkshake, how many times as much milk as icecream do I have?

(A) $2\frac{1}{2}$ (B) $22\frac{1}{2}$ (C) $10\frac{1}{2}$ (D) 3 (E) $4\frac{1}{2}$

13. The local landfill can hold 1 million cubic metres of rubbish. Each truck that goes to the landfill delivers 5 cubic metres of rubbish and 6 trucks per day go to the landfill 6 days per week. The number of years the landfill will last is about

(A) 1 (B) 3 (C) 11 (D) 25 (E) 100

14. In the diagram, $PQRS$ is a straight line, $\angle PQT = 60°$, $\angle SRV = 30°$. UQ bisects $\angle TQR$ and UR bisects $\angle QRV$. The value of x is



(A) 65 (B) 45 (C) 50 (D) 60 (E) 75

15. Which of the numbers 5, 6, 7, 8 or 9, when placed in the box below, gives the fraction which is closest to $2\frac{1}{2}$?

$$\frac{19}{\square}$$

(A) 5 (B) 6 (C) 7 (D) 8 (E) 9

16. Every day, I swim the same number of laps of my pool. After completing a certain number of laps, I have done 20% of the total, and after one more lap I have completed 25% of the total. How many laps do I swim each day?

(A) 20 (B) 30 (C) 40 (D) 50 (E) 60

17. In the following subtraction some of the digits are represented by letters.

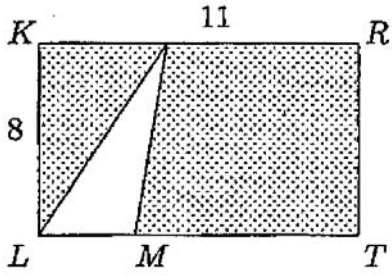
$$\begin{array}{rccccc} & a & 4 & b & 7 & c \\ - & 5 & d & 8 & e & 6 \\ \hline & 2 & 8 & 4 & 9 & 9 \end{array}$$

Which letter has the largest value?

(A) a (B) b (C) c (D) d (E) e

J4

18. In the diagram, $KRTL$ is a rectangle, 11 cm by 8 cm. $LM = 4$ cm. The shaded area, in square centimetres, is



(A) 44 (B) 56 (C) 72 (D) 48 (E) 32

19. The largest number of diagonals that can be drawn on the faces of a cube so that no two of the diagonals have a common point is

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

20. The first year after 1999 which is the product of three consecutive integers is

(A) 2004 (B) 2040 (C) 2046 (D) 2052 (E) 2184

Questions 21 - 30, 5 marks each

21. For each of the three-digit numbers with no digits zero, the difference between the number itself and the product of its digits is calculated. The largest such difference is

(A) 110 (B) 270 (C) 902 (D) 910 (E) 927

22. A date is said to be *lucky* if when written numerically, the product of the day and the month equals the last two digits of the year. For example, 31/3/1993 was a lucky day, since $31 \times 3 = 93$. How many lucky days were there in 1996?

(A) 3 (B) 4 (C) 5 (D) 6 (E) 10

23. Thirty-six $1 \times 1 \times 1$ cubes are used to make a rectangular prism. How many different rectangular prisms can be made?

(A) 5 (B) 6 (C) 7 (D) 8 (E) 9

24. The numbers 24, 27, 36, 42, 63, 84, 87 and 96 are separated into two groups of four numbers so that the difference between the sums of the numbers in each group is the least possible. This difference is

(A) 0 (B) 1 (C) 3 (D) 6 (E) 9

25. The fraction $\frac{n}{360}$ is reduced to its lowest terms. Replacing n with positive integers less than 360 will result in how many different fractions with a single digit denominator?

(A) 7 (B) 11 (C) 17 (D) 19 (E) 21

26. In how many different ways can three children share 8 identical sweets so that each child gets at least one?

(A) 21 (B) 24 (C) 36 (D) 45 (E) 132

27. In triangle PQR, the length of each side is a whole number of centimetres. Also, PQ is 14 cm longer than PR, and QR is 30 cm longer than PR. The minimum possible perimeter of $\triangle PQR$, in centimetres, is

(A) 44 (B) 47 (C) 91 (D) 94 (E) 95

28. Numbers with two digits or more, in which the digits, reading from left to right, occur in strictly increasing order are known as *sorted* numbers. For example, 125, 14 and 239 are sorted numbers but 255, 74 and 198 are not. Suppose that a complete list of sorted numbers is prepared and written in increasing order. The 100^{th} number on this list is

(A) 389 (B) 356 (C) 269 (D) 345 (E) 258

29. One hundred people are standing in a line and they are required to count off in fives as 'one, two, three, four, five, one, two, three, four, five,' and so on from the first person in the line. Anyone who counts 'five' walks out of the line. Those remaining repeat this procedure until only four people remain in the line. What was the original position in the line of the last person to leave?

(A) 94 (B) 96 (C) 97 (D) 98 (E) 99

30. If the tens digit of a perfect square number is 7, how many units digits are possible?

(A) one (B) two (C) three (D) four (E) five