The University of Melbourne School Mathematics Competition, 2026

JUNIOR DIVISION
Solutions
Time allowed: Two hours

These questions are designed to test your ability to analyse a problem and to express yourself clearly and accurately. The following suggestions are made for your guidance:

(1) *Considerable weight will be attached by the examiners to the method of presentation of a solution. Candidates should state as clearly as they can the reasoning by which they arrived at their results. In addition, more credit will be given for an elegant than for a clumsy solution.*

(2) *The* ***six*** *questions are not of equal length or difficulty. Generally, the later questions are more difficult than the earlier questions.*

(3) *It may be necessary to spend considerable time on a problem before any real progress is made.*

(4) *You may need to do rough work but you should then write out your final solution neatly, stating your arguments carefully.*

(5) *Credit will be given for partial solutions; however a good answer to one question will normally gain you more credit than sketchy attempts at several questions.*

Textbooks, electronic calculators and computers are ***NOT*** *allowed. Otherwise normal examination conditions apply.*

1. A place name is written with eight letters. The letters A,B,C,...,Z of the alphabet are assigned the values 1,2,3,...,26.

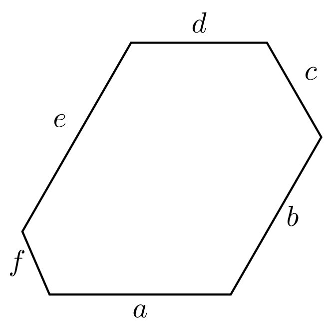
When the numbers assigned to the first and second letters are added, the result is 27
When the numbers assigned to the second and third letters are added, the result is 15
When the numbers assigned to the third and fourth letters are added, the result is 40
When the numbers assigned to the fourth and fifth letters are added, the result is 35
When the numbers assigned to the fifth and sixth letters are added, the result is 11
When the numbers assigned to the sixth and seventh letters are added, the result is 3
When the numbers assigned to the seventh and eighth letters are added, the result is 19.
What is the place name?

2. Find all four digit numbers that are perfect squares and such that each digit is a prime number.
Solution:

3. Find the sum of all positive integers less than 1000 which do not contain any of the digits 2, 3, 5.

4. Cal and Sal are each randomly assigned a 1km (connected) section of a 5km road to care for its upkeep. What is the probability that their sections overlap?

5. Consider a hexagon whose six angles are all equal to 120 degrees. Let a, b, c, d, e and f denote the lengths of the six sides (in order). Suppose that $e = \min(a, c)$. Prove that $b = \min(d, f)$.



(Note that $\min(x, y)$ is the minimum of x and y so $\min(4, 1) = 1$.)
Solution:

6. To train for a race Lanxin has decided to run every day for a week. She has decided to run at least one lap of a local running track each day, and no more than 12 laps across the week, to avoid being too tired. Show that there are consecutive days during which she runs a total of 7 laps. For example, she may have run 1, 4 and 2 laps on days 3, 4 and 5, or 1 lap each day over the 7 days.