

2010 UQ/QAMT Problem Solving Competition - Year 8 Paper

All questions have equal value.

Question 1

Find a 3 digit number equal to the sum of the cubes of its decimal digits. (The first digit is not allowed to be 0.)

Question 2

Let a , b , and c be real numbers such that $a - 7b + 8c = 4$ and $8a + 4b - c = 7$. What is the value of $a^2 - b^2 + c^2$?

Question 3

A camel has to carry 3,000 bananas across a 1,000 km desert. However the camel can only carry 1,000 bananas at a time, and she eats one banana for each km she travels. What is the maximum number of bananas that will reach the other side of the desert?

Question 4

Using each of the digits 1 . . . 9 exactly once, fill in the boxes to make a correct equation:

$$\square\square \times \square\square\square = \square\square\square\square.$$

Question 5

There are 15 cars in a parking lot.

- (1) Each car is red, yellow, blue or green.
- (2) There is at least one of each colour.
- (3) A majority of the cars are red.
- (4) There are more blue cars than green cars.
- (5) There are fewer yellow cars than any other color.

How many green cars are there?

Question 6

A light hitting a mirror at angle α measured from the perpendicular is reflected at angle α on the other side of the perpendicular. The rough diagram here shows a cross section of the pentagonal prism found in some cameras, where sides BC and DE are mirrors and the angles BCD and CDE are equal. Light entering the prism is reflected twice, and emerges at 90° to its original path. What is the angle BCD ?

