

2004 QAMT Problem-Solving Competition - Year 9 & 10 Paper

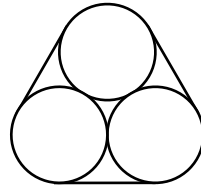
Question 1 I have 189 dollar coins and 20 jars. I want to distribute the coins amongst the jars so that each jar has a different number of dollars in it (note that I allow \$0 in a jar). Can I do it? If so, tell me how. If not, explain why not? 2 marks

Question 2 The values of a , b , and c are such that $a - b = b - c = 8$. Determine the numerical value of $a^2 - 2b^2 + c^2$. 2 marks

Question 3 Find a four digit even number $abcd$ (where a, b, c, d are the four digits) such that 1.5 times $abcd$ equals the four digit number $dcba$. ($a = 0$ is not allowed.) 4 marks

Question 4 Two planets are orbiting a star in circular orbits. The first takes 12 years to make an entire orbit, and the second takes 32 years. Currently both planets and the star are aligned along a straight line. How many years pass until this next happens? (The planets do not have to return to their starting positions, they just need to line up.) 4 marks

Question 5 A belt is drawn tight around 3 circles of radius 10 cm, as shown. How long is the belt? 4 marks



Question 6 Fill in the 3 by 3 square below with positive integers in such a way that the *product* of entries in each row, column and the two diagonals is 1000. No integer appearing in the square may occur more than once. 4 marks

