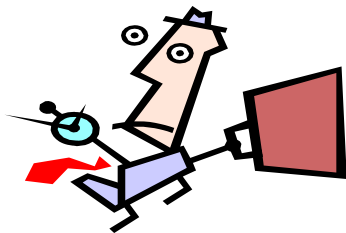


Problem Solving



- 70 What are the last two digits of 2^{222} ?
- 71 John has a rectangular paved area in his yard. He increases both the length and the width of this paved area by 20%. What is the percentage increase in the paved area?
- 72 A basketball team knows that it must win at least 60% of all its games in order to qualify for the finals. After 8 games it has only won 50 % of its games, with 12 games remaining. What is the minimum percentage of these remaining games that the team must win in order to qualify for the finals?
- 73 A sculpture consists of three large cubes, sitting, without overhang, one upon the other. It is to have its exposed surfaces painted bright yellow after being placed in the centre of Perth. The largest cube sits flat on the ground and has side length of 3 metres. The other two have side lengths of 2 and 1 metres respectively. One tin of paint is needed to cover each square metre. How many tins of paint are required?
- 74 The sum of three consecutive odd numbers is 27. What is the smallest of the three numbers?
- 75 The average of six numbers is 4. A seventh number is added and the new average is 5. What is the seventh number?
- 76 A father in his will left all his money to his children in the following manner:
\$1000 to the first born and $\frac{1}{10}$ of what then remains, then \$2000 to the second born and $\frac{1}{10}$ of what then remains, then \$3000 to the third born and $\frac{1}{10}$ of what then remains, and so on. When this was done each child had the same amount. How many children (between 5 and 11) were there?

- 77 The wheels of a truck travelling at 60 km/h make 4 revolutions per second. What is the diameter of each wheel in metres.
- 78 One electronic device makes a “bip” each 60 seconds. Another electronic device makes a “bip” each 62 seconds. They both “bip” at 10:00 am. When next will they “bip” together?
- 79 A painter can paint a room in twelve hours. An apprentice, who can paint the room in twenty-four hours, is added to the workforce. If they work together at the rates indicated, how long will it take them to paint the room?
- 80 Al and his younger brother Tim take their pocket money, \$20 and \$10 respectively, to the shops to buy fruit. Together they spent \$10.40. Al has three times as much money left as Tim. How much did Al spend?
- 81 A jet flies at 800 km/h for one third of its flight time and averages 700 km/h for the entire trip. What is the average speed, in kilometres per hour over the remaining part of the journey?
- 82 A bag contains 20 marbles coloured either red, blue or green. There is one more red than white, 4 more white than blue and one more blue than green. How many red marbles are there?
- 83 A glass of milk is full. The total weight of the milk and the glass is 375gm. When the glass is half full of milk its weight is 290gm. How much does the glass weigh?
- 84 Find the sum of all the four digit numbers that can be made by using the digits 1, 2, 3 and 4 without repeating any digit.
- 85 A traveller receives \$1.25 in New Zealand currency for each of his Australian dollars. How many Australian dollars would he need to change to receive NZ\$1000.
- 86 One of the elephants in the zoo is on a special diet and eats every day a portion of carrots which is equal to what one of the rabbits eats in one year (365 days). Together, in one day, the elephant and the rabbit eat 111 kilograms of carrots. How many kilograms of carrots does the rabbit eat in one day?

- 87 If your heart pumps about 80 millilitres of blood each second, then what volume of blood, in litres, does it pump in one day?
- 88 The average of four numbers is 48. If 8 is subtracted from each number, what is the average of these new numbers?
- 89 Mary's brother and grandmother both died young. The sum of their lifespans equalled 66 years. Mary's brother died 93 years after their grandmother was born. How many years after their grandmother died was Mary's brother born?
- 90 A shop buys 40 pens of three different types at a cost of \$40. If the pens cost 25c, \$1 and \$5 each, and there are more \$1 pens than \$5 pens, how many 25c pens were bought?
- 91 If the length of each edge of a cube is increased by 50%, what is the percentage increase of the surface area of the cube?
- 92 Find a two digit number such that the number itself, subtract the sum of its digits, equals 36. The sum of the digits, plus the product of the digits, equals the number subtract 8.
- 93 A bookworm started eating its way through a six volume set of encyclopedias starting at the front cover of volume 1 and ate its way through to the outside of the back cover of volume 6. If each volume was 4cm thick how far had the bookworm traveled? (You may assume the volumes are stacked in numerical order.)
- 94 Luke and Grant were born in the same year at the same hour of the same day to the same mother in the same hospital. They have the same father and yet they are not twins. WHY?
- 95 What number am I? I am a whole number. If you remove my head then I am even, and if you cut off my tail, then I am somebody's mother.
- 96 How quickly can you find out what is so unusual about this paragraph? It looks so ordinary that you would think that nothing is wrong with it at all, and, in fact, nothing is. But it is unusual. Why? If you study it and think about it, you may find out, but I am not going to assist you in any way. You must do it without coaching. No doubt, if you work at it for long it will dawn on you. Who knows? Go to work and try your skills. Good luck!
- 97 Burglar Bill was confident he could crack any safe in the country. Bookmaker Bert was so sure his safe could not be broken into, he gave clues about the combination. He stated that his combination was 9 digits long, not all different, contained no zeros, and was such that:
the product of the first pair of digits was equal to the second pair,

the product of the second pair of digits was equal to the third pair, the product of the third pair of digits was equal to the fourth pair and, the product of the fourth pair of digits was equal to the ninth digit.

Burglar Bill, who liked numbers, had no trouble with the combination. What was it?

98 If it takes 10 ships 10 days to use 10 tanks of oil, how many days will it take one ship to use one tank of oil?

99 The sum of a number, its square and its square root is 276. What is the number?

100 Diophantus, a Greek mathematician, spent one sixth of his life in childhood, one twelfth in youth and one seventh as a bachelor. Five years after his marriage he had a son, who died four years before his father at half his fathers age. How long did Diophantus live?

101 What two-digit number is twice the product of its digits?

102 There is a certain number consisting of 3 digits which is equal to 36 times the sum of its digits.

7 times the left most digit plus 9 is equal to 5 times the sum of the remaining digits.

8 times the second digit minus 9 is equal to the sum of the first and third digits.

What is the number?

103 There is an island in the form of a semi-circle. Two men start from a point on the diameter; one walks along the diameter, and the other at right angles to it. The former reaches the extremity of the diameter after walking 4 km and the latter the boundary of the island after walking 8km.

What is the area of the island?

104 If 40 people, on parting, all shake hands with each other, how many handshakes will there be altogether?

105 What is the smallest number which is divisible by every number from 1 to 10 inclusive?

106 Place two brackets (two pairs) in this statement to make it correct:

$$3 - 3 - 4 - 3 - 3 = 4$$

107 What is the two-digit number such that if you subtract 7 the result is divisible by 7 and if you subtract 8 it is divisible by 8?

108 Three men walk into a motel and ask for a room. The desk clerk says a room is \$30 so each man pays \$10 towards the cost. Later, the clerk realises he made a mistake, that the room should have been \$25. He calls the bellboy over and asks him to refund the other \$5 to the three men. The bellboy, not wanting to mess with a lot of change dividing the \$5 three ways, decides to lie about the price, refunding each man \$1 and keeping the other \$2 for himself. Ultimately each man paid \$9 towards the room and the bellboy got \$2, totalling \$29. But the original charge was \$30, where did the extra \$1 go?

109 A bartender has a three pint glass and a five pint glass. A customer walks in and orders four pints of beer. Without a measuring cup but with an unlimited supply of beer how does he get one pint in either glass?

110 You are a cook in a remote area with no clocks or other way of keeping time other than a four-minute hourglass and a seven-minute hourglass. You do have a stove however with water in a pot already boiling. Somebody asks you for a nine-minute egg, and you know this person is a perfectionist and will be able to tell if you undercook or overcook the eggs by even a few seconds. What is the least amount of time it will take to prepare the egg?

More to come.