

## YEAR 10 MATHMIND QUESTIONS

1. Most calculators can only give exact values of numbers up to ten digits. Find the EXACT value of  $1333333333^2$ . Ans: 17777777776888888889

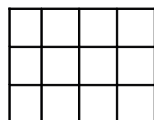
2. THE CUBE CHAIN PROBLEM: Starting with 36 find the sum of the cubes of the individual digits of the number. This will form a new number, repeat the process

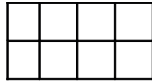
i.e.  $36 \rightarrow 3^3 + 6^3 = 243 \rightarrow 2^3 + 4^3 + 3^3 = 99 \rightarrow \text{etc.}$

Eventually a three digit number will occur which transforms into itself.

What is that number? Ans: 153

3. On a wet afternoon, Maddie wrote down all the multiples of 7 which were less than 1000. What is the sum of all the numbers? Ans: 71071
4. Farmer Jones has an interesting rectangular paddock. The lengths of the sides and the lengths of the diagonals are all whole numbers when measured in metres. The total distance around the paddock plus the two diagonals is 364m. What is the area of the paddock? Ans:  $1092 \text{ m}^2$
5. In a recent survey of 120 people, 19 played neither rugby nor cricket. 38 played rugby only and twice as many played both rugby and cricket as played cricket only. How many played both sports? Ans: 42
6. A googol is a 1 followed by one hundred zeros. What is the right most digit of 7 to the power of a googol? Ans: 1
7. Mr Smith lives in Gridsville. There are six streets running east/west and five avenues running north/south. Each intersection is 1km apart. This drawing shows one possible journey from his home to his workplace.





He always travels 9km to work but like to vary his route. How many different routes can he take? Ans: 126

$\frac{W}{H^2}$  8. Every person has a BMI ( Body Mass Index). It is calculated by the formula  $BMI = \frac{W}{H^2}$ . W is the weight in kg and H is the height in metres.

9. Mr Brown lost 11 kg and dropped his BMI by 3 units. How tall was Mr Brown to the nearest centimetre? Ans: 1.91 metres

10. I have five children and two of them are twins. The youngest two were born ten years apart. Their ages multiply to 527 136. How old are each of my children?

Ans: 6, 16, 17, 17, 19

11. I am an elephant and 3.5m tall. One night I stood 5 metres away from a 16 metre tall lamp post. How long was my shadow? Ans; 1.4m

12. I am thinking of a two-digit number less than 50. If you double my number and subtract 12, you get the original number with the digits reversed! What is the number I was thinking of? Ans: 48

13. There is a group of boys and girls standing in line at the bus stop. 15 girls get on the first bus to arrive; now there are 2 boys for each girl still at the bus stop. On the second bus, 45 boys get on; now, at the bus stop, there are 5 girls for each boy. What was the original number of girls? Ans: 40 girls

14. The following is a cryptarithm: each letter stands for a digit (0 through 9), no digit is represented by two different letters, and no number can begin with a 0.  
 $SQ \times LQ = RRR$

What is the value of  $S + Q + L + R$ ? Ans: 1.587

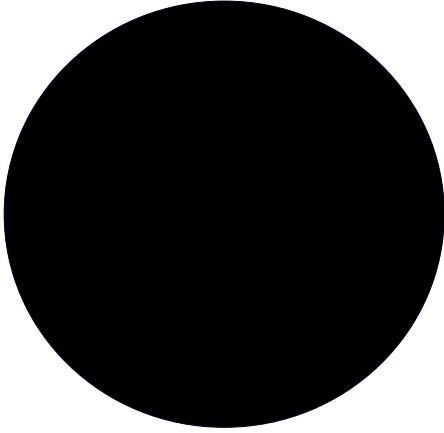
$$\frac{4\pi r^3}{3}$$

15. The volume of a sphere is given by the formula  $V = \frac{4\pi r^3}{3}$ . The surface area is given by  $S = 4\pi r^2$ . We blew some air into a sphere and doubled its volume. By how much did we multiply the surface area? Answer must be correct to three decimal places.  
Ans: 21 degrees.

16. My bath takes 20 minutes to fill using the cold tap only. It takes 30 minutes to fill if I use the hot tap only. These values assume the plug is in of course. I noticed it took 15 minutes for the bath to empty when I took the plug out. How long would it take the bath to fill if I turned both taps on and forgot to put the plug in? Ans: 60 minutes

17. How many triangles are there in this diagram? Hint: there are over 20. Ans 26

18. This design was drawn on the surface of a large field. The cost of drawing it is \$1 per metre. The square's vertices just touched the circumference of the circle. How much will it cost to make the design, to the nearest dollar. The square is 100m along each side. Ans: \$1127



19. Albert is twice as old as Barry. Charlie is ten years older than Albert. Dave is 14 years younger than Charlie. When Dave's age is added to Barry's, the sum is Eddie's age. If all their ages add to 1312 years. How old is Dave? Oh and by the way, they are all tortoises. Ans: 258

20. The cost of writing digits in Ruritania has gone up. Each digit 1 to 9 (zeros are free) cost the same as the value of the digit. I.e the cost of the digit 7 is \$7. To write down my telephone number 349876 costs me \$37 (check it out). What would it cost me to write all the numbers from 1 to 100?

Ans: \$901

