2022 Wits Mathematics Competition
Final Round
Middle Primary

Instructions

This paper is 90 minutes long and consists of ten single answer questions (to be answered in the below table) and two proofs (to be answered on the pages they're written on). If needed, additional sheets of blank paper may be used to finish your solutions.

Calculators may NOT be used. A ruler and compass may be used but all other geometric aids are NOT allowed. A translation aid (such as a dictionary) from English to another language is allowed.

Questions 1 – 3 are each worth 4 marks.
Questions 4 – 7 are each worth 5 marks.
Questions 8 – 10 are each worth 6 marks.
Questions 11 – 12 are each worth 10 marks.
The total number of marks available is 70.

"It requires a very unusual mind to undertake the analysis of the obvious." - Alfred North Whitehead

Question	Answer
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	
10.	

A. 4 point questions

1. Aiden got the 11th highest mark out of a class of 47 students in their maths test. What was his rank from the bottom of the class?

2. A printer can print a book in 5 minutes. How long does it take for 100 of these printers to print 100 books?

3. Palesa wanted to multiply a number by 101 but she forgot the 0 and multiplied the number by 11 instead. The resulting number was 99. What should her answer have been?
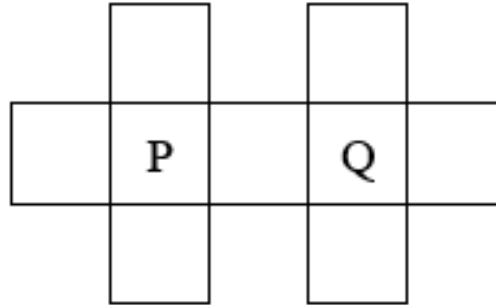
B. 5 mark questions

4. What is the value of $\frac{1}{2+\frac{1}{2+\frac{1}{2}}}$?

5. What is the sum of the largest 1-digit, 2-digit and 3-digit integer numbers?

6. The grid below contains a magic square. That means that each of the rows, columns and diagonals in the grid sum to the same total. Each of the digits in the grid are different (i.e. 1 to 9). The locations of digits 7 and 8 are given. What is the value of x?

		8
	7	x

7. A box measures $2,8m \times 1,5m \times 2m$. What is the maximum number of smaller boxes measuring $0,3m \times 0,5m \times 0,7m$ that can fit into the bigger box?

C. 6 mark questions

8. Each digit from 1 to 9 is placed, one per box, in the diagram shown. The five numbers in the middle row add to 18. The first column of three adds to 16, and the last column adds to 22. What is the value of P + Q?

9. If $A * B$ means $\frac{A+B}{2}$, then what is the value of $(8 * 10) * 3$?

10. A truck drives 60km from Johannesburg to Pretoria in 2 hours. The truck then makes the return trip from Pretoria to Johannesburg at an average speed of 90km/h. What was the average speed over the course of the entire trip?

D. Proof questions, 10 marks each

11. Eight teams participate in a soccer tournament. Each team will play every other team in the tournament once in the group stage. After the group stage, the quarter finals will be played (1st vs 8th, 2nd vs 7th, etc), followed by the semi finals and a final. How many matches will be played in total?

12. The lengths of the sides of the compound shape below are eight different whole numbers with the longest side being equal to $10cm$. What is the minimum area of the compound shape if $BC > AB > DC$ and $AH > ED$? Show all your working.