



TALENT SEARCH 2013

- Please write your personal details and your answers on the answer sheet provided.
- Work through the explanations carefully to ensure that you understand the nature of the questions fully before attempting to answer the questions.
- You may answer the questions in any order. Leave the difficult questions for last.
- In each case provide the BEST answer.
- It is important to place the answers in the correct line on the answer sheet.
- There are 30 questions in this paper.
- You have one hour (**60 minutes**) to attempt as many questions as possible.
- The maximum number of marks is **100**.
- The mark allocation per question is given on the answer sheet.
- You may ask your teacher to translate a question, but in all other ways the conditions are the same as for a formal examination.

1: Building A, which is 110 m tall, casts a shadow of 55 m. Building B, next to it casts a shadow of 33 m. How tall is building B?

2: Train A leaves Cape Town for Johannesburg at 06:00 and travels at 85 km/h. Train B leaves Johannesburg for Cape Town at 08:00 and travels at 105 km/h. Which train is closer to Cape Town when they pass each other?

3: $1 \times 2 \times 3 \times 4 \times 5 \times 6 \times 7 \times 8 \times 9 \times 0 =$

4: A toy boat floats in the bath. What will make the level of the water increase more - putting a R5 coin in the boat or putting it in the bath?

5: Which letter is next in the series
O T T F F S S E ?

6: A container weighs 500 kg when full, but 300 kg when half-full. What is the weight of the (empty) container itself?

7: Numbers can be palindromes if they have the same sequence of digits, whether read from Left to Right or from Right to Left. For example, 535 is a palindrome. What is the difference between the smallest three-digit palindrome and the largest three-digit palindrome?

8: A taxi travels at 120 km/h. How far does it travel in 30 seconds?

9: LEAD is to DEAL as 9514 is to

10: A pencil and a rubber together cost R1,30. The pencil costs R1 more than the rubber. What is the cost of the rubber?

11: Jason is 5 years old. In three years' time Ramone will be twice as old as Jason. How old is Ramone now?

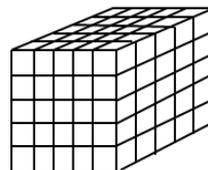
12: Z, Z, Y, Z, Y, X, Z, Y, X, W, Z, Y, X, W,
Which letter comes next in the sequence?

13: To get to her friends Sylvia can take bus route No 3 or No 7. On each route a bus runs every 15 minutes. Bus No 3 always leaves Sylvia's stop 5 minutes after bus No 7. Sylvia goes to her friends often, and at different times. She always catches the first bus to come along. Which route will she follow most frequently?

14: If the length of the sides of a square of area 10 cm² is doubled, what will the area of the new square be?

15: A sheet of paper is 0,1 mm thick. You fold it double 5 times. How thick will the result be?

16: 125 small white cubes are packed in a large cube in a 5x5x5 pattern. The paper the large cube was wrapped in, rubbed red onto every little cube it touched. How many cubes remained all white?

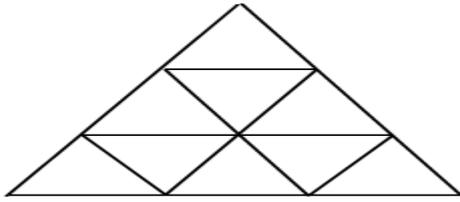


17: Which number comes next in the sequence 0, 3, 8, 15, 24, 35, 48, 63 ... ?



18: A snail climbs up a slippery garden wall, 2 m high. Each day the snail climbs 50 cm, but each night it slips 25 cm backwards. If it starts on 1 June, on which date will it reach the top?

19: How many triangles in this drawing?

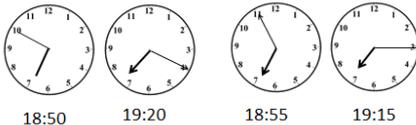


20: $85 \square 9176320$ Which number replaces \square ? Hint: Think of 0 as zero.

21: Earlier this year Anne told me: "Two days ago I was still 13. Next year I shall turn 16." On which date (day and month) is her birthday?

22: Three bags are weighed two at a time in all three possible ways. The weight of the pairs of bags is 12 kg, 13 kg and 15 kg. How much does the lightest bag weigh?

23: Only one of these times is correct: One watch is 20 minutes fast; one watch is 5 minutes slow; one watch is 25 minutes fast. What is the correct time?



24: The scoutmaster issues a pack of six badges to a scout group with four members. How many badges did Dineo get?

The following statements may help:

Anne: All three other scouts received badges

Berto: I can see a total of four badges on the other members.

Charles: None of the members I see have the same number of badges

Dineo: Charles has the most badges

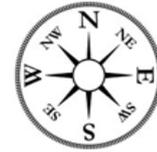
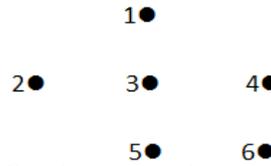
25: Three soccer teams, Ajax, City, and Hellenic play against each other in the Cape Cup. This is a competition where each team plays against the other two teams once only.

The results were as follows.

	Goals for	Goals against
Ajax	4	3
City	2	2
Hellenic	1	2

What was the score in the City-Hellenic game?

26:



On the map above, the dots represent towns. The towns are numbered from 1 to 6. The names of the towns are the letters A, B, C, D, E and F. A compass rose is provided to indicate North, South, East and West. We have the following information: C is due south of A and south-east of D; B is south-west of F and north-west of E. D is due south of F.

- Which town is at point 1?
- Which town is furthest west?
- Which town is south-west of A?
- Which town is north of D?
- Which town is at point 6?

27: Hyperspace Travel:

Imagine that the Starship Enterprise is on A3. Since D4 is written there it must travel to that position. When it arrives at B4 no travel instructions are found, so it must stay in that block forever.

	1	2	3	4
A	B2	X	D4	C3
B	A2	A4	C2	X
C	X	D2	D1	B1
D	C4	B3	X	B4

(a) Where will the Enterprise 'stay forever' if it starts at block C3?

(b) What happens if the Enterprise starts out on block B3?

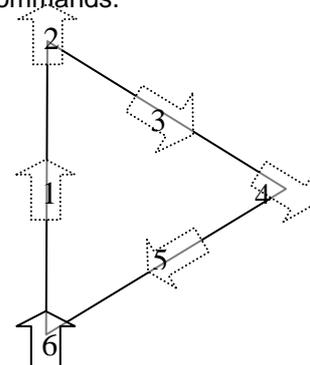
28: We have a robot known as Big Bert (BB). BB always leaves a trail of his movements. He can **only turn right** for a maximum of 360 degrees and cannot turn left at all. He can move forward any number of robot steps n but cannot go backwards. Summary of BB commands:

$T(n)$	Where n is the number of degrees to turn to the robot's right. Where $n \leq 360$
$M(n)$	Where n is the number of robot steps to move forward.

Example

To draw a shape such as an equilateral triangle with a side of 20 steps Big Bert must use the following list of commands.

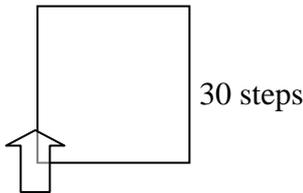
M20
T120
M20
T120
M20
T120



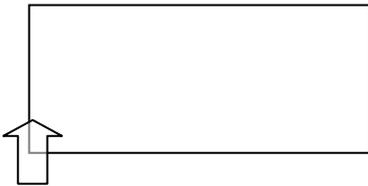
If the arrow represents the position of the robot at the start of the journey, you will see that this set of instructions brings the robot back to the starting position and facing the same way as it was before it started.

You can see that BB was instructed to do M20, T120 three times. This instruction can be written more efficiently as 3 (M20 T120).

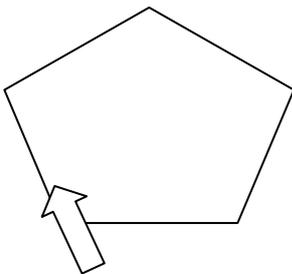
28(a) Write down the most efficient list of instructions to make BB draw a square, with the side of the square 30 steps. Remember the robot must end its journey in the position indicated.



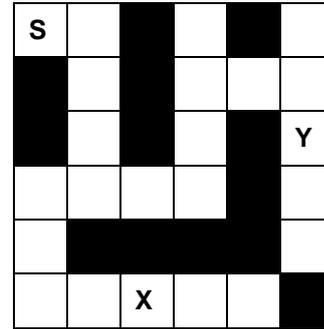
28(b) Write down the most efficient list of instructions to make BB draw a rectangle shape with a short side of 30 steps and a long side twice that. Remember the robot must end its journey in the position in which it started.



28(c) Write down the most efficient list of instructions to make BB draw a regular pentagon with each side having 30 steps. Remember the robot must end its journey in the position in which it started.



29: The following maze has two treasures marked as X and Y. Solid blocks show where walls are located, and the clear blocks show where a robot could travel. Your job is to instruct the robot to walk the shortest route through the maze to pick up the treasure. The commands you can give the robot are:



- Fx** - move forward x blocks
- R** - turn right 90°
- L** - turn left 90°
- P** - pick up treasure

Initially the robot is at position **S** and is facing towards the right of the map. The robot can only pick up the treasure if it is on the same square of the map as the treasure. As an example, here is how the robot would collect treasure **X**:

F1, R, F3, R, F1, L, F2, L, F2, P

With what commands would you need to program the robot for it to pick up treasure **Y**?

30: You need to drive your ambulance to X, the scene of an accident, as quickly as possible. Below is a map of the town, where A is the ambulance station, and each intersection is marked with a letter B, C, D, etc. The numbers along the road show how long it will take to drive that road. Find the quickest route to get from the ambulance station to the accident and indicate it with the letters for the intersections. A, B, C, D, etc.

