Wits Mathematics Competition
Grade 6-7 **9 May 2018**
Time Limit: 75 Minutes
Full Name: _____
E-mail: _____
Seat Number: _____
School: _____
Grade: _____

Instructions

This exam consists of 3 sections. Section A contains 10 multiple choice questions for 3 marks each. Section B consists of 10 single answer questions for 5 marks each. Section C consists of two questions which require full workings, each for 10 marks. You should answer Sections A and B on this page and section C on the sheets the questions are printed on.

Scores

Section	Mark	Perfect
A		30
B		50
C		20
Total		100

Problems worthy of attack prove their worth by fighting back - Piet Hein.

Section A [30 Marks]

Multiple Choice Questions					
1	A	B	C	D	E
2	A	B	C	D	E
3	A	B	C	D	E
4	A	B	C	D	E
5	A	B	C	D	E
6	A	B	C	D	E
7	A	B	C	D	E
8	A	B	C	D	E
9	A	B	C	D	E
10	A	B	C	D	E

Section B [50 Marks]

Single Answer Questions	
11	
12	
13	
14	
15	
16	
17	
18	
19	
20	

A. Multiple Choice

1. What is the value of $0,8 - 0,07$?
   A. $0,01$
   B. $0,1$
   C. $0,71$
   D. $0,73$
   E. $0,793$

2. What is thirteen million added to thirteen thousand?
   A. 1313000
   B. 130130130
   C. 13013000
   D. 13001300
   E. 13000013000

3. What integer is closest in value to $9 \times \frac{3}{5}$?
   A. 5
   B. 6
   C. 7
   D. 8
   E. 9

4. The integer 287 is exactly divisible by:
   A. 3
   B. 4
   C. 5
   D. 6
   E. 7

5. Find the value of $\frac{4}{7} + \frac{5}{9}$:
   A. $\frac{9}{16}$
   B. $\frac{9}{32}$
   C. $\frac{71}{63}$
   D. $\frac{9}{63}$
   E. $\frac{87}{63}$

6. If $4 + 6x = 46$, determine the value of x.

   A. 4

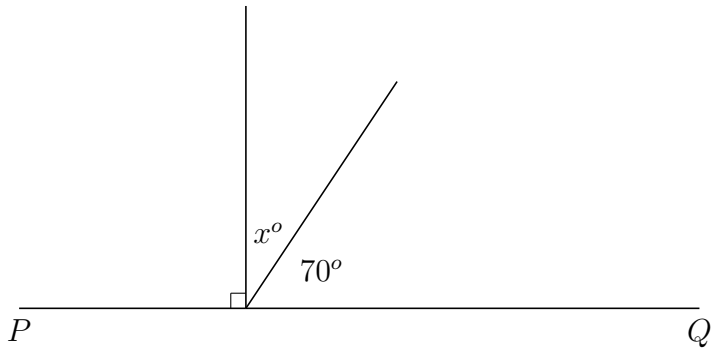
   B. 5

   C. 6

   D. 7

   E. 8

7. If $\overline{PQ}$ is a straight line segment, then the value of x (measured in degrees) is:



   A. 160

   B. 70

   C. 110

   D. 20

   E. 80

8. Two fair coins are flipped at the same time. Find the probability that both land as heads.

   A. 0

   B. $\frac{1}{4}$

   C. $\frac{1}{2}$

   D. $\frac{3}{4}$

   E. 1

9. Tian measured her steps and found that it took her 625 steps to walk 500 m. If she walks 10000 steps at this same rate, what distance will she walk?

   A. $6,4$ km

   B. 10 km

   C. $7,2$ km

   D. $12,5$ km

   E. 8 km

10. A Sweet Company has 8362 fizzers to package. They place exactly 12 fizzers in each package. How many fizzers remain after the maximum possible number of packages are filled?

   A. 2

   B. 4

   C. 6

   D. 8

   E. 10

B. Single Answer

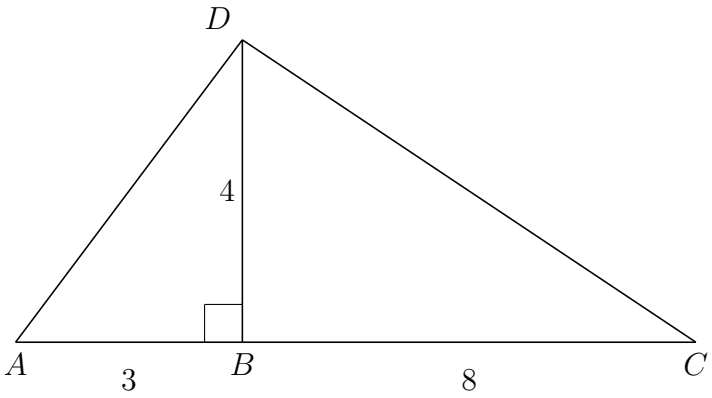
11. Luke has played 20 games and has a 95 % winning percentage. Without losing any more games, how many more games in a row must he win to reach exactly a 96 % winning percentage?

12. Bob's mathematics exam had 30 algebra questions and 50 geometry questions, each worth 1 mark. He got 70 % of the algebra questions correct, and his overall exam mark was 80 %. How many geometry questions did he answer correctly?

13. The digits 1,2,3,4,5 and 6 replace the letters a,b,c,d,e and f in some order and way to make the following product true $ab \times c = def$. For clarity note that if $a = 1$ and $b = 2$ ab would be 12. Find the value of c.

14. Chloe has made a code out of the alphabet by assigning a numerical value to each letter. She then assigns a numerical value to a word by adding up the numerical values of the letters in the word. Using her code, the numerical value of BAT is 6. Also, her code gives numerical values of 8 to CAT and 12 to CAR. Using her code, what is the numerical value of BAR?

15. In the diagram, the length of BC is 8cm, the length of AB is 3cm and the length of BD is 4cm. Find the area of the triangle ADC, in cm^2.



16. What is the units digit of $19^{19} + 99^{99}$?

17. Ana's monthly salary was $R2000$ in May. In June she received a 20 % raise. In July she received an additional 20 % pay raise. After the two changes in June and July, what was Ana's monthly salary?

18. When finding the sum $\frac{1}{2} + \frac{1}{3} + \frac{1}{4} + \frac{1}{5} + \frac{1}{6} + \frac{1}{7}$, the least common denominator used is:

19. Find the sum of all divisors of 2018. Note that you should include 2018 as a divisor of itself. For example, the divisors of 6 are 1,2,3 and 6 which sum to 12.

20. There is a list of seven numbers. The average of the first four numbers is 5, and the average of the last four numbers is 8. If the average of all seven numbers is $6\frac{4}{7}$, then the number common to both sets of four numbers is:

C. Proof Questions

21. You have 9 coins, one of which is fake. The 8 real coins all weigh the same but the fake one is slightly lighter. You have a balance scale, which you may use only twice. A balance scale works by letting you compare the weights of two coins (or two groups of coins). It will either tell you that the two groups weigh the same or that one is heavier. Explain how you'd find the fake coin.

22. An octagonal swimming pool has sides which are consecutively 10 m, 20 m, 30 m, 40 m, 50 m, 60 m, 70 m and 80 m. All the pool's angles are right angles. Find the top surface area of the pool, in square metres. Show your work and justify all steps.