FOBISIA Maths 2015 INDIVIDUAL CHALLENGE Written Paper	FOBISIA **BISS Puxi Shanghai**

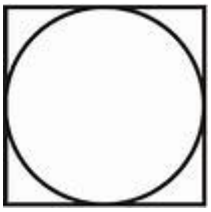
ANSWERS

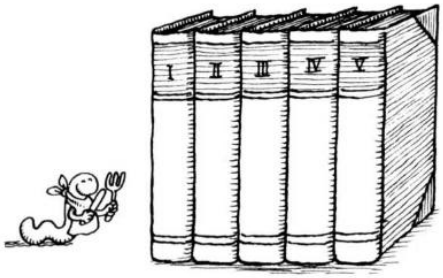
All questions are worth 1 mark. If it has a part A and B then each part is worth one mark.

Example: What is 13^2	169
1.) What time must it be if I want the hour hand on an analogue clock to turn 315° to give me 6 o'clock?	Answer: 7:30
2.) David goes in a time machine to the year 456798793 AD. How many years will he have to wait until the next Olympics? (Olympic Games are held every 4 years. The last one was in 2012)	Answer: 3 years
3.) What is the 17th triangular number?	Answer: 153
4.) Which one of the following numbers is a prime number? a.) 220352 b.) 543675 c.) 345663 d.) 220373 e.) 111477	Answer: d.) 220373
5.) Emma is 6 years older than her sister Isabella and 7 years younger than her sister Jasmine. The sum of their three ages is 55. How old is Emma?	Answer: Emma 18 (Isabella 12 Jasmine 25)

6.) The Great Wall of China is 6300Km long, 9m wide and 8 m high. If the wall was one long cuboid, what would the volume of the cuboid be in km³? (3 d.p.)	Answer: 0.454 km³
7.) In the Imperial system the measures for wine are: 2 gills = 1 chopin 2 chopins = 1 pint 2 pints = 1 quart 2 quarts = 1 pottle 2 pottles = 1 gallon 2 gallons = 1 peck 2 pecks = 1 demibushel 2 demibushels = 1 bushel (or firkin) 2 firkins = 1 kilderkin 2 kilderkins = 1 barrel How many gills are there in a barrel?	Answer: 1024
8.) Twelve million twelve thousand twelve hundred and twelve can be written as A. 12 012 012 B. 12 013 212 C. 12 121 212 D. 120 121 212 E. 133 212	Answer: B
9.) In a Toby Carvery restaurant in the UK you can have a starter, main meal and dessert for under £15. They have 5 starters, 8 different mains and 17 desserts. Mr. Roast decided that he would go to the restaurant every day and order a different combination of starter, main and dessert. For how many days was he able to eat a different combination?	Answer: 680 days
10.) The persistent frog In its search for water a frog fell down a 30ft well. Its progress out of the well was very erratic. Each day it managed to climb up 3ft, but the following night it slipped back 2 ft. How many days did it take the frog to get out of the well?	Answer: 28 days

11.) When preparing rice, farmers must remove the husk (the husk is like a shell). Until now, an old Chinese farmer would hire a local worker to help him use a pestle to remove these husks from his rice. For his work, the worker would be paid 10 Yuan per hour and it would take him 6 hours to remove the husks from 50 Kg of rice. The Old Chinese farmer has recently bought an electric machine, which does all the work for him, so he now has no need to hire the worker. If the new machine cost 1200 Yuan, how many Kg of rice must be cleaned by the machine for it to be more economical for the farmer to use the machine rather than the worker? 	Answer: just above 1000 kg. accept 1001 Kg, or 1000.001 Kg etc.
12.) In 1742 Christian Goldbach wrote a letter to Leonard Euler saying that he believed every even number greater than 2 can be written as the sum of two prime numbers. How many different ways are there of writing the number 36 as the sum of two prime numbers? (Note 3+5 and 5+3 would not be considered to be different ways of writing the number 8)	Answer: 4 ways = 29 & 7, 31 & 5, 13 &23, 17& 19
13.) a.) In 2009 Usain Bolt set a world record of 9.58 seconds for the 100 meter sprint . What was his approximate average speed in miles per hour? (Note 1 mile is approximately equal to 1600m) A. 14mph B. 17mph C. 20 mph D. 23mph E. 26mph b.) If Usain Bolt could maintain that speed for a whole marathon. What would be his finishing time in seconds to 1d.p.? (A marathon is 42.195 km)	Actual 23.486 mph Answer to A: D Answer: 4042.3 seconds
14.) What is the 12th Fibonacci number ? (Don't count 0)	Answer: 144
15.) An ant is crawling in a straight line from one corner of a table to the opposite corner when he bumps into a one centimeter cube of sugar. Instead of crawling round it, or eating his way through it, he climbs straight up and over it before continuing on his intended route. How much does the detour add to the expected length of his journey?	Answer: 2cm

16.) A recipe for 12 large Triple Chocolate cookies needs 125g butter, 120g caster sugar, 60g of cocoa powder and 165g of flour. How many large cookies can I make if I have 875g butter, 600g caster sugar, 250g of cocoa powder and 660g of flour ?	Answer = 48 cookies
17.) Nine metro stops are equally spaced along a bus route. The distance from the first to the third is 6km. How far is it from the first to the last?	Answer: 24Km
18.) Strictly Cookies has agreed to reduce the amount of sugar it uses in their cookies over the next five years. Each year, the amount of sugar used will be 10% less than the previous year. What will the total percentage reduction in sugar use over the five years be?	Answer: 59.049
19.) You have 13 diamond cards: Ace, 2, 3, 4, 5, 6, 7, 8, 9, 10, jack, queen, king What are the chances of drawing king, queen and jack in that order?	Answer: 1/13 x 1/12 x 1/11 = 1/ 1716
20.) The square has a perimeter of 36cm. What is the area of its inscribed circle 2dp? (Use π to 2 dp) 	Answer: 63.59cm²
21.) The sides of a rectangle are measured as 7 cm and 9 cm, to the nearest cm in each case. What is the least possible value of the rectangle's area ?	Answer = 55.25cm²

22.) Each letter stands for a different digit. 0 is never the first digit of any number. You must identify all the possible solutions! $\begin{array}{r} AB \\ +\,AB \\ \hline CA \end{array}$	Answer: 4 solutions $A=2, B=1, C=4$ or $A=2, B=6, C=5$ or $A=4, B=2, C=8$ or $A=4, B=7, C=9$
23.) I start with a square, increase one side by 3cm and decrease an adjacent side by 2cm to form a rectangle of area 24cm². Find the perimeter of the rectangle(in cm).	Answer: 3 by 8 perimeter = 22cm
24.) In the number 0.246512465124651.....(recurring) what is the 2017th digit?	Answer: 2
25.) If I toss 3 coins, A.) What is the probability that I will get 1 head ? B.) What is the probability that I will get two heads ?	Answer: (3/8 for both)
26.) A bookworm started earing its way through a five-volume set of encyclopaedias starting at the front cover of volume I and ate its way through to the outside of the back cover of volume V. If each volume was 3cm thick how far had the bookworm travelled? (You may assume the volumes are stacked in numerical order.)  a.) 6 b.) 9 c.) 10 d.) 12 e.)14	Answer: 9cm
27.) Out of 10 motors, 3 are defective. Two are chosen at random. What are the chances that both are defective?	Answer: 3/10 x2/9 = 6/90 or 1/15
28.) Take the number 510510 and divide it by the first 7 prime numbers. What is the answer?	Answer = 1