



# INTERNATIONAL SINGAPORE MATHS COMPETITION 2017 (Primary 6)

1 hour 30 minutes

## Instructions to participants

1. Do not open the booklet until you are told to do so.
2. Attempt ALL 25 questions.
3. Write your answers neatly in the Answer Sheet provided.
4. Marks are awarded for correct answers only.
5. All figures are not drawn to scale.
6. Calculators may be used.

Questions in Section A carry 2 marks each, questions in Section B carry 4 marks each and questions in Section C carry between 6 to 10 marks each.

Jointly organised by

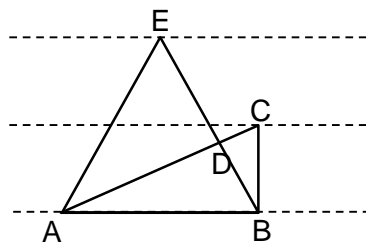


**Section A:**

Each of the questions 1 to 10 carries 2 marks.

1. The sum of 10 consecutive odd numbers is 20 000. What is the smallest of these numbers?

2. In the figure, the horizontal lines are equally spaced. Triangle ABE is an equilateral triangle and triangle ABC is a right-angled triangle.



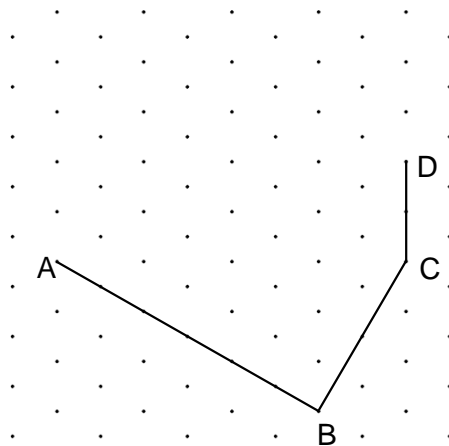
Which of the following statements about the difference in the areas of triangle ADE and triangle BCD is correct?

- (A) The difference is equal to the area of triangle ABC.
- (B) The difference is equal to the area of triangle ABD.
- (C) The difference is 1.5 times the area of triangle ABC.
- (D) The difference is twice the area of triangle ABD.

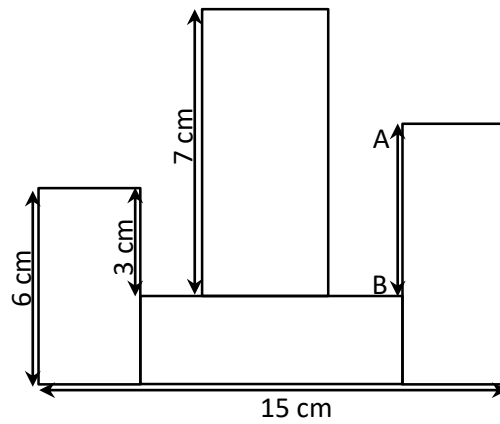
3. Sam has 3 pairs of blue boots and 4 pairs of black boots in a box. If Sam pulls out a single boot at a time without looking into the box, at least how many must he pull out to be sure to get a matching pair that he can put on?  
 (Note: Sam cannot put on boots which are both left-sided or both right-sided.)

4. Fay wrote down nine numbers in increasing order. The middle number is the average of all nine numbers. The average of the first five is 27 and the average of the last five is 49. What is the sum of all the numbers?

5. Jimmy wants to draw a 6-sided figure. He has drawn lines AB, BC and CD, where AB is perpendicular to BC. Continue drawing the figure such that  $\angle CDE$  is  $150^\circ$ ,  $\angle DEF$  is  $90^\circ$ , and FA is parallel to DC. What is the value of  $\angle EFA$ ?  
 (DO NOT USE A PROTRACTOR.)



6. The perimeter of the figure below, not drawn to scale, is 67 cm. Find the height of AB.



7. At a funfair, the ratio between the number of food stalls to the number of game stalls is 2 : 3 and the ratio of adult to children is 5:16. The ratio of the total number of stalls to the total number of people is 3 : 7. What is the ratio of the number of game stalls to the number of children?
8. If 3 dolls and 5 teddy bears cost as much as 5 dolls and 2 teddy bears, by what percentage is a doll more expensive than a teddy bear?

9. The product of the two page numbers to which my book is opened is 6162. What is the page number on the right-hand side?
10. A group of children were separated into 2 unequal teams. Everyone within the teams shook hands with each other. If the total number of handshakes from both teams is 21, how many children were there altogether?

**Section B**

Each of the questions 11 to 20 carries 4 marks.

11. Given that  $\frac{1}{4 - \frac{3}{2 + \frac{1}{n}}} = \frac{5}{13}$ , what is the value of  $n$ ?

12. In a group of young gymnasts, 24 of them can do the cartwheel, 13 of them can do the backflip and 6 of them can somersault. There are 8 gymnasts who can do the backflip but not the somersault. What is the least possible number gymnasts who can only do the cartwheel?
13. Every month, Vanessa spends a part of her salary and saves the rest. The ratio of the amount she spends to the amount she saves is 2 : 7. This month, she spent more than she usually does and the ratio became 3 : 7. By what percentage did she increase her spending?
14. What amount of water should be added to reduce 200 *ml* of 5% sugar solution to 2% sugar solution?

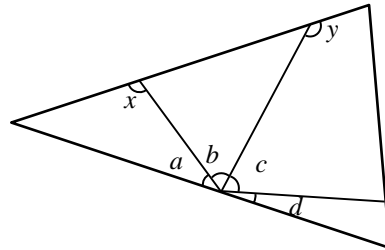
15. A group of 22 scouts went on a trip. They prepared enough food to last 18 days. At the last minute, 14 additional scouts joined them. If they still want the food to last 18 days, what fraction of the daily portion should each scout eat per day?

16. Mr Ali's age is equal to the sum of the ages of his four children. His age  $h$  years ago, was twice the sum of their ages then. What is the ratio of Mr Ali's age in  $h$  years' time to the sum of his children's age in  $h$  years' time?

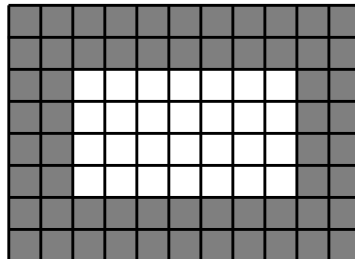
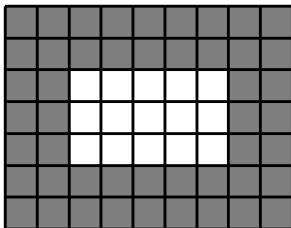
17. Given that  $1001^1 = 1001$   
 $1001^2 = 1001 \times 1001 = 1\ 002\ 001$   
 $1001^3 = 1001 \times 1001 \times 1001 = 1\ 003\ 003\ 001$ , and so on,

What is the sum of all the digits in the answer for  $1001^{11}$  ?

18. The values of  $\angle a$ ,  $\angle b$ ,  $\angle c$  and  $\angle d$  are in the ratio 3 : 5 : 5 : 2.  
 What is the value of  $\angle x + \angle y$ ?



19. Tom arranges some white tiles into rectangular shapes. Paul then surrounds the shapes with 2 layers of grey tiles. Below are two examples:



How many tiles will Paul use if Tom forms a rectangle with  $x$  tiles along its length and  $y$  tiles along its breadth? Give your answer in  $x$  and  $y$ .



20. A tree increases its number of fruits at the rate of 50% every year. What was the number of fruits produced by the tree 3 years ago, if this year it produced 54 fruits?

**Section C**

Questions 21, 22, 23, 24 and 25 carry 6, 7, 8, 9 and 10 marks respectively.

21. Given that  $\frac{1}{a} - \frac{1}{b} = \frac{1}{y}$  where  $a$  and  $b$  are consecutive numbers;

and that  $\frac{1}{x} - \frac{1}{y} = \frac{1}{3080}$ , where  $x$  and  $y$  are consecutive numbers, find the value of  $a$ .

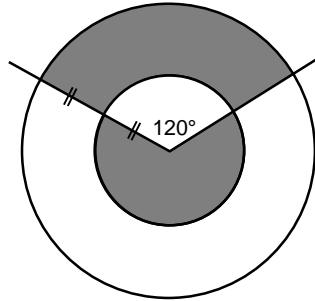
22. Which 3-digit number has exactly five factors including 1 and itself?

23. a) How many 3-digit numbers can be formed from the digits 3, 4, 5, 6, 7 and 8 with no repetition of digits? (1 mark)

b) How many ways can 6 people be divided into 2 equal groups? (2 marks)

c) Daniel has 6 pieces of straws of different lengths. The lengths are 5 cm, 6 cm, 8 cm, 9 cm, 11 cm and 15 cm. How many different triangles can he form by joining three straws end to end? (5 marks)

24. Both the white and grey parts of the  $120^\circ$  sector of the Pie-Chart represent the number of pupils from Primary 1 to Primary 2. The white and grey parts of the remaining sector represents the number of pupils from Primary 3 to Primary 6. The white parts of the Pie-Chart represent those who like Maths and the grey parts represent those who dislike Maths. Find the ratio of all the pupils who like Maths to those who dislike Maths.



25. Two trains each 400 m long, pass each other completely in 10 seconds when they are moving in opposite direction. Moving in the same direction, one passes the other completely in 20 seconds. Find the speed of the faster train.

**ROUGH WORKING**