

## MATHEMATICS ENTRANCE TEST SAMPLE PAPER

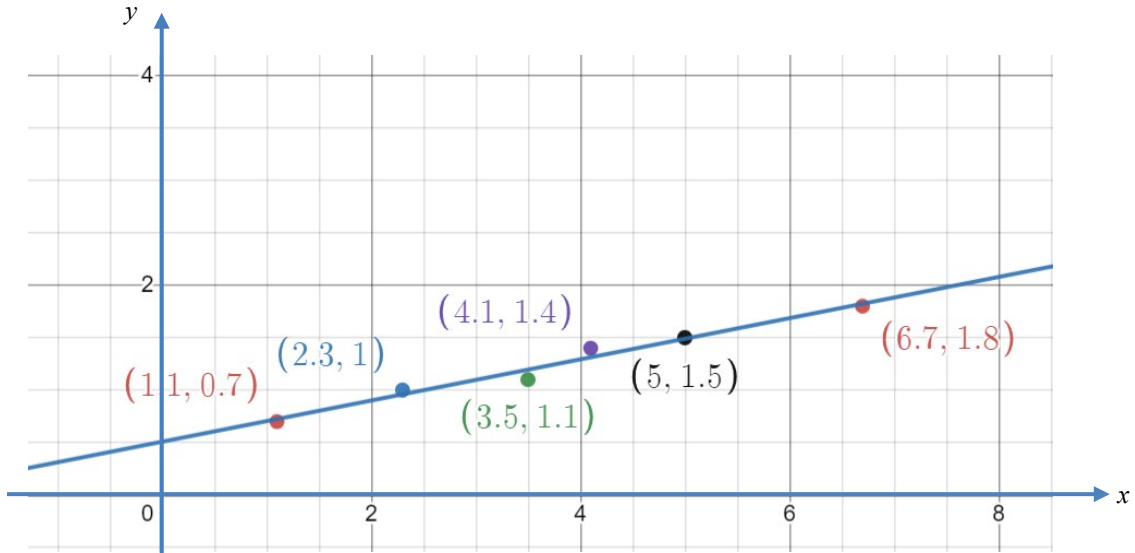
Time Allowed: 1½ hours

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### Instructions to candidates:

1. This is a **closed-book** test.
  2. Alert the invigilator if you are facing technical difficulties.
  3. You are to **ensure** that:
    - a. your laptops, computers and any other devices used for this test is in good functioning order and have uninterrupted power supply and internet connection throughout the duration of the test
    - b. you are in a conducive environment throughout the duration of the test
    - c. your answers are correctly saved by the end of the test
  4. You are **allowed** to use:
    - a. an electronic calculator
    - b. blank papers (no larger than A4 size) for rough work, but the papers will not be accepted for submission at the end of the test.
  5. You are **not allowed** to:
    - a. leave the test or leave your devices throughout the duration of the test
    - b. use the washroom throughout the duration of the test
    - c. communicate with any person, either face-to-face or through any communication device, other than the invigilator
    - d. refer to any references, e.g. textbooks, resources from a laptop or smart devices, etc.
    - e. share materials (e.g. electronic calculator) during the test
    - f. use any communication devices such as mobile phones, tablets or smart watches (except if it is used to log in to Zoom during the test)
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1.



Enter all your answers **without spacing**.

The gradient of the above graph is \_\_\_\_\_ . Leave your answer in 2 decimal places.

The y-axis intercept is \_\_\_\_\_ . Leave your answer in 1 decimal place.

The equation of the above graph is \_\_\_\_\_ .

2. A group of residents agrees to share the cost of chartering a bus to Malacca equally. The chartered fee is fixed at \$720. Before departure, four more residents join the group and each resident's share is reduced by \$6. How many residents were in the original group?

Enter your answer **without spacing**.

The number of residents in the original group is: \_\_\_\_\_  
 Leave your answer as a whole number.

3. The sum of the digits of a two-digit number is 12. If the digits are reversed, the number will be  $\frac{4}{7}$  of the original number. Find the original number.

Enter your answer **without spacing**.

The number is: \_\_\_\_\_  
 Leave your answer as a whole number.

4. Simplify  $\frac{\sqrt[3]{243}(a^3b^{-1}c)^3}{9^{\frac{3}{2}}ac^3}$  and leave your answer in positive exponents only.

Enter all your answers **without spacing**.

In the simplified expression,

- (i) the power of  $a$  in the numerator is \_\_\_\_\_  
 Leave your answer as a whole number.
- (ii) the power of  $b$  in the denominator is \_\_\_\_\_  
 Leave your answer as a whole number.
- (iii) the coefficient is \_\_\_\_\_  
 Leave your answer as a fraction.

5. Simplify  $\frac{9c^2 - 4a^2}{4a^3bc^2 - 6a^2bc^3}$ .

Enter all your answers **without spacing**.

The answer is: \_\_\_\_\_ /  $(2a^2bc^2)$ .

6. Given that  $\frac{R}{2} = \frac{3fgy^2}{y^2 - 2h}$ , express  $y^2$  in terms of  $R$ ,  $f$ ,  $g$  and  $h$ .

Enter all your answers **without spacing**.

The numerator is \_\_\_\_\_

The denominator is \_\_\_\_\_

Hence find the values of  $y^2$  if  $R = 26$ ,  $f = 2$ ,  $g = 1$ , and  $h = 3$ .

$y^2 =$  \_\_\_\_\_.

Leave your answer in 2 decimal places.

7. The mode of transport of 2160 people who work in a certain factory is shown in the table below.

Mode	No of people
Walk	$x$
MRT	162
Bus	1314
Car	408

Enter all your answers **without spacing**.

- (i) The value of  $x$  is: \_\_\_\_\_.  
Leave your answer as whole number.
- (ii) The percentage of people who travel to work by MRT is \_\_\_\_\_ % .  
Leave your answer in 1 decimal place.
- (iii) 60% of those who travel to work by bus are women. The number of men who travel by bus is \_\_\_\_\_.  
Leave your answer as whole number.
8. At a supermarket, the cost of oranges to apples is 5:4. A man bought 4 oranges at \$2.00. With the same amount of money, how many apples can he buy?

Enter your answer **without spacing**.

The number of apples he can buy is: \_\_\_\_\_.  
Leave your answer as whole number.

9. A man started work on the first day of January in a particular year and was paid \$135 per week for 24 weeks. His weekly salary was then raised by \$15 for the remaining 28 weeks in the year. What was his average monthly salary for the particular year?

Enter your answer **without spacing**.

His average monthly salary was \_\_\_\_\_.  
Leave your answer as whole number.

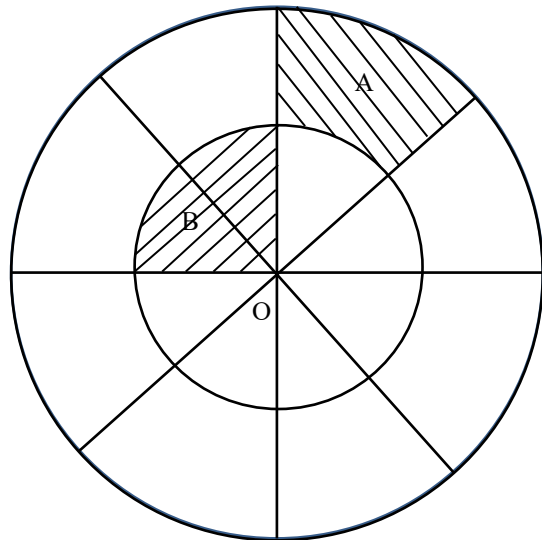
10. Alan can do a piece of work in 30 days, and Ben can do it in 6 days. If two of them are to work together, how long will it take to complete the same piece of work?

Enter your answer **without spacing**.

The time to complete the work together is: \_\_\_\_\_ days.

Leave your answer as a whole number.

11. In the figure on the right (not drawn to scale), O is the common centre of the two circles. The circles are divided into sectors of equal sizes. It is given that the area of the shaded portion A is twice that of the area of the shaded portion B.



Enter all your answers **without spacing**.

- (i) The percentage of shaded area is:  
\_\_\_\_\_ % .

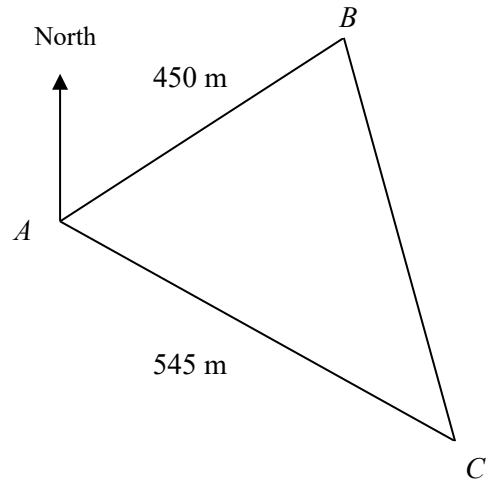
Leave your answer as a whole number.

- (ii) If the difference in area between the two shaded portions is 200 square units, calculate the diameter of the bigger circle.

The diameter of the bigger circle is: \_\_\_\_\_ units.

Leave your answer in 2 decimal places.

12. In the diagram below,  $A$ ,  $B$  and  $C$ , are three points at sea level. Given  $AB = 450$  m,  $AC = 545$  m, the bearing of  $B$  from  $A$  is  $072^\circ$  and the bearing of  $C$  from  $A$  is  $110^\circ$ .

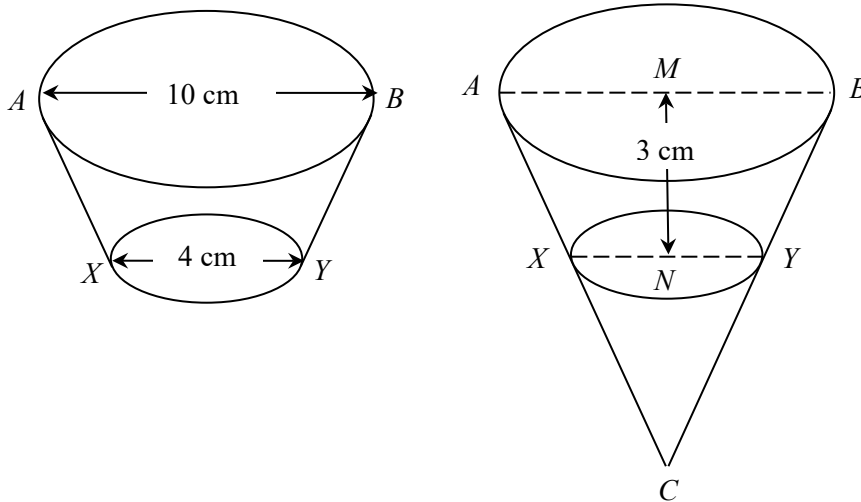


Enter all your answers **without spacing**.

Calculate the following:

- (i) The distance  $BC$  is \_\_\_\_\_ m.  
Leave your answer in 2 decimal places.
- (ii) The  $\angle ACB$  is \_\_\_\_\_  $^\circ$ .  
Leave your answer in 1 decimal place.
- (iii) The bearing of  $C$  from  $B$  is \_\_\_\_\_  $^\circ$ .  
Leave your answer in 1 decimal place.

13. A frustum is a solid cone with its top end cut off. The diagram on the right below shows how a frustum can be constructed from an inverted cone. The diameter of the base  $AB = 10$  cm and the cone is cut horizontally at  $N$  such that  $MN = 3$  cm and diameter  $XY = 4$  cm.



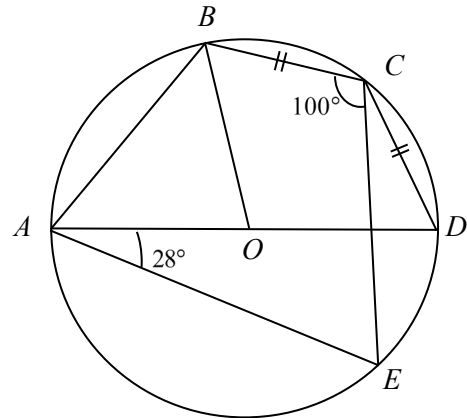
Enter all your answers **without spacing**.

Find the following:

- (i) The height,  $CN$  of the cone that was cut away, is \_\_\_\_\_ cm.  
Leave your answer as a whole number.

- (ii) The volume of the frustum is \_\_\_\_\_  $\text{cm}^3$ .  
 Leave your answer in 1 decimal place.
- (iii) The surface area of the frustum is \_\_\_\_\_  $\text{cm}^2$ .  
 Leave your answer in 2 decimal places.

14. A circle, centre  $O$ , passes through the points  $A$ ,  $B$ ,  $C$ ,  $D$  and  $E$ .  $AOD$  is a straight line. Given that  $BC = CD$ ,  $\angle DAE = 28^\circ$  and  $\angle BCE = 100^\circ$ .



Enter all your answers **without spacing**.

Leave all your answers as whole number.

Find the followings:

- (a)  $\angle DCE$  is \_\_\_\_\_  $^\circ$   
 (b)  $\angle BAD$  is \_\_\_\_\_  $^\circ$   
 (c)  $\angle AOB$  is \_\_\_\_\_  $^\circ$   
 (d)  $\angle AEC$  is \_\_\_\_\_  $^\circ$

\*\*\*\*\* END \*\*\*\*\*