ONLINE MATHEMATICS ENTRANCE EXAMINATION

DATE: AUGUST 6, 2020

TIME: 11.00-12.30

1. You have 1 hour and 30 minutes for the exam.

2. You must answer all questions.

3. No calculators are allowed.

4. Type your answers in the spaces below the questions.

5. Answers with no evidence of calculations will not score any marks. Workings and answers written on any other page will not be considered.

6. You will need a computer connected to high speed Internet and stable electricity (You cannot take online math entrance exam on mobile phone).

Please note additional requirements:

7. Applicant will be automatically disqualified from the examination and will receive a score of 0 for the exam and exam administration fee payment will not be reimbursed:
   a) If he/she leaves the room during the examination.
   b) If he/she talks, whispers, or turns around.
   c) If he/she found to have any unauthorized materials during the examination
   d) If he/she caught cheating in the examination.
   e) If he /she fails to show contents of his/her pockets or any other containers to the invigilators.
   f) If he/she is found to have a mobile phone or other electronic device (switched on or off) on his/her room/table during the exam.

8. During the examination period, any technical problems including poor internet connection from applicant's side that may cause an applicant to leave the examination environment is under the applicant's responsibility.
9. Applicant _cannot_ re-join the exam and continue the examination process. Once you leave the examination or you disconnect, you cannot continue the exam.
10. Invigilator may conduct room security checks at any point during your exam. You must perform all requested security checks. Loss of time during these security checks cannot be made up.
11. Please follow detailed exam instruction sent to applicant's personal account via admission system.
12. Applicant has to follow the instruction strictly during the examination.
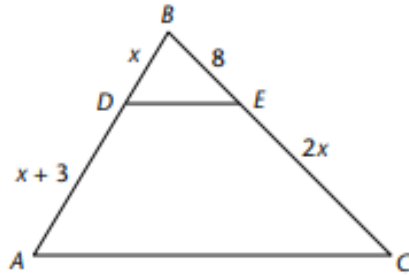
Applicant ID:

All questions on this paper must be answered.

Write the answers in the space below each question.

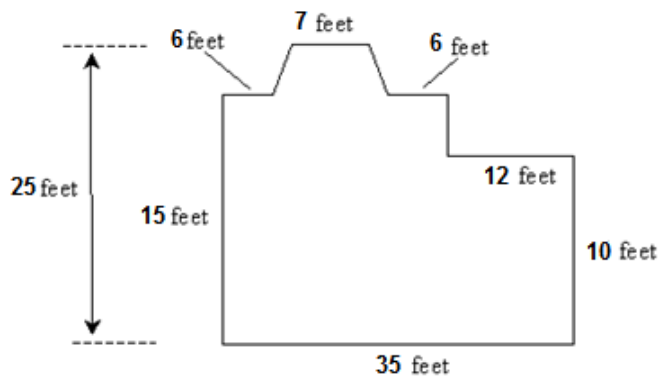**Working must be shown for all stages of the questions.**

1. Find the value of x in the figure below, if DE is parallel to AC.

(4 marks)

2. An engineer has to construct a house with the given sizes.

Calculate the total area covered by the house.

(4 marks)

3. Equations of several straight lines are given.

A. $-x = 5 + 3y$ B. $13 = 2x - \frac{1}{2}y$ C. $y = 4x + 1$

D. $7y = 21x + 3$ E. $\frac{x-2}{3} = \frac{y-1}{2}$
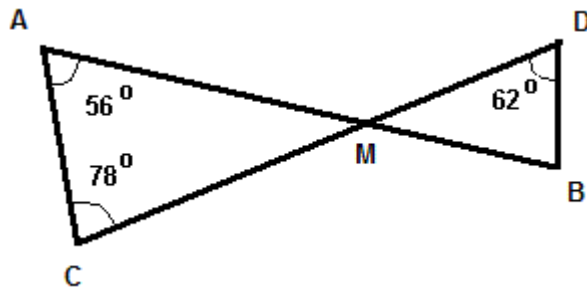
a) Find pair of lines which are parallel

(2 marks)

b) Find pair of lines which are perpendicular

(2 marks)

c) Find one line which is nor parallel or perpendicular to any other line
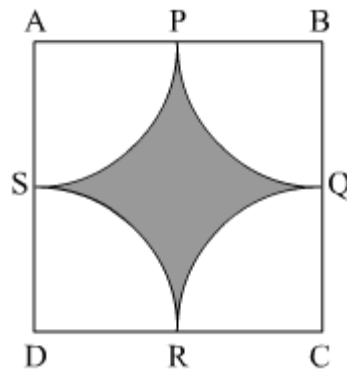
(1 mark)

4. Find the size of the angle MBD in the given figure

(2 marks)

5. The square ABCD below is 8 cm x 8 cm, where PQRS are mid-points of each side. Find the area of the shaded region.
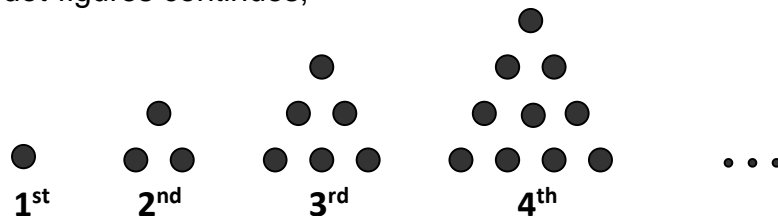

(3 marks)

6. Solve the equation

$$log_2(x^2 - 6x) = 3 + log_2(1 - x)$$

(4 marks)

7. If the pattern of dot-figures continues,

1st 2nd 3rd 4th

a) How many dots will there be in the 50th figure?

(3 marks)

b) In which figure will there be 1035 dots?

(3 marks)

8. Solve the simultaneous equations

$$\begin{cases} 7x - 6y = 5 \\ -2x + y = -5 \end{cases}$$

(4 marks)

9. Work out the following examples

a) $5\frac{1}{4} \times 3\frac{3}{7} \times 1\frac{1}{12}$

(2 marks)

b) $2\frac{1}{3} - 3\frac{2}{5} \div 9\frac{3}{7}$

(3 marks)

c) $\dfrac{3.2(34) - 2.4(24)}{0.(5)}$

(3 marks)

10. Simplify

a) $\dfrac{x^2 - 3xy}{9y^2 - x^2}$

(2 marks)

b) $\dfrac{5x-6}{x^2-4} - \dfrac{x}{x^2-4} \div \dfrac{x}{x-2}$

(3 marks)

11. a) If you received a box of 60 books and 8 of them were damaged, what percentage of the shipment was damaged?

(2 marks)

b) Due to COVID-19 crisis the shop discounted a coat with price of $76 by 10%.

After a few days salesmen decided to give another 15 % discount.

How much is the coat after the double discount?

(3 marks)

12. Mr. Peter sold an item for $ 680 at a loss of 15%.

Find the selling price of the item if he sold at 20% profit on sale.

(3 marks)

13. How many real solutions are there for x that satisfy the equation

$$3^{4x+2} \cdot 9^{2x+4} = 27^{x+5}$$

(4 marks)

14.

    a) Make *t* the subject of

$$\frac{7x - t}{3} = at$$

(2 marks)

    b) Expand and simplify

$$(1 - 3x)(2 - 4x)(3 - 5x)$$

(3 marks)

15. Identify the prime numbers which satisfy the inequality

$$-2 \le 3x - 5 \le 2x + 7$$

(3 marks)

16. Give the equation of each function below

a)

(2 marks)

b)

(3 marks)