

# Math Test 1

## Subjective Test

- (i) All questions are compulsory.
- (ii) Questions 1 to 10 are very short answer type questions. These questions carry one mark each.
- (iii) Questions 11 to 15 are short answer type questions. These questions carry two marks each.
- (iv) Questions 16 to 25 are also short answer type questions. These questions carry three marks each.
- (v) Questions 26 to 30 are long answer type questions and carry six marks each.

### Question 1 ( 1.0 marks)

Find the value of  $m$  in the expression  $\frac{3^{7+m}}{(9)^{-6} \times (81)^2} = (243)^3$

### Question 2 ( 1.0 marks)

Find 5 rational numbers between  $\frac{5}{7}$  and  $\frac{4}{5}$ .

### Question 3 ( 1.0 marks)

Find a Pythagorean triplet, one of whose member is 530.

### Question 4 ( 1.0 marks)

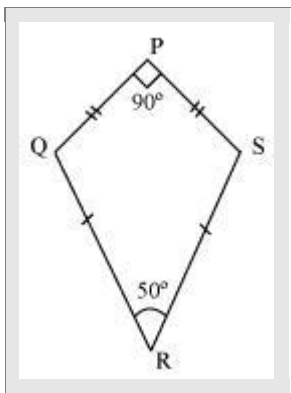
Find the smallest perfect square number which is a multiple of 21, 28, and 45.

### Question 5 ( 1.0 marks)

Is it possible to draw a regular polygon whose exterior angle is  $22.5^\circ$ ? If yes, then how many sides will the polygon have? Also, find the sum of all interior angles of this polygon.

### Question 6 ( 1.0 marks)

Use the following information to answer the next question.



Find the measure of  $\angle PQR$  and  $\angle PSR$  for the given figure.

### Question 7 ( 1.0 marks)

Use the following information to answer the next question.

A spinning wheel is divided into 5 regions as shown in the figure. If the pointer wheel falls in either blue or yellow region, then the player will win.



Find the probability that a player will win.

**Question 8** ( 1.0 marks)

The sum of 3 consecutive common multiples of 5 and 7 is 525. Find these multiples.

**Question 9** ( 1.0 marks)

Evaluate by using an identity:  $984 \times 1016$

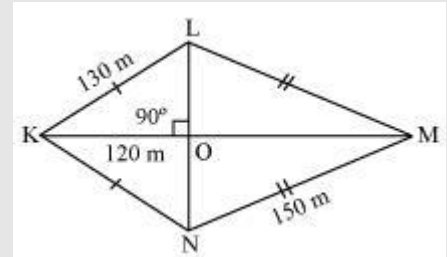
**Question 10** ( 1.0 marks)

Factorize  $x^2 + \frac{1}{x^2} - 23$ .

**Question 11** ( 2.0 marks)

Use the following information to answer the next question.

A park is in the shape of a kite as shown in the figure. KM and LN are two paths in the park which meet each other at O. ( Assume  $\sqrt{2} = 1.414$  )



Find the length of roads KM and LN.

**Question 12** ( 2.0 marks)

Three numbers are in the ratio 1: 6: 8. The sum of their cubes is 5832. Find the square of their sum.

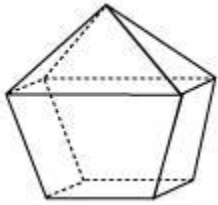
**Question 13** ( 2.0 marks)

(a)The following table represents the number of faces (F), vertices (V), and edges (E) of some polyhedrons. Complete the following table.

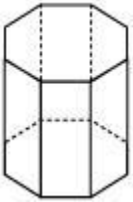
F	?	8
V	16	?
E	24	18

(b)Verify Euler's formula for the following solids.

(i)



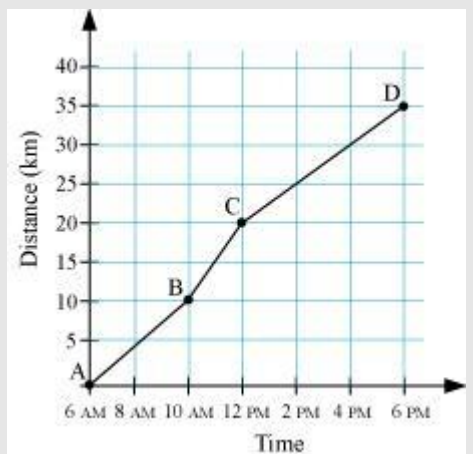
(ii)



**Question 14** ( 2.0 marks)

Use the following information to answer the next question.

The given graph represents the distance travelled by a cyclist and the time taken by him.



(a) Find the maximum speed of the cyclist during his journey from A to D.

(b) If the cyclist travelled with the uniform speed obtained in the above question, then find the time taken by him to reach a place which is at a distance of 80 km from point A.

**Question 15** ( 2.0 marks)

The denominator of a rational number is 4 more than 3 times of its numerator. When 2 is added to its denominator, the number becomes.  $\frac{1}{5}$

Find the rational number.

**Question 16** ( 3.0 marks)

Construct a quadrilateral MONA, where  $MO = 4$  cm,  $ON = 6$  cm,  $\angle M = 120^\circ$ ,  $\angle N = 60^\circ$ , and  $\angle A = 150^\circ$ .

**Question 17** ( 3.0 marks)

Use the following information to answer the next question.

$P = ab$  is a two-digit number and  $Q$  is the number formed by reversing the digits of  $P$  i.e.,  $ba$ .

I.  $P + Q$  is a prime number.

II.  $P - Q$  is a multiple of 3 and 9 both.

Are these statements always correct? Give reasons.

**Question 18** ( 3.0 marks)

Use the following information to answer the next question.

By using 3 different non-zero digits,  $J$ ,  $K$ , and  $L$ , four numbers are formed such that

$$A = JKL$$

$$B = LJK$$

$$C = K LJ$$

$$D = LKJ$$

(i) Write four factors other than 1 for the expression  $A - D$ .

(ii) Is the expression  $(A + B + C)$  a prime number? Give reasons.

**Question 19** ( 3.0 marks)

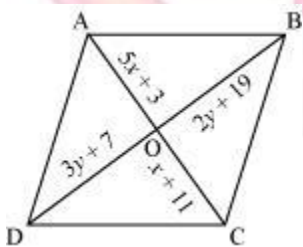
(a) There are 96 non-perfect square numbers between the squares of two natural numbers. Find these numbers.

(b) Find the square root of the sum of all natural numbers that are odd and less than 1000.

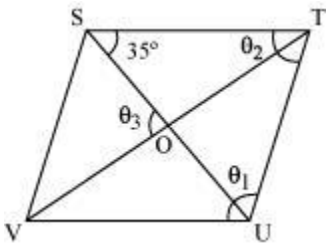
(c) If  $486 \times 488 = a^2 - 1$ , then find the value of  $a$ .

**Question 20** ( 3.0 marks)

(i) Find the area of the given rhombus.



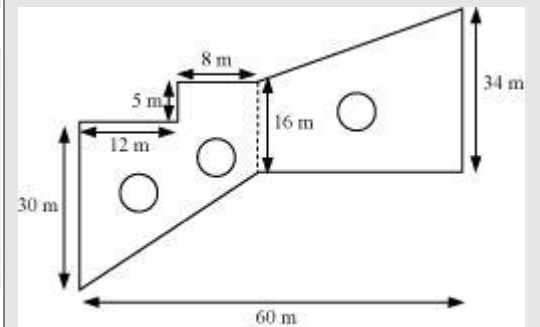
(ii) The given figure shows a rhombus STUV. Find the value of expression  $(\theta_2 + \theta_3 - 2\theta_1)$ .



**Question 21** ( 3.0 marks)

Use the following information to answer the next question.

The given figure shows the layout of a park to be constructed with three circular ponds each of 7 m radius in it. The rest of the area, other than ponds, is to be covered with grass.

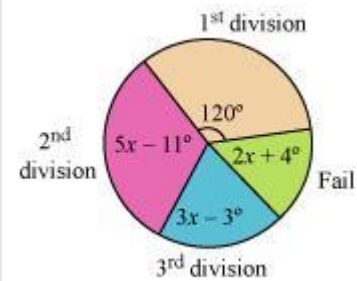


If the cost of covering the park with grass is Rs  $2/\text{m}^2$ , then find the total cost of covering the park with grass.

**Question 22** ( 3.0 marks)

Use the following information to answer the next question.

The given pie-chart represents the result of an examination of class VIII of a school. 90 students failed in the examination.



I. How many students appeared in the exam?

II. What percentage of students passed the exam?

III. What is the difference between the number of students getting first division and third division?

**Question 23** ( 3.0 marks)

A car was bought at Rs 300000. Its value depreciated at the rate of 7% per annum. Find its value after 2 years.

**Question 24** ( 3.0 marks)

25 men were assigned to do a work in 40 days. However, due to some reasons, 5 men did not turn up for the work. How many more days are required by the remaining men to complete the work?

**Question 25** ( 3.0 marks)

Factorise the expression  $9m^3 - 27m^2 - 16m + 48$ .

**Question 26** ( 6.0 marks)

(a) Use the following information to answer the next question.

$$\begin{array}{r} 3B \\ \times 7 \\ \hline 2CC \end{array}$$

If  $B$  and  $C$  represent a single digit number and  $B \neq C$ , then find the values of  $B$  and  $C$ .

(b) Use the following information to answer the next question.

$$\begin{array}{r} BCD \\ + CC5 \\ \hline A0BA \end{array}$$

If  $A, B, C, D$  are single digit numbers, not equal to each other, and are other than 0 and 5, then find the values of  $A, B, C$ , and  $D$ .

**Question 27** ( 6.0 marks)

(a) A cuboid of dimension  $6 \text{ cm} \times 4 \text{ cm} \times 4 \text{ cm}$  is cut into cubes of side 2 cm. Find the percentage increase in the surface area of the cuboid.

(b) A rectangle sheet of length 50 cm and width 44 cm is rolled along its width. Find the volume of the cylinder so formed.  $\left( \text{Assume } \pi = \frac{22}{7} \right)$

(c) A cubical tank of side 6 m is fully filled with water. A hole in the bottom of the tank can empty it in 60 hours. Find the rate of flow of water through this hole.

**Question 28** ( 6.0 marks)

Use the following information to answer the next question.

A financial company offers 20% simple interest (S.I.) on deposits under its special scheme.

Draw a graph to illustrate the relation between the sum deposited and simple interest earned. Then from the graph, find

(a) the annual interest obtainable on deposit of Rs 4500

(b) the investment one has to make to obtain an annual simple interest of Rs 700

**Question 29** ( 6.0 marks)

(a) An article is sold at 15% discount. The shopkeeper marked up the price of this article by 25%.

Find the profit or loss percentage incurred by this shopkeeper.

(b) Find the compound interest earned on a sum of Rs 10000 in 1.5 years at a rate of 10% per annum compounded half yearly.

**Question 30** ( 6.0 marks)

Construct a kite-shaped quadrilateral KLMN, where equal pair of adjacent sides measure 12 cm (KL and LM) and 16 cm (KN and MN) and the smaller diagonal measures 8 cm.

