



ITL PUBLIC SCHOOL
Periodic Test-3 (2020-21)

Date: .16.12.2020

Class: IX

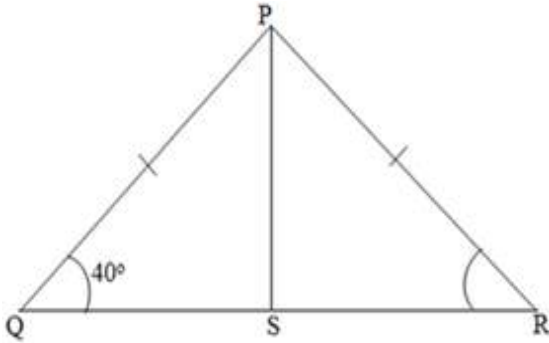
Mathematics (Code-041)

Time: 2 Hour

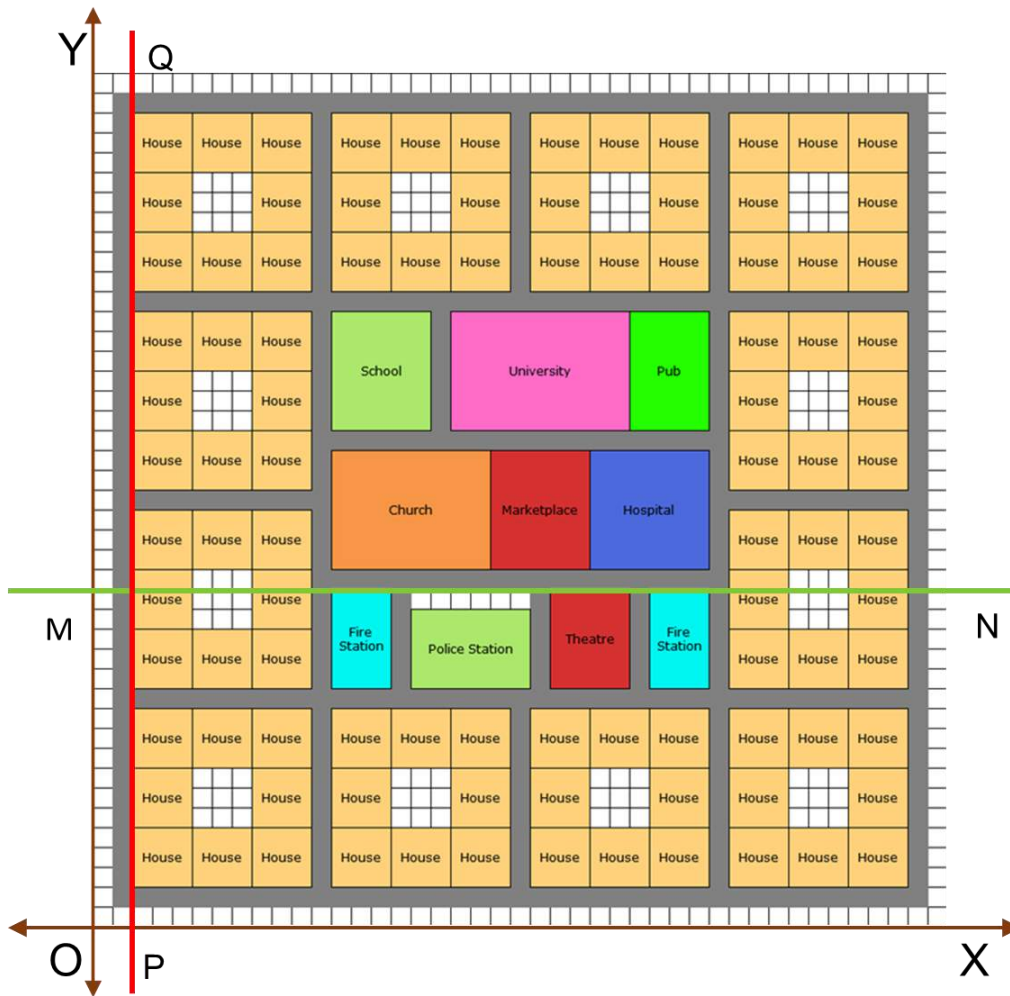
M.M: 40

General Instructions:

- Read the question paper carefully and answer legibly.
- All questions are compulsory.
- The question paper consists of 19 questions divided into two parts A and B.
- Part A consists of two sections I and II. Section I has 9 questions of 1 mark each. Internal choices are provided in two questions. Section II has 2 questions on case studies. Each question has 5 case-based sub parts. An examinee has to attempt any 4 out of 5 sub-parts.
- Part B consists of 3 questions of 2 marks, 4 questions of 3 marks and 1 question of 5 marks.
- Internal choice is provided in 1 question of 2 marks, 1 question of 3 marks and 1 question of 5 marks.

Question No.	Part-A	Marks Allocated
	Section-1 Section I has 9 questions of 1 mark each. Internal choice is provided in 2 questions.	
1	Give one example of a trinomial of degree 2. OR Check whether the expression $(5t)^{-4} + t\sqrt{5}$ is a polynomial in one variable or not? Justify your answer.	1
2	In the given figure if PS is the median then find the measure of $\angle QPS$. 	1

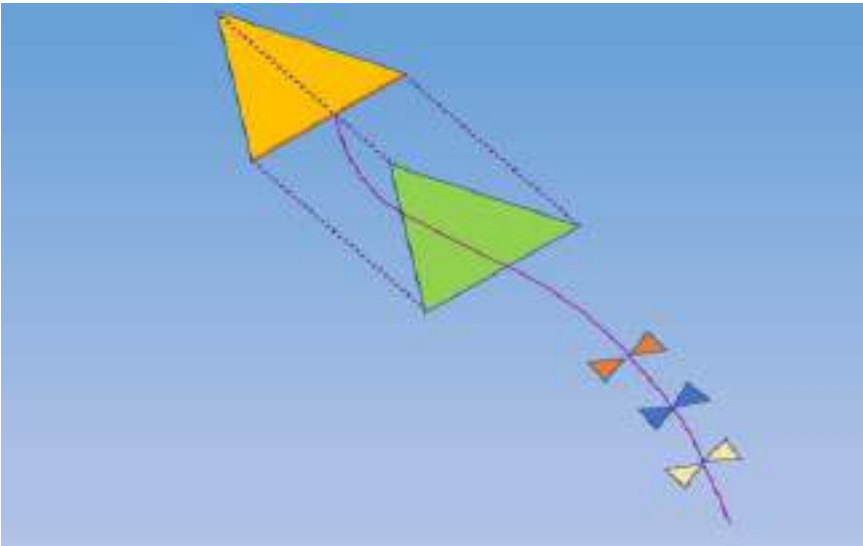
3	Formulate an equation of a line passing through the point $(-3, 15)$. OR The auto rickshaw fare in a city is charged ₹ 10 for the first kilometer and ₹ 4 per kilometer for subsequent distance covered. Write the linear equation in two variables taking distance covered as x km and total fare as ₹ y .	1
4	Which type of quadrilateral will be obtained by joining the mid-points of the sides of a quadrilateral? What will be the type of the quadrilateral obtained if the given quadrilateral is a rhombus?	1
5	Factorise $4x^2 + 25y^2 + 9z^2 + 20xy - 30yz - 12zx$ using the suitable algebraic identity.	1
6	It is given that $\Delta ABC \cong \Delta RPQ$, can we say that $BC = QR$? Why?	1
7	Express the linear equation $3x = -4$ in the form $ax + by + c = 0$ and indicate the values of a , b and c .	1
8	In two triangles ABC and DEF , $AC = DF$, $AB = DE$, $\angle A = \angle D$. Check whether the two triangles be congruent or not. Justify your answer.	1
9	Find the value of a , if $x = -1$ is a zero of the polynomial: $ax^3 + x^2 - 2x + 4a - 9$.	1
	Section-II Case study-based questions are compulsory. Attempt any four sub parts of each question. Each subpart carries 1 mark	
10	Case Study based-1 LAYOUT PLAN OF AN URBAN SMART CITY Given below is a layout plan of an urban smart city. Each small square box represents a unit square.	4



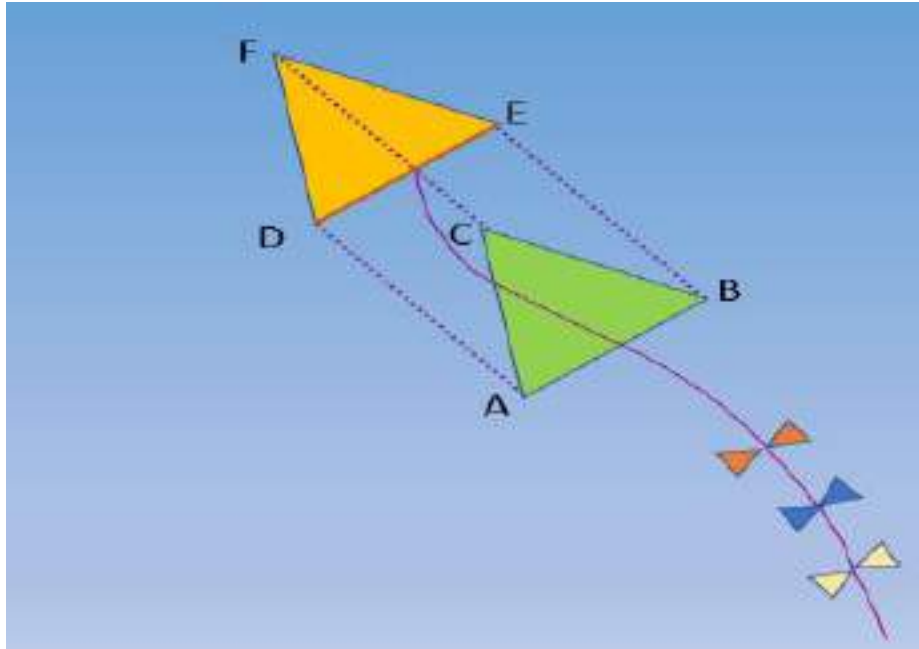
- i. The equations of the horizontal and the vertical lines meeting at point O, are respectively:
 - (a) $x = 0, y = 0$
 - (b) $y = 0, x = 0$
 - (c) $x = 0, y = 1$
 - (d) $y = 0, x = 1$

- ii. Trees are to be grown in the free space in front of the police station along the line MN. The equation of the line MN in one variable is given as:
 - (a) $y = 17$
 - (b) $x = 17$
 - (c) $x + 0y = 34$
 - (d) $0x + y = 34$

	<p>iii. The equation of the line MN in two variables will be given as: (a) $x + y = 17$ (b) $x + y = 34$ (c) $x + 0y = 17$ (d) $y + 0x = 17$</p> <p>iv. It is planned to construct a service lane along the line PQ. The equation of this line in two variables will be given as: (a) $y = 2$ (b) $x = 2$ (c) $x + 2y = 0$ (d) $x + 0y = 2$</p> <p>v. The branch of mathematics that helps to answer such questions is: (a) Geometry (b) Algebra (c) Coordinate geometry (d) Mensuration</p>	
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11	<p>Case Study based-2</p> <p style="text-align: center;">KITE MAKING ACTIVITY</p> <p>Students of class IX participated in a kite making activity for a skill bazaar to be organized in their school to help the needy people. Given below is a sample kite made by Anandita. She cut two triangular pieces of paper and joined them with the help of a designer string.</p> 	4
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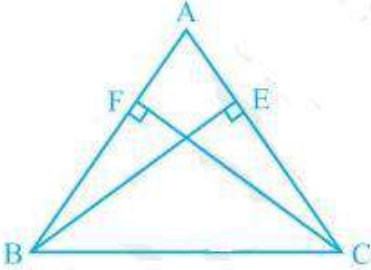
If the triangular pieces ABC and DEF are arranged in a manner such that, $AB = DE$, $AB \parallel DE$, $BC = EF$ and $BC \parallel EF$. Vertices A, B and C are joined to vertices D, E and F respectively as shown in the figure given below:

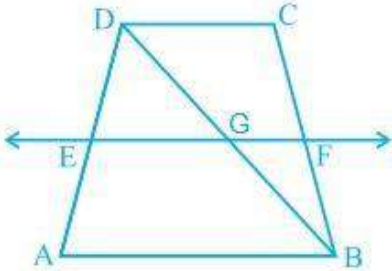
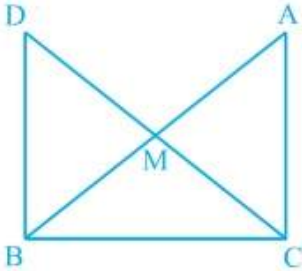


Anandita found some interesting mathematical concepts applied in her kite.

- i. She claimed that the quadrilateral ABED is a parallelogram as:
 - (a) $AB = DE$ and $BE = AD$
 - (b) $AB = DE$ and $BE \parallel AD$
 - (c) $AB \parallel DE$ and $BE = AD$
 - (d) $AB = DE$ and $AB \parallel DE$

- ii. Also, the quadrilateral BEFC is a parallelogram as:
 - (a) Both the pairs of opposite sides of quadrilateral BEFC are equal.
 - (b) Both the pairs of opposite sides of quadrilateral BEFC are parallel.
 - (c) One pair of opposite sides of the quadrilateral BEFC is both equal and parallel.
 - (d) None of these.

	<p>iii. From i and ii, it is correct to say that:</p> <p>(a) $AD \parallel BE$ and $AD = BE$ (b) $BE \parallel CF$ and $BE = CF$ (c) $AD \parallel CF$ and $AD = CF$ (d) All of these</p> <p>iv. Quadrilateral ACFD will be a:</p> <p>(a) Rectangle (b) Square (c) Parallelogram (d) Rhombus</p> <p>v. $\Delta ABC \cong \Delta DEF$ by which of the following congruence criteria?</p> <p>(a) SAS (b) ASA (c) SSS (d) RHS</p>	
	<p>Part –B</p> <p>All questions are compulsory. In case of internal choices, attempt any one</p>	
12	<p>Using the method of splitting the middle term, factorize the polynomial: $\sqrt{2}x^2 + 3x + \sqrt{2}$</p>	2
13	<p>In the figure given below, BE and CF are two equal altitudes of a triangles ABC. Using RHS congruence rule, prove that the triangle ABC is isosceles.</p> <div style="text-align: center;">  </div> <p style="text-align: center;">OR</p> <p>Prove that angles opposite to equal sides of an isosceles triangle are equal.</p>	2

14	<p>ABCD is a trapezium in which $AB \parallel DC$, BD is a diagonal and E is the mid-point of AD. A line is drawn through E parallel to AB intersecting BC at F. Show that F is the mid-point of BC.</p> 	2
15	<p>Factorise the given polynomial: $x^3 + 2x^2 - 19x - 20$</p>	3
16	<p>The force applied on a body is directly proportional to the acceleration produced in the body. Write an equation to express the situation and plot the graph of the equation taking the constant mass as 4 units.</p> <p style="text-align: center;">OR</p> <p>Virat Kohli and Rohit Sharma together scored a century in a cricket match played against New Zealand at Kanpur. Express this situation in the form of a linear equation in two variables and hence draw its graph.</p>	3
17	<p>Prove that a diagonal of a parallelogram divides it into two congruent triangles.</p>	3
18	<p>Using suitable identities, (a) Evaluate $(10.1)^2$ (b) Expand $(2p - 5q)^3$</p>	3
19	<p>In right triangle ABC, right angled at C, M is the mid-point on hypotenuse AB. C is joined to M and produced to a point D such that $DM = CM$. Point D is joined to point B. Show that:</p> <p>(i) $\triangle AMC \cong \triangle BMD$ (ii) $\triangle DBC$ is a right angle (iii) $\triangle DBC \cong \triangle ACB$ (iv) $CM = \frac{1}{2}AB$</p>  <p style="text-align: center;">OR</p>	5

$\triangle ABC$ is an isosceles triangle in which $AB = AC$. Side BA is produced to D such that $AD = AB$. Show that $\angle BCD$ is a right angle.

