



Grade: 9th

Aspect: Winter Assignment
Subject: Mathematics

Chapter: Polynomials

Introduction:

A polynomial is a single term, or a sum or difference of terms in which all variables have whole-number exponents and no variable appears in the denominator. Each term can be either a constant, a variable, or a combination of coefficients and variables.

The numerical part of the term is the coefficient. The highest power of the variable is the degree of the polynomial.

Types of Polynomials

- Monomial-A constant, or the product of a constant, and one or more variables raised to a whole number.
- Polynomial-Any finite sum (or difference) of terms.

Questions:

Q1. If $y = -1$ is a zero of the polynomial $q(y) = 4y^3 + ky^2 - y - 1$, then find the value of k

Q2. For what value of m is $x^3 - 2mx^2 + 16$ divisible by $x + 2$

Q3. Prove that $(a + b + c)^3 - a^3 - b^3 - c^3 = 3(a + b)(b + c)(c + a)$

Q4. If $x + 1/x = 5$, find the value of $x^3 + 1/x^3$

Q5. If $a + b + c = 9$ and $ab + bc + ca = 26$, find $a^2 + b^2 + c^2$

Q6. If $a + b + c = 0$, prove that :

$$a^2/bc + b^2/ab + c^2/ca = 3$$

Q7. Find the zeroes of $(x - 2)^2 - (x + 2)^2$

Q8. Factorise $p(x) = x^4 + x^3 - 7x^2 - x + 6$ by factor theorem

Q9. Prove that $2x^4 - 6x^3 + 3x^2 + 3x - 2$ is exactly divisible by $x^2 - 3x + 2$

i. By actual division

ii. Without actual division

Q10. When a polynomial $p(x) = x^4 - 2x^3 + 3x^2 - ax + b$ is divisible by $x - 1$ and $x + 1$, the remainders are 5 and 19 respectively. Find the remainder when $p(x)$ is divided by $x - 2$.

Q11. If $x - 3$ and $x - 1/3$ are both factors of $ax^2 + 5x + b$, show that $a = b$

Q12. Factorize:

i. $3(x+2)^2 - 5(x+2) + 2$

ii. $x^6 + y^6$

iii. $3\sqrt{3}x^3 - 5\sqrt{5}y^3$

Solve all the questions on below mentioned link.

<https://www.careerlauncher.com/cbse-ncert/class-9/Math/CBSE-%20Polynomials-HOTS%20Questions.html>

Chapter: Linear Equations in Two Variables

Introduction:

In Linear equations in two variables class 9, students can learn different concepts such as introduction to a linear equation in one variable, a linear equation in two variables, process of finding the solution to the given linear equations, graphing methods and so on.

Questions:

Q.1: Express the following linear equations in the form $ax + by + c = 0$ and indicate the values of a, b and c in each case:

(i) $x - y/5 - 10 = 0$

(ii) $y - 2 = 0$

Q2. Show that the points A (1, 2), B (-1, -16) and C (0, -7) lie on the graph of the linear equation $y = 9x - 7$.

Q3. Draw the graph of the linear equation $3x + 4y = 6$. At what points, the graph cuts x and y-axis?

Q4. A and B are friends. A is elder to B by 5 years. B's sister C is half the age of B while A's father D is 8 years older than twice the age of B. If the present age of D is 48 years, find the present ages of A, B and C.

Q5. Ram is half of his father's age. Twenty years ago the age of father was six times age of Ram. Find the present ages of Ram and his father.

Solve all the questions on below mentioned link.

<http://davcae.net.in/File/WS-HOTS-%20LINEAR%20EQUATION-9.pdf>

Chapter: Triangles

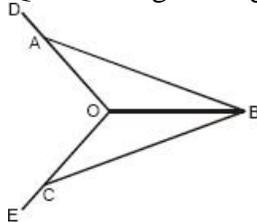
Introduction:

Triangles are one of the most interesting and simple mathematics topics in Class 9. Students will learn the basic ideas of triangles in this chapter, such as triangle congruence and criterion for triangle congruences, and some important properties of triangles, such as:

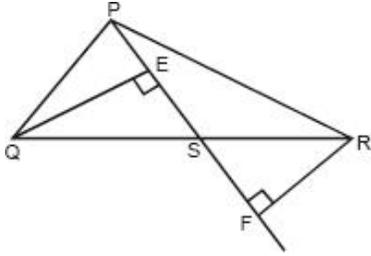
- An equilateral triangle has 60 degrees of angle on each side.
- The angle opposing the longer side of a triangle is bigger
- The side opposite the bigger angle of a triangle is longer
- .The sum of any two triangle sides is bigger than the third side
- If two figures have the same shape and size, they are said to be congruent.

Questions:

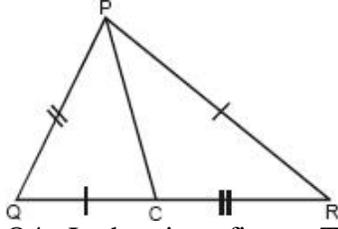
Q1. In the given figure, $AB = BC$ and $\angle ABO = \angle CBO$, then prove that $\angle DAB = \angle ECB$.



Q2. In the given figure, PS is median produced upto F and QE and RF are perpendiculars drawn from Q and R, prove that $QE = RF$.

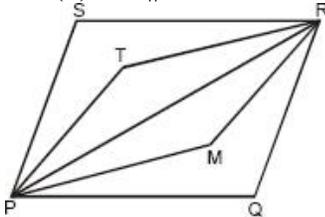


Q3. In the given figure, triangles PQC and PRC are such that $QC = PR$ and $PQ = CR$. Prove that $\angle PCQ = \angle CPR$.

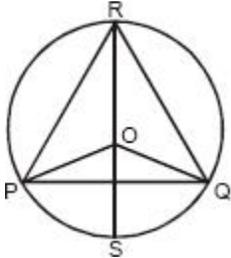


Q4. In the given figure, T and M are two points inside a parallelogram PQRS such that $PT = MR$ and $PT \parallel MR$. Then prove that

- (a) $\triangle PTR \cong \triangle RMP$
- (b) $RT \parallel PM$ and $RT = RM$



Q5. In given figure, RS is diameter and PQ chord of a circle with centre O. Prove that (a) $\angle RPO = \angle OQR$ (b) $\angle POQ = 2\angle PRO$



Solve all the questions on below mentioned link

<https://www.careerlauncher.com/cbse-ncert/class-9/Math/CBSE-Triangles-SampleQuestions.html>

Chapter: Circles

Introduction:

- A plane is divided by the circle into 3 parts, namely, the interior and exterior of the circle and the circle itself.
- A chord is a line passing from one point to another on the circumference of a circle.
- Diameter is a chord that passes through the centre.
- The perimeter of a circle is known as the circumference.

- Chords equal in length subtend equal angles at centre. Similarly, the chords are equal if the angles subtended by chords are equal at the centre.
- The perpendicular drawn on a chord from centre bisects the chord. Similarly, the line is perpendicular if it is drawn from the centre to bisects the chord.
- Only one circle can pass through 3 non-collinear points.
- Chords equal in length are equidistant from the centre. Similarly, Chords are equal if they are equidistant from the centre.
- In a cyclic quadrilateral, the sum of pair of angles opposite to each other is 180 degree.
- Angles subtended by the same line segment are equal.
- If chords of a circle are equal in length, then the corresponding arcs will be congruent. Similarly, if arcs are congruent, then the corresponding chords will be equal.
-

Questions:

Q1. Prove that the quadrilateral formed by the bisectors of internal angles of a quadrilateral, is cyclic

Q2. Three points A,B and C are located on a circle which are equidistant from one another. If the radius of the circle is 20m the calculate the length of AB.

Q3. AB and AC are two equal chords of a circle. Prove that the bisector of the angle BAC passes through the centre of the circle.

Q4. Two equal chords AB and CD of a circle when produced intersect at a point P. Prove that PB = PD.

Q5. In any triangle ABC, if the angle bisector of $\angle A$ and perpendicular bisector of BC intersect, prove that they intersect on the circumcircle of the triangle ABC.

Solve all the questions on below mentioned link

<http://davcae.net.in/File/WS-classIX-circles.pdf>

Chapter: Surface Areas and Volumes

Introduction:

Students will be introduced to the surface areas and volumes for different shapes such as cuboid, cube, right circular cylinder, right circular cone and sphere. Let us see the important notes and formulas for each of the shapes.

Cuboid

- Total Surface Area of a Cuboid
- Lateral Surface Area of a Cuboid

Cube

- Total Surface Area of a cube
- Lateral Surface area of a cube

Right Circular Cylinder

- Curved Surface area of a right circular cylinder
- Total surface area of a right circular cylinder

Right Circular Cone

- Relation between slant height and height of a right circular cone
- Curved Surface Area of a Right Circular Cone

- Total Surface Area of a Right Circular Cone

Sphere

- Surface area of a Sphere

Volume of a Cuboid

Volume of a Cube

Volume of a Right Circular Cylinder

Volume of a Right Circular Cone

Volume of a Sphere

Questions:

Q1. The difference between outside and inside surface of a cylindrical metallic pipe 14m long is 44 cm². If the sum of the diameters of the inner and outer surface of the cylinder is 9 cm, find the inner and outer radii of the cylinder.

Q2. A class room is 7m long, 6.5 m wide and 4m high. It has one door of 3m × 1.4 m and three windows of measure 2m × 1m. The internal walls are to be colour washed. The contractor charges Rs.5.52 per square meter. Find the cost of colour washing.

Q3. The diameter of a roller is 250 cm and length is 140 cm. If it takes 500 complete revolutions to level a play-ground, determine the cost of levelling at the rate of 50 paise per square meter.

Q4. The internal and external diameters of hollow hemispherical vessel are 24 cm and 25 cm respectively. If the cost of painting 1cm² surface area is Rs. 1.5, find the total cost of painting the vessel all over.

Q5. The surface area of a sphere of radius 5 cm is five times the area of the curved surface area of a cone of radius 4cm. Find the height of the cone.

Solve all the questions on below mentioned link

<https://www.careerlauncher.com/cbse-ncert/class-9/Math/CBSE-SurfaceAreasandVolumes-HOTSQuestions.html>

Note: All the above questions (including the questions mentioned in the above links) should be solved on loose sheets.