1 Latex CBSE

1.1 Algebra Questions

1. Solve the system of equations:
   $\frac{bx}{a} - \frac{ay}{b} + a + b = 0 \quad \text{and} \quad bx - ay + 2ab = 0.$

2. Given that:

$$P = \frac{x+2y}{x+y} + \frac{x}{y}, Q = \frac{x+y}{x-y} - \frac{x-y}{x+y} \quad and \quad R = \frac{x+2y}{x+y} - \frac{x}{x+y}$$

3. If $(x+2)(x-3)$ is the HCF of the polynomials $p(x) = (x^2+x-2)(3x^2-8x+c)$ and $q(x) = (x^2+x-12)(2x^2+x+b)$,
   find the values of c and b.

4. Using the quadratic formula, solve the equation: $A^2b^2x^2 - (4b^4 - 3a^4)x - 12a^2b^2 = 0$.

5. A household article is available for ₹970 cash or ₹210 cash down payment followed by three equal monthly installments. If the rate of interest charged under the installment plan is 16% per annum, find the amount of each installment

6. A man borrows ₹25,200 from a finance company and has to repay it in two equal annual installments. If the interest is charged at the rate of 10% per annum compounded annually, calculate the amount of each installment.

7. The speed of a boat in still water is 11 km/hr. It can go 12 km upstream and return downstream to the original point in 2 hours 45 minutes. Find the speed of the stream.

8. A bucket made up of a metal sheet is in the form of a frustum of a cone. Its depth is 24 cm and the diameters of the top and bottom are 30 cm and 10 cm respectively. Find the cost of milk which can completely fill the bucket at the rate of ₹20 per liter and the cost of the metal sheet used, if it costs ₹10 per 100 cm^2. $(Use \pi = 3.14)$

9. Mrs. Ruchi's salary is Rs.32, 250 per month exclusive of HRA. She donates ₹12,000 to Prime Minister's Relief Fund (100% exemption). She also donates ₹6,000 to a school and gets a relief of 50% on this donation. She contributes ₹5,000 per month towards her Provident Fund. She pays a quarterly premium of Rs.2, 500 towards her LIC policy and invests ₹25,000 in NSCs. If ₹2,700 is the tax deducted each month from her salary for 11 months, find the tax deducted from her salary in the last month of the year.

   Income Tax Rates:

Slab	Tax Rate
Up to Rs.1, 35, 000	No tax
From Rs.1, 35, 001 to Rs.1, 50, 000	10% of the taxable income above Rs.1, 35, 000
From Rs.1, 50, 001 to Rs.2, 50, 000	Rs.1, 500 + 20% of the income exceeding Rs.1, 50, 000
Rs.2, 50, 001 and above	Rs.21, 500 + 30% of the amount exceeding Rs.2, 50, 000

   Education Cess: 2% of the income tax

1.2 Data Handling

1. The following table shows the monthly expenditure of company. Draw apie chart for the data.

	Amount (in Rs.)
Wages	4800
Materials	3200
Taxation	2400
Adm. Expenditure	3000
Miscellaneous	1000

2. The Arithmetic Mean of the following frequency distribution is 47. Determine the value of p.

Classes	Frequency
0 - 20	8
20 - 40	15
40 - 60	20
60 - 80	p
80 - 100	5

1.3 Probability Questions

1. A card is drawn at random from a well-shuffled deck of playing cards. Find the probability that the card drawn is

   (a) a card of spades or an ace

   (b) a red king

   (c) neither a king nor a queen

   (d) either a king or a queen.

Geometry Question .

1. In Figure 1, $\angle BAC = 90^\circ$. $AD \parallel BC$. Prove that $AB^2 + CD^2 = BD^2 + AC^2$.

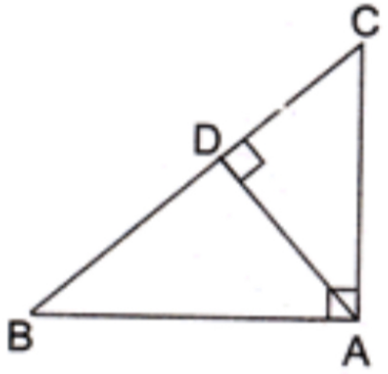

Figure 1: 1

2. In Figure 2, $PT = 6$ cm, $AR = 5$ cm. Find the length of PA.

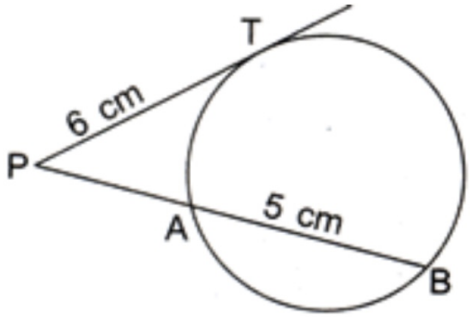

Figure 2: 2

3. Draw the graphs of the following equations: $3x - 4y + 6 = 0, 3x + y - 9 = 0$ Also, determine the co-ordinates of the vertices of the triangle formed by these lines and the x axis.

4. A solid is in the form of a right circular cylinder with hemispherical ends. The total height of the solid is 58 cm and the diameter of the cylinder is 28cm. Find the total surface area of the solid $\pi \approx \frac{22}{7}$

5. . Construct a triangle ABC in which $BC = 7$ cm, and median $AD = 5$ cm, $\angle A = 60^\circ$ Write the steps of construction also.

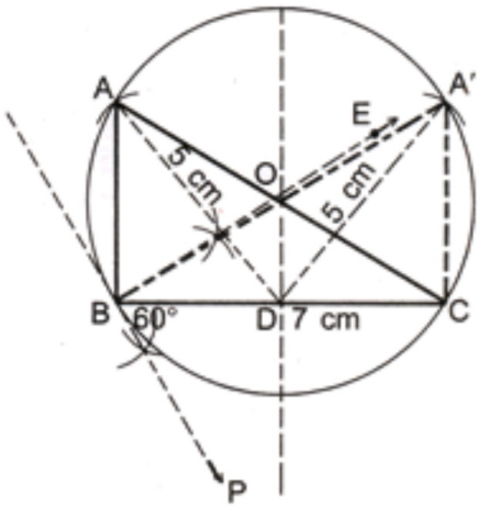

Figure 3: 3

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6. Show that the points A(6, 2), B(2, 1), C(1, 5) and D(5, 6) are the vertices of a square
7. Find the value of p for which the points (- 5, 1), (1, p) and $4, -2$ are collinear.
8. . Prove that in a right triangle, the square of the hypotenuse is equal to the sum of the squares of the other two sides.

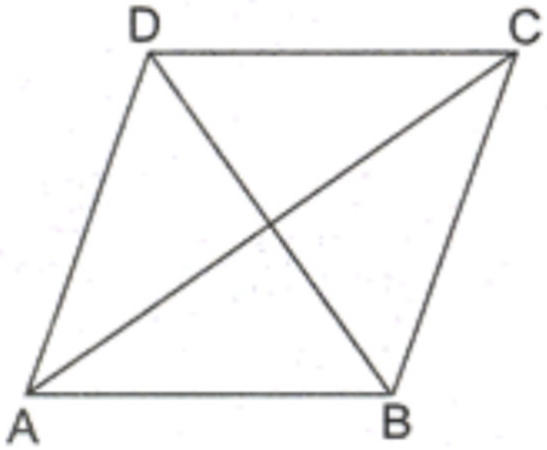

Figure 4: 4

Makeing ue of the above, prove the following:
In fig:4, $ABCD$ is a fig:4 rhombus. prove that $4AB^2 = AC^2 + BD^2$.

9. Prove that I a line touch a circle and from the point of contact a chord is drawn, the angles which this chord makes with the given line are equal respectively to the angles formed in the corresponding alternate segments. Using the above, do the following:
AB is a diameter and AC is a chord of a circle such that $\angle$BAC= 30°‘. The tangent at C intersects AR produced in a point I Prove that $BC = RD$.

10. A man standing on the deck of a ship, which is 10 m above the water level, observes the angle of elevation of the top of a hill as 60° and the angle of depression of the base of the hill as 300. Calculate the distance of the hill from the ship and the height of the hill.

11. From a window x meters high above the ground in a street, the angles of elevation and depression of the top and foot of the other house on the opposite side of the street are α and β respectively. Show that the height of the opposite house is $x(1 + \tan\alpha \cot\beta)$ meters.

1.4 Sequences questions.

1. The 5^{th} term of an Arithmetic Progression (A.P.) is 26 and the 10th term is 51. Determine the 15^{th} term of the A.P.

2. Find the sum of all the natural numbers less than 100 which are divisible by 6.