Sample Paper – 2007
Class – X
Mathematics

SECTION A (7 x 2 = 14 marks)

Question numbers 1 to 7 carry 2 marks each.

Q1. **Solve for x and y :** $9x + 5y = 37xy$; $7x - 4y = 13xy.$

Q2. **The H.C.F and L.C.M of 2 polynomials P(x) and Q(x) are** $(3x+2)$ **and** $(6x^3 - 35x^2 + 19x + 30)$**.If** $p(x) = 6x^2 - 5x - 6$**. Find Q(x)**

OR

If G.C.D of $x^2 - ax - 6$ **and** $x^2 - 2x + b$ **is** $x - 6$**. Find the values of** a **and** b

Q3. **Determine the A.P whose 5th term is 15 and the sum of its 3rd and 8th term is 34**

OR

If the sum of first 'n' terms of an A.P is $3n^2 - 2n$**. Find the A.P and its 19th term.**
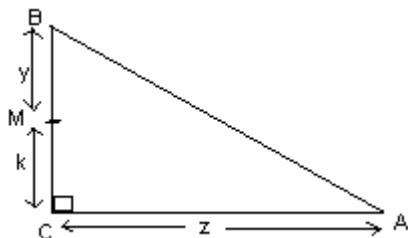
Q4. **The perimeter of two similar triangles ABC and DEF are respectively 54 cm and 36 cm.** **If DE = 15 cm, Find AB**

Q5. **In the fig. AB** ‖ **DC , Find** x **:**
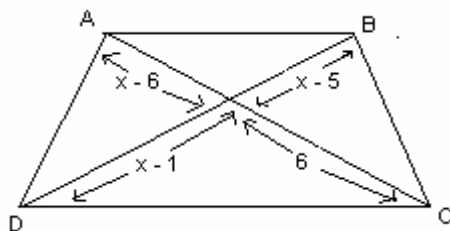
Q6 **In fig.ΔABC is right angled at C.M is**
   a point on BC such that BM = y ,
  MC =k, AC = z and
  MC + AC = AB +BM . Show that
$$y = \frac{k z}{2k + z}$$

Q7. Without using trigonometric tables, evaluate the following:

$4(Sin^4 30 + Cos^4 60) - 3(Cos^2 45 - Sin^2 90)$

SECTION B (12 x 3 = 36 marks)

Question numbers 8 to 19 carry 3 marks each.

Q8. Solve the following system of equations graphically:

$2x + 3y - 12 = 0$; $7x - 3y - 15 = 0$. **Also determine the co-ordinates of the vertices of the triangle formed by the lines and y axis.**

Q9. If $P = \dfrac{x^4 - 8x}{x^3 - x^2 - 2x}$, $Q = \dfrac{x^2 + 2x + 1}{x^2 - 4x - 5}$ and $R = \dfrac{2x^2 + 4x + 8}{x - 5}$. **Find the value of**

$(P \times Q) \div R$

OR

If $x = \dfrac{6ab}{a + b}$, **find the value of** $\dfrac{x + 3a}{x - 3a}$ + $\dfrac{x + 3b}{x - 3b}$

Q10. Solve for x : $\sqrt{2x + 9} + x = 13$

Q11. Find the sum of all odd integers between 100 and 1000 which are divisible by 7.

Q12. A table clock is available for Rs 200 cash or for Rs 60 as cash down payment followed by Rs168 after 6 months. Find the rate of interest charged under the instalment plan.

Q13. A loan of Rs 78040 is to be paid back in 3 equal annual instalments. If the rate of interest charged is 8 % p.a. Find each instalment.

Q14. In $\triangle ABC$, $\llcorner A = 60^0$, Prove that $BC^2 = AB^2 + AC^2 - AB.AC$

Q15. Construct $\triangle ABC$ in which BC = 6 cm, $\llcorner A = 60^0$ and the median AD = 5 cm, Also construct another $\triangle BPQ \sim \triangle BAC$ such that BP = $\dfrac{3}{2}$ BC.

Q16. If $Sec\theta + Tan\theta = p$ show that $\dfrac{p^2 - 1}{p^2 + 1} = Sin\theta$

OR

Without using trigonometric tables, evaluate the following:

$\cos^2(90^o - A)\left[1 + \tan^2(90^o - A)\right]$ + $\dfrac{\tan(90^o - A)\sin(90^o - A)}{\cos ec^2 A. \cos(90^o - A)}$ − $\dfrac{1}{\cos ec^2(90^o - A)}$

Q17. A Rectangular sheet of aluminium foil is 44 cm long and 20 cm wide. A cylinder is made by rolling the foil along its length and filled with wax. Find the volume and whole surface area of the solid cylinder so formed.

Q18. A conical flask is full of water. The flask has base radius 'r' and height 'h'. The water is poured into a cylindrical flask of base radius 'mr'. Find the height of water in the cylindrical flask.

Q19. The surface area of a sphere is $452\dfrac{4}{7}$ cm^2. Find its diameter and volume.

SECTION C (6 x 5 = 30 marks)

Question numbers 20 to 25 carry 5 marks each.

Q20. A train running at a constant speed crosses a man in 9 seconds who is walking at 5 km/hr in the direction   in which the train is moving. If the train crosses the platform which is 56.25 m long is 13.5 seconds, find the speed and the length of the train.

Q21. A and B are two stations 300 km apart. Two trains start simultaneously from A and B, each to the opposite stations. The train from A reaches B in 9 hours, the train from B reaches A in 4 hours
        after they   meet. Find the speed of each train

<p align="center">OR</p>

(i)   In an examination paper, one mark is awarded for every correct answer while ¼ mark is deducted for every wrong answer. A student answered 120 questions and got 20 marks. How many questions did he answer correctly?

(ii)   Solve for x : $\sqrt{6}x^2 - 5 + \sqrt{2}x - 5\sqrt{3} = 0$

Q22. The annual income of Vandana, who is a senior citizen is Rs 600000 exclusive of HRA. She contributes   Rs 5500 per month to   her P.F and pays Rs 12000 half yearly to the Life Insurance Policy. She has donated Rs 10000 towards National Defence Fund (100 % exemption) and Rs 5000 towards Rajiv
        Gandhi Foundation (50 % exemption). Find the income tax to be paid by Mrs. Vandana in the last   month of the year, if she had   been paying Rs 2500 per month as income tax for the first 11 months of   the financial year.

Use the following for calculating income tax:

Savings : 100 % exemption for savings upto Rs 1,00,000.

The rates of income tax for Women Employees are as under:

SLAB	RATE OF TAX
1. Taxable income upto Rs.1,35,000	NIL
2. Taxable income from Rs.1,35001 to Rs. 1,50,000	10% of the amount by which taxable income exceeds Rs. 1,35,000.
3. Taxable income from Rs.1,50,001 to Rs. 250,000	Rs. 1500 + 20% of the amount by which taxable income exceeds Rs. 1,50,000
4. Taxable income above Rs.2,50,000	Rs. 21500 + 30% of the amount by which taxable income exceeds Rs. 250,000
5. Surcharge	10% of the amount of tax payable if the taxable income exceeds Rs. 1000,000
6. Education Cess	2% of the amount of tax payable.

The rates of Income tax for Senior Citizens are as under :(65 years and above)

SLAB	RATE OF TAX
1. Taxable income upto Rs.1,85,000	NIL

2. Taxable income from Rs.185001 to Rs. 250,000 20% of the amount by which taxable income
    exceeds Rs. 1,85,000.
3. Taxable income above Rs.2,50,000   **Rs. 13000 + 30% of** the amount by which taxable income
    exceeds Rs. 2,50,000

4. Surcharge   **10% of the amount of tax payable if the** taxable income   **exceeds** Rs. 1000000
5. Education Cess   **2% of the amount of tax payable.**

Q23. **Prove that the ratio of the areas of similar triangles is equal to the ratio of the squares on the   corresponding sides.**

  Using the above theorem prove that the area of the equilateral triangle described on the side of a square is half the area of the equilateral triangle described on its diagonal.

Q24. **In a triangle, if the square of one side is equal to the sum of the squares of other two sides, then the angle   opposite to the first side is a right angle.**

  Using the above result, prove the following: In an isosceles triangle ABC , if AC = BC and $AB^2 = 2 \, AC^2$, prove that $\llcorner C$ is a right angle.

Q25. **The interior of a building is in the form of a cylinder of diameter 4.3 m and height 3.8 m surmounted by   a cone whose vertical angle is a right angle. Find the area of the surface and volume of the building.**

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OR

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  An inverted cone of radius 6 cm and height 8 cm is completely filled with water. A sphere is placed into   the cone which has size such that it just fits into the cone. What fraction of water overflows?