

2012 Maths Half-yearly Q. Paper

1. Rationalise the denominator of $\frac{1}{2\sqrt{3}-\sqrt{5}}$
2. The product of a number and itself is 3969. Find the number.
3. If $x^2 + y^2 = 6xy$, prove that $2\log(x + y) = \log x + \log y + 3\log 2$.
4. Find the lateral surface area of a right circular cylinder if its base has radius 7 cm. and height 10 cm.
5. What are the major components of a computer?
6. If $A = \begin{pmatrix} 1 & 2 \\ 2 & 3 \end{pmatrix}$, $B = \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$, show that $k(A + B) = kA + kB$.
7. If $\mu = \{2,3,4,5\}$, $A = \{2,4\}$, then find (i) $A \cup A^c$ (ii) $A \cap A^c$.
8. Prepare a less than cumulative frequency distribution table for the following data:

Class	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60
Frequency	5	11	19	21	16	8

9. Write any two computer languages you know.
10. What is the slope of the line $2x + 4y + 3 = 0$?
11. The radius of the base of a cone is 7 cm, the slant height is 10 cm. Find its lateral surface area.
12. Draw Venn diagram of $A - B$.
13. Find the value of $\log_8 512$.
14. If $R = \{(1,2), (2,3), (3,4), (5,4)\}$ is a relation, write domain and range of R.
15. Out of 120 members of a class, 50 play cricket, 60 play football, 48 play hockey, 18 play cricket and hockey, 20 play cricket and football, 24 play hockey and football and 10 play all the three games. Using Venn diagrams or otherwise answer the following. (Textbook pg. 128 – 5th problem)
 - (i) How many of them play only cricket?
 - (ii) How many of them play none?
16. If $x = 1 + \log_a bc$, $y = 1 + \log_b ca$, $z = 1 + \log_c ab$, show that $xy + yz + zx = xyz$.
17. A top (toy) is of the shape of a cone over a hemisphere. The radius of the hemisphere is 3.5 cm. The total height of the top is 15.5 cm. Find the total surface area of the top.
18. Solve $x(x + 1)(x + 2)(x + 3) = 120$.

19. If $A = \begin{pmatrix} a & b \\ c & d \end{pmatrix}$, $I = \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$, show that $A^2 - (a + d)A = (bc - ad)I$.

20. If $A = \begin{pmatrix} 2 & -1 \\ 4 & 3 \end{pmatrix}$, $B = \begin{pmatrix} -1 & 1 \\ 2 & 4 \end{pmatrix}$, show that $(AB)^T = B^T A^T$.

21. (This problem is in Textbook pg. 360 – 1st problem).

22. If $A = \{1,2,3\}$, $B = \{3,4,5\}$, $C = \{4,6\}$, show that $A \times (B \cup C) = (A \times B) \cup (A \times C)$.

23. Draw a frequency polygon for the given data.

Class	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60	60 - 70
Frequency	6	10	19	21	16	10	7

24. Write a step-by-step procedure for simple interest for 5 years in which Principle = Rs. 5,000 at Rate of 10% per year. Draw the flow chart also.