

Sample Test Paper For Half Yearly
Mathematics for Class - XI [2013-2014]
By OP Gupta (+91- 9650 350 480)

For NCERT Solutions, visit at:
www.theOPGupta.WordPress.com
Mail me at : theopgupta@gmail.com

- Q01.** Write the set $\{2, 5, 10, 17, \dots\}$ in set-builder form.
- Q02.** Find the value of $\cos(-1710^\circ)$.
- Q03.** Solve: $-5 \leq 5 - \frac{3x}{2} \leq 8$.
- Q04.** Find the range of $f(x) = \sqrt{x-1}$.
- Q05.** Find the multiplicative inverse of: $-i$.
- Q06.** Solve: $-12x > 30$, when x is integer.
- Q07.** If $A \subset B$, then find the value of $A \cap B$ and $A \cup B$.
- Q08.** Evaluate: $i^n + i^{n+1} + i^{n+2} + i^{n+3}$.
- Q09.** If $\left(\frac{1+i}{1-i}\right)^p = 1$, find least positive integral value of p .
- Q10.** Convert $\frac{11}{16}$ in degree measure.
- Q11.** If $a + ib = \frac{(x+i)^2}{2x^2+1}$ then, prove that $a^2 + b^2 = \frac{(x^2+1)^2}{(2x^2+1)^2}$.
- Q12.** Let $U = \{1, 2, 3, \dots, 10\}$, $A = \{1, 2, 5, 6\}$ and $B = \{2, 3, 4, 9\}$. Verify that $(A \cup B)' = A' \cap B'$.
- Q13.** By using principle of mathematical induction, prove the rule of exponents: $(xy)^n = x^n y^n \quad \forall n \in \mathbb{N}$.
- Q14.** Find all the pair of consecutive even positive integers both of which are larger than 5 such that their sum is less than 23.
- Q15.** Write the relation $R = \{(x, x^3) : x \text{ is a prime number less than } 10\}$ in roster form. Hence find its domain.
- Q16.** Prove that: (a) $\cos\left(\frac{\pi}{4} + x\right) + \cos\left(\frac{\pi}{4} - x\right) = \sqrt{2} \cos x$ (b) $\frac{\sec 8x - 1}{\sec 4x - 1} = \frac{\tan 8x}{\tan 2x}$.
- Q17.** From a class of 25 students, 10 are to be chosen for excursion party. There are 3 students who decide that either all of them will join or none of them will join. In how many ways can the party be chosen?
- Q18.** Let $f = \{(1,1), (2,3), (0,-1), (-1,-3)\}$ be a function from Z to Z defined by $f(x) = mx + n$ for some integers m and n . Find the function and hence its domain.
- Q19.** Show that: $\cos^2 A + \cos^2\left(\frac{2\pi}{3} - A\right) + \cos^2\left(\frac{2\pi}{3} + A\right) = \frac{3}{2}$.
- Q20.** Prove that $(1+x)^n \geq (1+nx)$, for all natural numbers n , where $x > -1$.
- Q21.** Find the real numbers a and b such that $(a-ib)(3+5i)$ is conjugate of $-6-24i$.
- Q22.** How many litres of water will have to be added to 1125 litres of the 45% solution of acid so that the resulting mixture will contain more than 25% but less than 30% acid content?
- Q23.** The function $f(x)$ is defined by $f(x) = \begin{cases} 1-x, & \text{when } x < 0 \\ 1, & \text{when } x = 0 \\ 1+x, & \text{when } x > 0 \end{cases}$. Draw the graph of $f(x)$. Also find its domain and the range.
- Q24.** Solve the equation: $(1 - \tan \theta)(1 + \sin 2\theta) = 1 + \tan \theta$.
- Q25.** If $\sin \theta = \frac{1}{4}$, $x \in \text{II quadrant}$, then find $\sin \frac{\theta}{2}$, $\cos \frac{\theta}{2}$ and $\tan \frac{\theta}{2}$.
- Q26.** Using principle of mathematical induction, prove that: $\frac{1}{1.2.3} + \frac{1}{2.3.4} + \dots + \frac{1}{n(n+1)(n+2)} = \frac{n(n+3)}{4(n+1)(n+2)}$.
- Q27.** Find the modulus and argument of $\frac{i-1}{\cos \frac{\pi}{3} + i \sin \frac{\pi}{3}}$. Also find its polar form.
- Q28.** Solve graphically: $x + 2y \leq 10$, $x + y \geq 1$, $x - y \leq 0$, $x \geq 0$, $y \geq 0$.
- Q29.** There are 200 individuals with a skin disorder, 120 had been exposed to the chemical C_1 , 50 to chemical C_2 and 30 to both the chemical C_1 and C_2 . Find the number of individuals exposed to (a) chemical C_1 but not chemical C_2 (b) chemical C_2 but not chemical C_1 (c) chemical C_1 or chemical C_2 .
- Q30.** Find the number of different 8 letter arrangements that can be made from the letters of the word DAUGHTER so that the vowels never occur together.