

ST THOMAS SCHOOL, INDIRAPURAM
WORKSHEET -2 CLASS XI MATHEMATICS

1. Write the relation $R = \{(x, x^3): x \text{ is a prime number less than } 10\}$ in roster form. What is its domain and range?
2. (a) Find 'n' if ${}^n P_5 = 60$ ${}^{n-1} P_3$ (b) Find 'n' if ${}^{2n} C_3: {}^n C_2 = 44: 3$
3. Solve, $\frac{2x-1}{3} \geq \frac{3x-2}{4} - \frac{(2-x)}{5}$
4. (i) If $f(x) = ax + b$, where a and b are integers, $f(-1) = -5$ and $f(3) = 3$, then find a and b .
(ii) If $f(x) = \frac{x-1}{x+1}$, then show that $f\left(\frac{1}{x}\right) = -f(x)$
5. Find a if the 17th and 18th terms of the expansion $(2 + a)^{50}$ are equal.
6. The coefficients of three consecutive terms in the expansion of $(1 + a)^n$ are in the ratio 1:7:42. Find n
7. Find the number of arrangements of the letters of the word INDEPENDENCE.
In how many of these arrangements,
 - a. Do the words start with P
 - b. Do all the vowels always occur together
 - c. Do the vowels never occur together
 - d. Do the words begin with I and end in P
8. What is the number of ways of choosing 4 cards from a pack of 52 playing cards? In how many of these
 - (a) Four cards are of the same suit (b) Four cards belong to different suits
 - (b) Two are red cards and two are black cards
 - (c) Cards are of the same colour
9. If $\tan x = \frac{3}{4}$, $\pi < x < \frac{3\pi}{2}$, find the value of $\sin \frac{x}{2}$, $\cos \frac{x}{2}$ and $\tan \frac{x}{2}$.
10. Find the square root of $(7 - 24i)$
11. Prove that $\cos^2 x + \cos^2\left(x + \frac{\pi}{3}\right) + \cos^2\left(x - \frac{\pi}{3}\right) = \frac{3}{2}$
12. Solve: $|x - 1| + |x - 2| \geq 4$
13. Find a, b and n in the expansion of $(a + b)^n$ if the first three terms of the expansion are 729, 7290 and 30375, respectively.
14. Find the coefficient of x^4 in the expansion of $(1 + x + x^2 + x^3)^{11}$
15. Show that $\sqrt{2 + \sqrt{2 + \sqrt{2 + 2 \cos 8x}}} = 2 \cos x, 0 < x < \frac{\pi}{8}$
16. Solve the equation $25x^2 - 30x + 11 = 0$ by using the general expression for the roots of the quadratic equation.
17. Write the complex number in polar form $-3\sqrt{2} + 3\sqrt{2}i$.
18. Find the range of function $f(x) = |x - 3|$
19. Solve the system of inequalities and represent the solution on the number line
 $3x - 7 \leq 5 + x; 11 - 5x \leq 1$
20. Find the coefficient of $x^6 y^3$ the expansion of $(x + 2y)^9$.

