CLASS: X **TOPIC: REAL NUMBERS**

SUBJECT: MATHEMATICS

1. If 7x5x3x2 + 3 is composite number? Justify your answer

2. Show that any positive odd integer is of the form 4q + 1 or 4q +3 where q is a positive integer

3. Prove that $\sqrt{2} + \sqrt{5}$ is irrational

4. Use Euclid's Division Algorithms to find the H.C.F of a) 135 and 225 (45)

   b) 4052 and 12576 (4)

   c) 270, 405 and 315

5. Prove that $5 - 2\sqrt{3}$ is an irrational number

6. Find the HCF and LCM of 26 and 91 and verify that LCM X HCF = Product of two numbers (13,182)

7. Explain why $\frac{29}{2^3 \times 5^3}$ is a terminating decimal expansion

8. given that LCM (77, 99) = 693, find the HCF (77, 99) (11)

9. Find the greatest number which exactly divides 280 and 1245 leaving remainder 4 and 3 (138)

10. Prove that $\sqrt{2}$ is irrational

11. The LCM of two numbers is 64699, their HCF is 97 and one of the numbers is 2231. Find the other (2813)

12. If HCF (6, a) = 2 and LCM (6, a) = 60 then find a (20)

13. Two numbers are in the ratio 15: 11. If their HCF is 13 and LCM is 2145 then find the numbers (195,143)

14. Express 0.363636………… in the form a/b (4/11)

15. Find the HCF 52 and 117 and express it in form 52x + 117y

16. Write the HCF of smallest composite number and smallest prime number

17. Write whether $\frac{2\sqrt{45} + 3\sqrt{20}}{2\sqrt{5}}$ on simplification give a rational or an irrational number

CLASS: X **TOPIC: POLYNOMIALS**

SUBJECT: MATHEMATICS

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1. Show that $x^2 - 3$ is a factor of $2x^4 + 3x^3 - 2x^2 - 9x - 12$

2. Divide: $4x^3 + 2x^2 + 5x - 6$ by $2x^2 + 3x + 1$ (2x-2, 9x-4)

3. Find other zeroes of the polynomial $p(x) = 2x^4 + 7x^3 - 19x^2 - 14x + 30$ if two of its zeroes are $\sqrt{2}$ and $-\sqrt{2}$ (3/2, -5)

4. Find all the zeroes of the polynomial $3x^4 + 6x^3 - 2x^2 - 10x - 5$, if two of its zeroes are $\sqrt{5/3}$ and $-\sqrt{5/3}$ (-1,-1)

5. Find all the zeroes of $2x^4 - 3x^3 - 3x^2 + 6x - 2$, if it is known that two of its zeroes are $\sqrt{2}$ and $-\sqrt{2}$ (1, ½)

6. If the polynomial $f(x) = x^4 - 6x^3 + 16x^2 - 25x + 10$, is divided by another polynomial $x^2 - 2x + k$ the remainder Comes out to be $x + a$, find k and a (k = 5, a = -5)

7. Find the polynomial, whose zeroes are $2 + \sqrt{3}$ and $2 - \sqrt{3}$ ($x^2 - 4x + 1$)

8. Form a quadratic polynomial, one of whose zero is $2 + \sqrt{5}$ and the sum of zeroes is 4

9. If α and β are zeroes of the polynomial $x^2 - 2x - 15$, then form a quadratic polynomial whose zeroes are 2α and 2β

10. Write a quadratic polynomial, the sum and product of whose zeroes are 3 and -2 ($x^2 - 3x - 2$)

11. Find the zeroes of the polynomial and verify the relationship between the zeroes and the coefficient
    a) $4x^2 - 4x + 1$ b) $x^2 - 3$ c) $\sqrt{3}x^2 - 8x + 4\sqrt{3}$

12. If α and β are the zeroes of the polynomial $2y^2 + 7y + 5$, write the value of $\alpha + \beta + \alpha\beta$ (-1)

13. If one root of the polynomial $5x^3 + 13x + k$ is reciprocal of the other, then find the value of k?

14. What must be subtracted from $2x^4 - 11x^3 + 29x^2 - 40x + 29$, so that the resulting polynomial is exactly divisible By $x^2 - 3x + 4$ (-2x + 5)

15. If the polynomial $6x^4 + 8x^3 - 5x^2 + ax + b$ is exactly divisible by the polynomial $2x^2 - 5$, then find the values of a and b (-20, -25)

16. If the zeroes of the polynomial $x^3 - 3x^2 + x + 1$ are a – b, a, a + b, find a and b (1, ±√2)

17. On dividing $x^3 - 3x^2 + x + 2$ by a polynomial g(x), the quotient and remainder were x – 2 and -2x +4, respectively Find g(x) ($x^2 - x + 1$)

18. If α and β are the zeroes of the polynomial $f(x) = 6x^2 + x - 2$, find the value of $\frac{1}{\alpha} + \frac{1}{\beta} - \alpha\beta$ (5/6)

(8/15)

19. If α and β are the zeroes of the quadratic polynomial $2x^2 + 3x - 5$, find the value of $\frac{1}{\alpha} + \frac{1}{\beta}$ (-3/5)

20. If α and β are the zeroes of the polynomial $f(x) = x^2 - 5x + k$ such that $\alpha - \beta = 1$, find k (6)

21. If the product of zeroes of the polynomial $ax^2 - 6x - 6$ is 4, find the value of a (-3/2)

22. If α,β are the zeroes of quadratic polynomial $2x^2 + 5x + k$, find the value of k such that $(\alpha + \beta)^2 - \alpha\beta = 24$

CLASS: X **TOPIC: TRIGONOMETRY**

1. If $\cot\theta = 15/8$, evaluate $\dfrac{(2 + 2\sin\theta)(1 - \sin\theta)}{(1 + \cos\theta)(2 - 2\cos\theta)}$ (225/64)

2. If $7 \sin^2\theta + 3 \cos^2\theta = 4$, show that $\tan\theta = 1/\sqrt{3}$

3. Evaluate: $\tan^2 60^\circ - 2 \cos^2 60^\circ - \frac{3}{4} \sin^2 45^\circ - 4 \sin^2 30^\circ$ (9/8)

4. Evaluate: $\dfrac{\sec^2 54^\circ - \cot^2 36^\circ}{\mathrm{Cosec}^2 57^\circ - \tan^2 33^\circ} + 2 \sin^2 38^\circ \sec^2 52^\circ - \sin^2 45^\circ$ (5/2)

5. Evaluate: $\sqrt{2} \tan^2 45^\circ + \cos^2 30^\circ - \sin^2 60^\circ$ ($\sqrt{2}$)

6. If $\sec^2\theta (1+\sin\theta)(1-\sin\theta) = k$, find the value of k (k = 1)

7. Evaluate: $(\sin 90^\circ + \cos 45^\circ + \cos 60^\circ)(\cos 0^\circ - \sin 45^\circ + \sin 30^\circ)$ (7/4)

8. Find the value of:

$$\frac{2 \sin 68^\circ}{\mathrm{Cos}\ 22^\circ} - \frac{2 \cot 15^\circ}{5 \tan 75^\circ} - \frac{3 \tan 45^\circ \tan 20^\circ \tan 40^\circ \tan 50^\circ \tan 70^\circ}{5}$$ (1)

9. If $\sin (A + B) = 1$, $\cos (A - B) = 1$, find A and B (45°, 45°)

10. If $\cos (40^\circ + x) = \sin 30^\circ$, find the value of x (20°)

11. $\mathrm{Sin}\ 4A = \cos (A - 20^\circ)$, where 4A is an acute angle, find the value of A (22°)

12. Find the acute angles A and B, A>B, if $\sin (A + 2B) = \sqrt{3}/2$ and $\cos (A + 4B) = 0$ (30°, 15°)

13. Evaluate: $\sec (90 - \theta)\mathrm{cosec}\theta - \tan (90 - \theta)\cot\theta + \dfrac{\cos^2 35 + \cos^2 55}{\mathrm{Tan}5^\circ \tan 15^\circ \tan 45^\circ \tan 75^\circ \tan 85^\circ}$ (2)

14. If $\sin A - \cos B = 0$, prove that $A + B = 90^\circ$

15. If $\dfrac{\sin\theta + \cos\theta}{\sin\theta - \cos\theta} = \dfrac{5}{3}$, evaluate $\dfrac{7 \tan\theta + 2}{2\tan\theta + 7}$ (2)

16. What is the maximum value of $1/\sec\theta$

17. If A, B and C are interior angles of triangle ABC, show that $\cos\left\{\dfrac{B+C}{2}\right\} = \sin \dfrac{A}{2}$

18. If $x = a \sin\theta$, $y = b \tan\theta$. Prove that $\dfrac{a^2}{x^2} - \dfrac{b^2}{y^2} = 1$

19. Prove that: $\dfrac{1}{1 + \sin\theta} + \dfrac{1}{1 - \sin\theta} = 2 \sec^2 \theta$

20. Prove that: $\dfrac{\sin\theta}{1 + \cos\theta} + \dfrac{1 + \cos\theta}{\sin\theta} = 2\mathrm{cosec}\theta$