



# MATHS

## BOOKS - AGRAWAL PUBLICATION

### POLYNOMIALS

#### Example

1. If  $\alpha$  and  $\beta$  are the zeros of the quadratic polynomial  $p(x) = 4x^2 - 2x - 3$ , find the value of  $\frac{1}{\alpha} + \frac{1}{\beta}$ .



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2. If one of the zeros of polynomial  $p(x) = (k - 1)x^2 - kx + 1$  is  $-3$ , find the value of  $k$ .



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3. If  $\alpha$  and  $\beta$  be the roots of the equation  $x^2 - 1 = 0$ , then show that  $\alpha + \beta = \frac{1}{\alpha} + \frac{1}{\beta}$ .



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4. A teacher asked 10 of his students to write a polynomial in one variable on a paper and then to handover the paper. The following were the answer given by the students:  $2x+3$ ,  $3x^2+7x+2$ ,  $4x^3+3x^2+2$ ,  $x^3+\sqrt{3x}+7$ ,  $7x+\sqrt{7}$ ,  $5x^3-7x+2$ ,  $2x^3+3-5/x$ ,  $5x-1/2$ ,  $ax^3+bx^2+cx+d$ ,  $x+1/x$ . Answer the following questions: How many of the above ten are not polynomials?



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5. A teacher asked 10 of his students to write a polynomial in one variable on a paper and then to handover the paper. The following were the answer given by the students:  $2x+3$ ,  $3x^2+7x+2$ ,  $4x^3+3x^2+2$ ,  $x^3+\sqrt{3x}+7$ ,  $7x+\sqrt{7}$ ,  $5x^3-7x+2$ ,  $2x^3+3-5/x$ ,  $5x-1/2$ ,  $ax^3+bx^2+cx+d$ ,  $x+1/x$ . Answer the following questions: How many of the above ten are quadratic polynomials?



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6. If one of the zeroes of the quadratic polynomial  $f(x) = 4x^2 - 8kx - 9$  is equal in magnitude but opposite in sign of the other, then find the value of  $k$ .



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7. Can  $(x-5)$  be the remainder on division of a polynomial  $p(x)$  by  $(x+8)$ ?



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8. If the zeros of the polynomial  $x^3 - 2x^2 + x + 1$  are  $a-b$ ,  $a$  and  $a+b$ , then find the values of  $a$  and  $b$ .



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9. What number should be added to the polynomial  $x^2 - 5x + 4$  so that 3 is the zero of the polynomial?



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10. If the zeroes of a quadratic  $x^2 - 8x + k = 0$  is the HCF of (6,12), then find the value of k.



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11. Find the quadratic polynomial sum and product of whose zeroes are -1 and -20 respectively. Also, find the zeroes of the polynomial so obtained.



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**12.** Find the quadratic polynomial whose zeroes are reciprocals of the zeroes of the polynomial  $f(x) = ax^2 + bx + c, a \neq 0, c \neq 0$ .



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**13.** If the zeroes of the polynomial  $x^2 + px + q$  are double the value to the zeroes of  $2x^2 - 5x - 3$ , find the value of  $p$  and  $q$ .



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**14.** Find the value of  $k$  such that the equation  $x^2 - (k + 6)x + 2(2k - 1) = 0$  has sum of the roots equal to half of their product :



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**15.** Find the zeroes of following polynomials by factorisation method and verify relation between the zeroes and coefficients of polynomials.  $2x^2 + \frac{7}{2}x + \frac{3}{4}$



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**16.** Find the zeroes of following polynomials by factorisation method and verify relation between the zeroes and coefficients of polynomials.  $2s^2 - (1 + 2\sqrt{2})s + \sqrt{2}$



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**17.** Find the zeroes of following polynomials by factorisation method and verify relation between the zeroes and coefficients of polynomials.  $7y^2 - \frac{11}{3}y - \frac{2}{3}$





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**18.** Find a quadratic polynomial whose zeroes are 1 and -3. Verify the relation between the coefficients and zeroes of polynomial.



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**19.** If one root of the equation  $3x^2 - 8x + 2k + 1 = 0$  is seven times the others, find the two roots and the value of  $k$ .



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20. Without actually calculating the zeroes, form a quadratic polynomial whose zeroes are reciprocals of the zeroes of the polynomial  $5x^2 + 2x - 3$ .



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21. Obtain other zeroes of the polynomial  $f(x) = 2x^4 + 3x^3 - 5x^2 - 9x - 3$  if two of its zeroes are  $-\sqrt{3}$  and  $-\sqrt{3}$ .



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**22.** Given that the zeroes of the cubic polynomial  $x^3 - 6x^2 + 3x + 10$  are of the form  $a, a+b, a+2b$  for some real numbers  $a$  and  $b$ , find the values of  $a$  and  $b$  as well as the zeroes of the given polynomial.



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**23.** Given that  $\sqrt{2}$  is a zero of the cubic polynomial  $6x^2 + \sqrt{2}x^2 - 10x - 4\sqrt{2}$ , find its

other two zeroes.



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**24.** Given that  $x - \sqrt{5}$  is a factor of the cubic polynomial  $x^3 - 3\sqrt{5}x + 13x - 3\sqrt{5}$ , find all the zeroes of the polynomial.



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**25.** For which values of  $a$  and  $b$  are the zeroes of  $q(x) = x^3 + 2x^2 + a$  also the zeroes of the

polynomial

$$p(x) = x^5 - x^4 - 4x^3 + 3x^2 + 3x + b?$$



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