MATHS

BOOKS - NCERT MATHS (ENGLISH)

POLYNOMIALS

Exercise 2 1 Multiple Choice Questions Mcqs

1. which one of the following is a polynomial ?

A. $\dfrac{x^2}{2} - \dfrac{2}{x^2}$

B. $\sqrt{2x} - 1$

C. $x^2 + \dfrac{3x^{3/2}}{\sqrt{x}}$

D. $\dfrac{x-1}{x+1}$

Answer: C

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2. $\sqrt{2}$ is a polynomial of degree

A. 2

B. 0

C. 1

D. $\dfrac{1}{2}$

Answer: B

3. Degree of the polynomial $4x^4 + 0x^3 + 0x^5 + 5x + 7$ is

A. 4

B. 5

C. 3

D. 7

Answer: A

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4. Degree of the zero polynomial is

A. 0

B. 1

C. any natural number

D. not defined

Answer: D

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5. If $p(x) = x^2 - 2\sqrt{2}x + 1$, then p $\left(2\sqrt{2}\right)$ is equal to

A. 0

B. 1

C. $4\sqrt{2}$

D. $8\sqrt{2} + 1$

Answer: B

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6. The value of the polynomial $5x - 4x^2 + 3$, when x=-1 is

A. -6

B. 6

C. 2

D. -2

Answer: A

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7. If $P(x) = x + 3$, then $p(x) + p(-x)$ is equal to

A. 3

B. $2x$

C. zero

D. 6

Answer: D

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8. Zero of the zero polynomial is

A. 0

B. 1

C. any real number

D. not defined

Answer: C

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9. Zero of the polynomial $p(x) = 2x + 5$ is

A. $-\dfrac{2}{5}$

B. $-\dfrac{5}{2}$

C. $\dfrac{2}{5}$

D. $\dfrac{5}{2}$

Answer: B

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10. One of the zeroes of the polynomial $2x^2 + 7x - 4$ is

A. 2

B. $\dfrac{1}{2}$

C. $-\dfrac{1}{2}$

D. -2

Answer: B

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11. If $x^{51} + 51$ is divided by $x + 1$, then the remainder is

A. 0

B. 1

C. 49

D. 50

Answer: D

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12. If $x + 1$ is a factor of the polynomial $2x^2 + kx$, then the value of k is

A. $- 3$

B. 4

C. 2

D. $- 2$

Answer: C

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13. $x + 1$ is a factor of the polynomial

A. $x^3 + x^2 - x + 1$

B. $x^3 + x^2 + x + 1$

C. $x^4 + x^3 + x^2 + 1$

D. $x^4 + 3x^3 + 3x^2 + x + 1$

Answer: B

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14. One of the factors of $(25x^2 - 1) + (1 + 5x)^2$ is

A. $5 + x$

B. $5 - x$

C. $5x - 1$

D. $10x$

Answer: D

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15. the value of $249^2 - 248^2$ is

A. 1^2

B. 477

C. 487

D. 497

Answer: D

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16. the factorisation of $4x^2 + 8x + 3$ is

A. $(x + 1)(x + 3)$

B. $(2x + 1)(2x + 3)$

C. $(2x + 2)(2x + 5)$

D. $(2x - 1)(2x - 3)$

Answer: B

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17. which of the following is a factor of $(x + y)^3 - (x^3 + y^3)$?

A. $x^2 + y^2 + 2xy$

B. $x^2 + y^2 - xy$

C. xy^2

D. $3xy$

Answer: D

18. The coefficient of x in the expansion of $(x + 3)^3$ is

A. 1

B. 9

C. 18

D. 27

Answer: D

19. if $\dfrac{x}{y} + \dfrac{y}{x} = -1(x, y \neq 0)$, then the value of $x^3 - y^3$ is

A. 1

B. -1

C. 0

D. $\dfrac{1}{2}$

Answer: C

20. If $49x^2 - b = \left(7x + \dfrac{1}{2}\right)\left(7x - \dfrac{1}{2}\right)$, then the value of b is

A. 0

B. $\dfrac{1}{\sqrt{2}}$

C. $\dfrac{1}{4}$

D. $\dfrac{1}{2}$

Answer: C

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21. If a+b+c=0, then $a^3 + b^3 + c^3$ is equal to

A. 0

B. abc

C. 3abc

D. 2abc

Answer: C

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1. which of the following expressions are polynomials ? Justify your answere,

(i) 8 (ii) $\sqrt{3x}^2 - 2x$ (iii) $1 - \sqrt{5x}$

$(iv)\dfrac{1}{5x^{-2}} + 5x + 7$ (v) $\dfrac{(x-2)(x-4)}{x}$ (vi) $\dfrac{1}{x+1}$

(vii) $\dfrac{1}{7}a^3 - \dfrac{2}{\sqrt{3}}a^2 + 4a - 7$ (viii) $\dfrac{1}{2x}$

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2. write whether the following statements are true or false , justify Your answer.

(i) A binomial can have atmost two terms.

(ii) Every polynomial is a Binomial .

(iii) A binomial may have degree 5.

(iv) zero of a polynomial is always 0.

(V) A polynomial cannot have more then one zero.

(vi) the degree of the sum of tum polynomals each of degree 5 is wlways .

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3. Find the zeroes of the polynomial ineach of the following .

(i) p(x)=x-4 (ii) g(x)=3-6x

(iii) q(x)=2x-7 (iv) h(y)=2y

4. Find the zeroes of the polynomial$p(x) = (x - 2)^2 - (x + 2)^2.$

A. 0

B. 2

C. -2

D. 1

Answer: A

5. BY actual division , find the quotient and the remainder when the first polynomial is divided by the second polynomial $x^4 + 1$ and $x - 1$.

6. BY Remainder theorem , find the remainder when p(x) is divided by g(x)

(i)   p(x) $= x^3 - 2x^2 - 4x - 1, g(x) = x + 1$ (ii)

$p(x) = x^3 - 3x^2 + 4x + 50, g(x) = x - 3$

7. check whether p(x) is a multiple of g(x) or not

(i) $p(x) = x^3 - 5x^2 + 4x - 3, g(x) = x - 2.$

(ii) $p(x) = 2x^3 - 11x^2 - 4x + 5, g(x) = 2x + 1$

8. Show that

(i) $x + 3$ is factor of $69 + 11x - x^2 + x^3$

(ii) $2x - 3$ is factor of $x + 2x^3 - 9x^2 + 12$

9. Determine which of the following polynomial has x-2 a factor

(i) $3x^2 + 6x - 24$ (ii) $4x^2 + x - 2$

10. Show that p-1 is a factor of $p^{10} - 1$ and also of $p^{11} - 1$.

11. For what value of m is $x^3 - 2mx^2 + 16$ Divisible by x+2 ?

A. -1

B. -2

C. 1

D. 8

Answer: C

12. If $x + 2a$ is factor of $x^5 - 4a^2x^3 + 2x + 2a + 3$, then find the value of a .

13. Find the value of m, so that 2x-1 be a factor of

$8x^4 + 4x^3 - 16x^2 + 10 + m$.

14. If x+1 is a factor of $ax^3 + x^2 - 2x + 4a - 9$, then value of a .

A. -9

B. 0

C. 6

D. 2

Answer: D

15. Factorise

(i) $x^2 + 9x + 18$ (ii) $6x^2 + 7x - 3$

$(iii)\, 2x^2 - 7x - 15 (iv) 84 - 2r - 2r^2$

16. Factorise

(i) $2x^3 - 3x^2 - 17x + 30$ (ii) $x^3 - 6x^2 + 11x - 6$

(iii) $x^3 + x^2 - 4x - 4$ (iv) $3x^2 - x^2 - 3x + 1$

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17. Using suitable identity , evaluate the following

(i) 103^3 (ii) 101×102 (iii) 999^2

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18. Factorise the following :

$(i) 4x^2 + 20x + 25$ $(ii) 9y^2 - 66yz + 121z^2$ $(iii) \left(2x + \dfrac{1}{3}\right)$

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19. Factorise the following

(i)$9x^2 - 12x + 3$ (ii) $9x^2 - 12x + 4$

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20. Expand the following

(i) $(4a - b + ac)^2$ (ii) $(3a - 5b - c)^2$

(iii) $(-x + 2y - 3z)^2$

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21. Facorise the following

(i) $9x^2 + 4y^2 + 16z^2 + 12xy - 16yz - 24xz$

(ii) $25x^2 + 16y^2 + 4z^2 - 40xy + 16yz - 20xz$

(iii) $16x^2 + 4y^2 + 9z^2 - 16xy - 12yz + 24xz$

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22. if a +b+c=9 and ab+bc+ca=26,find $a^2 + b^2 + c^2$.

23. Expand the following

$(i)(3a - 2b)^3 (ii) \left(\dfrac{1}{x} + \dfrac{y}{3}\right)^3$ (iii) $\left(4 - \dfrac{1}{3x}\right)^2$

24. Facorise the following

(i) $1 - 64a^3 - 12 + 48a^2$ (ii) $8p^3 + \dfrac{12}{5}p^2 + \dfrac{6}{25}p + \dfrac{1}{125}$

25. find the following products

$(i) \left(\dfrac{x}{2} + 2y\right) \left(\dfrac{x^2}{4} - xy + 4y^2\right)$ (ii) $(x^2 - 1)(x^4 + x^2 + 1)$

26. Factorise

(i) $1 + 64x^3$ (ii) $a^3 - 2\sqrt{2}b^3$

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27. Find the product:

$(2x - y + 3z)\left(4x^2 + y^2 + 9z^2 + 2xy + 3yz - 6xz\right)$

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28. Factorise (i) $a^3 + 8b^3 + 64c^3 - 24abc$

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29. without actually calculating , the cubes , find the valuse of

(i) $\left(\dfrac{1}{2}\right)^3 + \left(\dfrac{1}{3}\right)^3 - \left(\dfrac{5}{6}\right)^3$ (ii) $(0.2)^3 - (0.3)^3 + (0.1)^3$

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30. Factorize : $(x - 2y)^3 + (2y - 3z)^3 + (3z - x)^3$

31. Find the value of : $(1) x^3 + y^3 - 12xy + 64$ when $x + y + 4 = 0$

$(2) x^3 - 8y^3 - 36xy + 216$ when $x - 2y + 6 = 0$

32. Give possible expression for the length and breadth of the rectangle whose area is given by $4a^2 + 4a - 3$.

Exercise 2 3 Very Short Answer Type Questions

1. Classify the following polynomials as polynomials in one variable , two variables etc.

(1)$x^2 + x + 1$ (ii) $y^3 - 5y$

(iii) $xy + yz + zx$ (iv)$x^2 - 2xy + y^2 + 1$

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2. Determine the degree of each of the following polynomials.

(i) 2x-1 (ii) -10

(iii) $x^3 - 9x + 3x^5$ (iv) $y^3 (1 - y^4)$

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3. For the polynomials $\dfrac{x^3 + 2x + 1}{5} - \dfrac{7}{2}x^2 - x^6$,then write

(i) the degree of the polynomial (ii) the coefficient of x^3

(iii) the coeficient of x^6 (iv) the constant term

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4. write the coefficient of x^2 in each of the following

(i) $\frac{\pi}{6}x + x^2 - 1$ (ii) 3x-5

(iii) $(x - 1)(3x - 4)$ (iv) $(2x - 5)(2x^2 - 3x + 1)$

5. Classify the follwing as a constant , linear , quadratic and cubic polynomials

(i) $2 - x^2 + x^3$ (ii) $3x^3$ (iii) $5t - \sqrt{7}$

(iv)$4 - 5y^2$ (v) 3 (vi) 2+x

$(vii)y^3 - y$ (viii) $1 + x + x^2$ $(ix)t^2$(x) $(\sqrt{2})x - 1$

6. Give an example of a polynomial , which is

(i) Monomial of degree1.

(ii) Binomial of degree 20.

(iii) Triomial of degree 2.

7. find the value of the polynomial $3x^3 - 4x^2 + 7x - 5,$, when x=3 and also when x=-3.

8. If $p(x) = x^2 - 4x + 3,$ then evaluate $p(2) - p(-1) + p\left(\dfrac{1}{2}\right).$

9. Find p(0),p(1) and p(-2) for the following polynomials

(i)$p(x) = 10x - 4x^2 - 3$ (ii) $p(y) = (y + 2)(y - 2)$

10. Verify whether the following are true or false . (i) -3 is a zero of x-3 (ii) $-\dfrac{1}{3}$ is a zero of 3x+1

(iii) $-\dfrac{4}{5}$ is a zero of 4-5y (iv) 0 and 2 are the zeroes of $t^2 - 2t$

(v) -3 is a zero of $y^2 + y - 6$

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Exercise 2 4 Long Answer Type Questions

1. If the polynomials $az^3 + 4z^2 + 3z - 4$ and $z^3 - 4z + a$ leave the same remainder when divided by $z - 3$, find the value of a.

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2. the polynomial $p(x) = x^4 - 2x^3 + 3x^2 - ax + 3a - 7$ when divided by x+1 leaves the remainder 19. find the values of A , also find the remainder when p(x) is divided by x+2.

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3. if both x-2 and $x - \dfrac{1}{2}$ are factors of $px^2 + 5x + r.$ then show that p=r.

4. Without actual division, prove that $2x^4 - 5x^3 + 2x^2 - x + 2$ is exactly divisible by $x^2 - 3x + 2.$

5. Simplify :$(2x - 5y)^3 - (2x + 5y)^3$

6. Multiply: $x^2 + 4y^2 + z^2 + 2xy + xz - 2yz$ by $x - 2y - z$

7. if a,and c are all non zero and a+b+c=0 , then prove that

$$\frac{a^2}{bc} + \frac{b^2}{ac} + \frac{c^2}{ab} = 3.$$

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8. If $a + b + c = 5$ and $ab + bc + ca = 10,$ then prove that

$a^3 + b^3 + c^3 - 3abc = -25.$

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9. Prove that $(a + b + c)^3 - a^3 - b^3 - c^3 = 3(a + b)(b + c)(c + a).$

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