EXERCISE # 1

Q.1 Factorise:
(i) $12x^3y^4 + 16x^2y^5 - 4x^5y^2$
(ii) $18a^3b^2 + 36ab^4 - 24a^2b^3$

Q.2 Factorise:
(i) $(x + y)(2x + 3y) - (2x + 3y) - (x + y)(x + 1)$
(ii) $(x + y)(2a + b) - (3x - 2y)(2a + b)$

Q.3 Factorise :
(i) $x^2 + xy + 8x + 8y$
(ii) $15xy - 6x + 10y - 4$
(iii) $n - 7 + 7lm - lmn$

Q.4 Factorise:
(i) $a^2 + 2a + ab + 2b$
(ii) $x^2 - xz + xy - xz$

Q.5 Factorise each of the following expressions:
(i) $a^2 - b + ab - a$
(ii) $xy - ab + bx - ay$
(iii) $6ab - b^2 + 12ac - 2bc$
(iv) $a(a + b - c) - bc$
(v) $a^2x^2 + (ax^2 + 1)x + a$
(vi) $3ax - 6ay - 8by + 4bx$

Q.6 Factorise:
(i) $x^3 - 2x^2y + 3xy^2 - 6y^3$
(ii) $6ab - b^2 + 12ac - 2bc$

Q.7 Factorise :
(i) $x^4 - y^4$ (ii) $16x^4 - 81$
(iii) $x^4 - (y + z)^4$ (iv) $2x - 32x^5$
(v) $3a^4 - 48b^4$ (vi) $81x^4 - 121x^2$

Q.8 Factorise each of the following algebraic expressions:
(i) $16(2x - 1)^2 - 25z^2$
(ii) $4a^2 - 9b^2 - 2b - 3b$
(iii) $x^2 - 4x + 4y - y^2$
(iv) $3 - 12(a - b)^2$
(v) $x(x + z) - y(y + z)$
(vi) $a^2 - b^2 - a - b$

Q.9 Factorise :
(i) $4x^2 - 4xy + y^2 - 9z^2$
(ii) $16 - x^2 - 2xy - y^2$
(iii) $x^4 - (x - z)^4$

Q.10 Factorise :
(i) $4(x + y)^2 - 28y(x + y) + 49y^2$
(ii) $(2a + 3b)^2 + 2(2a + 3b)(2a - 3b) + (2a - 3b)^2$

Q.11 Factorise each of the following expressions:
(i) $9x^2 - 4y^2$
(ii) $36x^2 - 12x + 1 - 25y^2$
(iii) $a^2 - 1 + 2x - x^2$

Q.12 Factorise:
(i) $9 - a^6 + 2a^3b^3 - b^6$
(ii) $x^{16} - y^{16} + x^8 + y^8$

Q.13 Factorzie: $(2x + 3y)^2 - 5(2x + 3y) - 14$

Q.14 Factorise: $3m^2 + 24m + 36$

Q.15 Divide:
(i) $6x^4yz - 3xy^3z + 8x^2yz^4$ by $2xyz$
(ii) $\frac{2}{3}a^2b^2c^2 + \frac{4}{3}ab^2c^3 - \frac{1}{5}ab^3c^2$ by $\frac{1}{2}abc$

Q.16 Divide the polynomial $2x^4 + 8x^3 + 7x^2 + 4x + 3$ by $x + 3$.

Q.17 Divide $10x^4 + 17x^3 - 62x^2 + 30x - 3$ by $2x^2 + 7x - 1$

Q.18 Divide $3y^5 + 6y^4 + 6y^3 + 7y^2 + 8y + 9$ by $3y^3 + 1$ and verify that
Dividend = Divisor × Quotient + Remainder

Q.19 Divide $16x^4 + 12x^3 - 10x^2 + 8x + 20$ by $4x - 3$. Also, write the quotient and remainder.

Q.20 Divide $8y^3 - 6y^2 + 4y - 1$ by $4y + 2$. Also, write the quotient and the remainder.

Q.21 Divide: $a^4 - b^4$ by $a - b$

Q.22 Divide: $x^{4a} + x^{2a}y^{2b} + 4y^{4b}$ by $x^{2a} + x^ay^b + y^{2b}$

ANSWER KEY

EXERCISE # 1

2. (i) $(x + y)(x + 3y - 1)$ (ii) $(-2x + 3y)(2a + b)$

4. (i) $(a + 2)(a + b)$ (ii) $(x + y)(x - z)$

5. (i) $(a + b)(a - 1)$ (ii) $(y + b)(x - a)$ (iii) $(b + 2c)(6a - b)$
(iv) $(a + b)(a - c)$ (v) $(x + a)(ax^2 + 1)$ (vi) $(3a + 4b)(x - 2y)$

6. (i) $(x - 2y)(x^2 + 3y^2)$ (ii) $(6a - b)(b + 2c)$

7. (i) $(x - y)(x + y)(x^2 + y^2)$ (ii) $(2x - 3)(2x + 3)(4x^2 + 9)$
(iii) $(x - y - z)(x + y + z)\{x^2 + (y + z)^2\}$ (iv) $2x(1 + 4x^2)(1 - 2x)(1 + 2x)$
(v) $3(a - 2b)(a + 2b)(a^2 + 4b^2)$ (vi) $x^2(9x - 11)(9x + 11)$

8. (i) $(8x - 5z - 4)(8x + 5z - 4)$ (ii) $(2a + 3b)(2a - 3b - 1)$
(iii) $(x - y)(x + y - 4)$ (iv) $3(1 + 2a - 2b)(1 - 2a + 2b)$
(v) $(x - y)(x + y + z)$ (vi) $(a + b)\{(a - b) - 1\}$

9. (i) $(2x - y + 3z)(2x - y - 3z)$ (ii) $(4 + x + y)(4 - x - y)$
(iii) $(2x^2 - 2xz + z^2)(2x - z)z$

10. (i) $(2x - 5y)^2$ (ii) $16a^2$

11. (i) $(3x + 2y)(3x - 2y)$
(ii) $(6x - 5y - 1)(6x + 5y - 1)$
(iii) $(a - 1 + x)(a + 1 - x)$

12. (i) $(a^3 - b^3 + 3)(-a^3 + b^3 + 3)$
(ii) $(x^8 + y^8)(x^8 - y^8 + 1)$
(iii) $(p + q - a + b)(p + q + a - b + 1)$

13. $(2x + 3y - 7)(2x + 3y + 2)$

14. $3(m + 2)(m + 6)$

15. (i) $3x^3 - \frac{3}{2}y^2 + 4xz^3$ (ii) $\frac{4}{3}abc + \frac{8}{3}bc^2 - \frac{2}{5}b^2c$

16. $(x + 3)(2x^3 + 2x^2 + x + 1)$

17. $(2x^2 + 7x - 1)(5x^2 - 9x + 3)$

20. $(4y + 2)\left(2y^2 - \frac{5}{2}y + \frac{9}{4}\right) - \frac{11}{2}$

21. $(a + b)(a^2 + b^2)$

22. $x^{2a} - x^a y^b + y^{2b}$

EXERCISE # 2

Q.1 If x and y are non-zero rational unequal numbers, then find the value of $\frac{(x+y)^2-(x-y)^2}{x^2y-xy^2}$

(A) $\frac{1}{xy}$ (B) $\frac{1}{x-y}$ (C) $\frac{4}{x-y}$ (D) $\frac{2}{x-y}$

Q.2 Let $\frac{a}{b}-\frac{b}{a}=x:y$. If $(x-y)=\left(\frac{a}{b}+\frac{b}{a}\right)$, then find the value of x -

(A) $\frac{a+b}{a}$ (B) $\frac{a+b}{b}$

(C) $\frac{a-b}{a}$ (D) None of these

Q.3 If $(x-2)$ is a factor of $(x^2+3qx-2q)$, then find the value of q.

Q.4 If x^3+6x^2+4x+k is exactly divisible by $(x+2)$, then find the value of k.

Q.5 Let $f(x)=x^3-6x^2+11x-6$. Then, which one of the following is not factor of f(x) ?

(A) $x-1$ (B) $x-2$ (C) $x+3$ (D) $x-3$

Q.6 The polynomial $(x^4-5x^3+5x^2-10x+24)$ has a factor as -

(A) $x+4$ (B) $x-2$

(C) $x+2$ (D) None of these

Q.7 $(x^{29}-x^{25}+x^{13}-1)$ is divisible by -

(A) both $(x-1)$ & $(x+1)$

(B) $(x-1)$ but not by $(x+1)$

(C) $(x+1)$ but not by $(x-1)$

(D) neither $(x-1)$ nor $(x+1)$

Q.8 Value of k for which $(x-1)$ is a factor of (x^3-k).

Q.9 Find the factors of $(8x^3-27y^3)$ -

(A) $(2x-3y)(4x^2+9y^2-6xy)$

(B) $(2x-3y)(4x^2+9y^2+6xy)$

(C) $(2x-3y)(4x^2-9y^2-6xy)$

(D) $(2x-3y)(4x^2-9y^2+6xy)$

Q.10 Find the factors of $(x^3+y^3+2x^2-2y^2)$.

Q.11 Find the factors of (x^3-5x^2+8x-4).

Q.12 Find the factors of (x^4+4).

Q.13 Find the factors of $(x+y)^3-(x-y)^3$.

Q.14 If $(x^5-9x^2+12x-14)$ is divided by $(x-3)$, then find the remainder.

Q.15 If $(x^{11}+1)$ is divided by $(x+1)$, then find the remainder.

Q.16 Find the value of expression $(16x^2+24x+9)$ for $x=-\frac{3}{4}$.

Q.17 Find the sum of (x^2+1) and the reciprocal of (x^2-1).

Q.18 Find the factors of $(x^2-1-2a-a^2)$.

Q.19 Find the factors of $(x^2-8x-20)$.

Q.20 Find the factors of $(x^2-xy-72y^2)$.

Q.21 Find the factors of $(x^2-11xy-60y^2)$.

Q.22 Find the factors of (x^4+x^2+25).

ANSWER KEY

EXERCISE # 2

1. $\frac{4}{x-y}$ **2.** None of these **3.** –1

4. –8 **5.** x + 3 **6.** x – 2

7. (x – 1) but not by (x + 1) **8.** 1 **9.** $(2x - 3y)(4x^2 + 9y^2 + 6xy)$

10. $(x + y)(x^2 + y^2 + xy + 2x - 2y)$ **11.** $(x - 2)^2 (x - 1)$

12. $(x^2 + 2x + 2)(x^2 - 2x + 2)$

13. $2y(3x^2 + y^2)$ **14.** 184 **15.** 0

16. 0 **17.** $\frac{x^4}{x^2 - 1}$ **18.** (x + a + 1) (x – a – 1)

19. (x – 10) (x + 2) **20.** (x – 9y) (x + 8y) **21.** (x – 15y) (x + 4y)

22. $(x^2 + 5 + 3x)(x^2 + 5 - 3x)$