RD SHARMA

Solutions

Class 8 Maths

Chapter 7

Ex 7.5

Q.1) $16x^2 - 25y^2$

Soln.:

$16x^2 - 25y^2$

$= (4x)^2 - (5y)^2$

$= (4x - 5y)(4x + 5y)$

Q.2) $27x^2 - 12y^2$

Soln.:

$27x^2 - 12y^2$

$= 3(9x^2 - 4y^2)$

$= 3[(3x)^2 - (2y)^2]$

$= 3(3x - 2y)(3x + 2y)$

Q.3) $144a^2 - 289b^2$

Soln.:

$144a^2 - 289b^2$

$= (12a)^2 - (17b)^2$

$= (12a - 17b)(12a + 17b)$

Q.4) $12m^2 - 27$

Soln.:

$12m^2 - 27$

$= 3(4m^2 - 9)$

$= 3[(2m)^2 - 3^2]$

$= 3(2m - 3)(2m + 3)$

Q.5) $125x^2 - 45y^2$

Soln.:

$125x^2 - 45y^2$

$= 5(25x^2 - 9y^2)$

$= 5[(5x)^2 - (3y)^2]$

$= 5(5x - 3y)(5x + 3y)$

Q.6) $144a^2 - 169b^2$

Soln.:

$144a^2 - 169b^2$

$= (12a)^2 - (13b^2)$

$= (12a - 13b)(12a + 13b)$

Q.7) $(2a - b)^2 - 16c^2$

Soln.:

$(2a-b)^2-16c^2$

$=(2a-b)^2-(4c)^2$

$=[(2a-b)-4c][(2a-b)+4c]$

$=(2a-b-4c)(2a-b+4c)$

Q.8) $(x+2y)^2-4(2x-y)^2$

Soln.:

$(x+2y)^2-4(2x-y)^2=(x+2y)^2-[2(2x-y)]^2$

$=[(x+2y)-2(2x-y)][(x+2y)+2(2x-y)]$

$=(x+2y-4x+2y)(x+2y+4x-2y)$

$=5x(4y-3x)$

Q.9) $3a^5-48a^3$

Soln.:

$3a^5-48a^3$

$=3a^3(a^2-16)$

$=3a^3(a^2-4^2)$

$=3a^3(a-4)(a+4)$

Q.10) a^4-16b^4

Soln.:

a^4-16b^4

$=a^4-2^4b^4$

$=(a^2)^2-(2^2b^2)^2$

$=(a^2-2^2b^2)(a^2+2^2b^2)$

$=[a^2-(2b)^2](a^2+4b^2)$

$(a-2b)(a+2b)(a^2+4b^2)$

Q.11) x^8-1

Soln.:

$x^8-1=(x^4)^2-1^2$

$=(x^4-1)(x^4+1)$

$=[(x^2)^2-1^2](x^4+1)$

$=(x^2-1)(x^2+1)(x^4+1)$

$=(x^2-1^2)(x^2+1)(x^4+1)$

$=(x-1)(x+1)(x^2+1)(x^4+1)$

Q.12) $64-(a+1)^2$

Soln.:

$64-(a+1)^2$

$=(8)^2-(a+1)^2$

$=[8-(a+1)][8+(a+1)]$

$=(8-a-1)(8+a+1)$

$= (7 - a)(9 + a)$

Q.13) $36L^2 - (m + n)^2$

Soln.:

$36L^2 - (m + n)^2$

$= (6L)^2 - (m + n)^2$

$= [6L - (m + n)][6L + (m + n)]$

$= (6L - m - n)(6L + m + n)$

Q.14) $25x^4y^4 - 1$

Soln.:

$25x^4y^4 - 1$

$= (5x^2y^2)^2 - 1$

$= (5x^2y^2 - 1)(5x^2y^2 + 1)$

Q.15) $a^4 - 1/b^4$

Soln.:

$a^4 - 1/b^4$

$= (a^2)^2 - 1/(b^2)^2$

$= a^2 - 1/b^2a^2 + 1/b^2$

$= a - 1/ba + 1/ba^2 + 1/b^2$

Q.16) $x^3 - 144x$

Soln.:

$x^3 - 144x$

$= x(x^2 - 144)$

$= x(x^2 - 12^2)$

$= x(x - 12)(x + 12)$

Q.17) $(x - 4y)^2 - 625$

Soln.:

$(x - 4y)^2 - 625$

$= (x - 4y)^2 - 25^2$

$= [(x - 4y) - 25][(x - 4y) + 25]$

$= (x - 4y - 25)(x - 4y + 25)$

Q.18) $9(a - b)^2 - 100(x - y)^2$

Soln.:

$9(a - b)^2 - 100(x - y)^2$

$= [3(a - b)]^2 - [10(x - y)]^2$

$= [3(a - b) - 10(x - y)][3(a - b) + 10(x - y)]$

$= (3a - 3b - 10x + 10y)(3a - 3b + 10x - 10y)$

Q.19) $(3 + 2a)^2 - 25a^2$

Soln.:

$(3 + 2a)^2 - 25a^2$

$= (3 + 2a)^2 - (5a)^2$

$= [(3 + 2a) - 5a][(3 + 2a) + 5a]$

$= (3 + 2a - 5a)(3 + 2a + 5a)$

$= (3 - 3a)(3 + 7a)$

$= 3(1 - a)(3 + 7a)$

Q.20) $(x + y)^2 - (a - b)^2$

Soln.:

$(x + y)^2 - (a - b)^2$

$= [(x + y) - (a - b)][(x + y) + (a - b)]$

$= (x + y - a + b)(x + y + a - b)$

Q.21) $\frac{1}{16}\, x^2y^2 - \frac{4}{49}\, y^2z^2$

Soln.:

$\frac{1}{16}\, x^2y^2 - \frac{4}{49}\, y^2z^2$

$= y^2(\frac{1}{16}\, x^2 - \frac{4}{49}\, z^2)$

$= y^2[(\frac{1}{4}x)^2 - (\frac{2}{7}z)^2]$

$= y^2\, (\frac{1}{4}x - \frac{2}{7}z)(\frac{1}{4}x + \frac{2}{7}z)$

$= y^2(\frac{x}{4} - \frac{2}{7}z)(\frac{x}{4} + \frac{2}{7}z)$

Q.22) $75a^3b^2 - 108ab^4$

Soln.:

$75a^3b^2 - 108ab^4$

$= 3ab^2(25a^2 - 36b^2)$

$= 3ab^2\, [(5a)^2 - (6b)^2]$

$= 3ab^2(5a - 6b)(5a + 6b)$

Q.23) $x^5 - 16x^3$

Soln.:

$x^5 - 16x^3$

$= x^3(x^2 - 16)$

$= x^3(x^2 - 4^2)$

$= x^3(x - 4)(x + 4)$

Q.24) $\frac{50}{(x)^2} - \frac{2x^2}{81}$

Soln.:

$\frac{50}{(x)^2} - \frac{2x^2}{81}$

$= 2(\frac{25}{(x)^2} - \frac{x^2}{81})$

$= 2\{(\frac{5}{x})^2 - (\frac{x}{9})^2\}$

$= 2(\frac{5}{x} - \frac{x}{9})(\frac{5}{x} + \frac{x}{9})$

Q.25) $\mathbf{256x^5 - 81x}$

Soln.:

$256x^5 - 81x$

$= x(256x^4 - 81)$

$= x[(16x^2)^2 - 9^2]$

$= x(16x^2 + 9)(16x^2 - 9)$

$= x(16x^2 + 9)[(4x)^2 - 3^2]$

$= x(16x^2 + 9)(4x + 3)(4x - 3)$

Q.26) $\mathbf{a^4 - (2b + c)^4}$

Soln.:

$a^4 - (2b + c)^4$

$= (a^2)^2 - [(2b + c)^2]^2$

$= [a^2 + (2b + c)^2][a^2 - (2b + c)^2]$

$= [a^2 + (2b + c)^2]\{[a + (2b + c)][a - (2b + c)]\}$

$= [a^2 + (2b + c)^2](a + 2b + c)(a - 2b - c)$

Q.27) $\mathbf{(3x + 4y)^4 - x^4}$

Soln.:

$(3x + 4y)^4 - x^4$

$= [(3x + 4y)^2]^2 - (x^2)^2$

$= [(3x + 4y)^2 + x^2][(3x + 4y)^2 - x^2]$

$= [(3x + 4y)^2 + x^2][(3x + 4y) + x]\ [(3x + 4y) - x]$

$= \{(3x + 4y)^2 + x^2\}\ (3x + 4y + x)(3x + 4y - x)$

$= \{(3x + 4y)^2 + x^2\}\ (4x + 4y)(2x + 4y)$

$= \{(3x + 4y)^2 + x^2\}\ 4(x + y)\ 2\ (x + 2y)$

$= 8\{(3x + 4y)^2 + x^2\}\ (x + y)(x + 2y)$

Q.28) $\mathbf{p^2q^2 - p^4q^4}$

Soln.:

$p^2q^2 - p^4q^4$

$= p^2q^2(1 - p^2q^2)$

$= p^2q^2\ [1 - (pq)^2]$

$= p^2q^2\ (1 - pq)(1 + pq)$

Q.29) $\mathbf{3x^3y - 243xy^3}$

Soln.:

$3x^3y - 243xy^3$

$= 3xy(x^2 - 81y^2)$

$= 3xy[x^2 - (9y)^2]$

$= 3xy(x - 9y)(x + 9y)$

Q.30) $\mathbf{a^4b^4 - 16c^4}$

Soln.:

$a^4b^4 - 16c^4$

$= [(a^2b^2)^2 - (4c^2)^2]$

$= (a^2b^2 + 4c^2)(a^2b^2 - 4c^2)$

$= (a^2b^2 + 4c^2)[(ab)^2 - (2c)^2]$

$= (a^2b^2 + 4c^2)(ab + 2c)(ab - 2c)$

Q.31) $\mathbf{x^4 - 625}$

Soln.:

$x^4 - 625$

$= (x^2)^2 - 25^2$

$= (x^2 + 25)(x^2 - 25)$

$= (x^2 + 25)(x^2 - 5^2)$

$= (x^2 + 25)(x + 5)(x - 5)$

Q.32) $\mathbf{x^4 - 1}$

Soln.:

$x^4 - 1$

$= (x^2)^2 - 1$

$= (x^2 + 1)(x^2 - 1)$

$= (x^2 + 1)(x + 1)(x - 1)$

Q.33) $\mathbf{49(a - b)^2 - 25(a + b)^2}$

Soln.:

$49(a - b)^2 - 25(a + b)^2$

$= [7(a - b)^2] - [5(a + b)]^2$

$= [7(a - b) - 5(a + b)]\ [7(a - b) + 5(a + b)]$

$= (7a - 7b - 5a - 5b)(7a - 7b + 5a + 5b)$

$= (2a - 12b)(12a - 2b)$

$= 2(a - 6b)\ 2(6a - b)$

$= 4(a - 6b)(6a - b)$

Q.34) $\mathbf{x - y - x^2 + y^2}$

Soln.:

$x - y - x^2 + y^2$

$= (x - y) + (y^2 - x^2)$

$= (x - y) + (y + x)(y - x)$

$= (x - y) - (y + x)(x - y)$ [since, $(y - x) = -(x - y)$]

$= (x - y)[1 - (y + x)]$

$= (x - y)(1 - x - y)$

Q.35) $16(2x - 1)^2 - 25y^2$

Soln.:

$16(2x - 1)^2 - 25y^2$

$= [4(2x - 1)]^2 - (5y)^2$

$= [4(2x - 1) - 5y][4(2x - 1) + 5y]$

$= (8x - 4 - 5y)(8x - 4 + 5y)$

$= (8x - 5y - 4)(8x + 5y - 4)$

Q.36) $4(xy + 1)^2 - 9(x - 1)^2$

Soln.:

$4(xy + 1)^2 - 9(x - 1)^2$

$= [2(xy + 1)]^2 - [3(x - 1)]^2$

$= [2(xy + 1) - 3(x - 1)]\ [2(xy + 1) + 3(x - 1)]$

$= (2xy + 2 - 3x + 3)(2xy + 2 + 3x - 3)$

$= (2xy - 3x + 5)(2xy + 3x - 1)$

Q.37) $(2x + 1)^2 - 9x^4$

Soln.:

$(2x + 1)^2 - 9x^4$

$= (2x + 1)^2 - (3x^2)^2$

$= [(2x + 1) - 3x^2][(2x + 1) + 3x^2]$

$= (-3x^2 + 2x + 1)(3x^2 + 2x + 1)$

$= (-3x^2 + 3x - x + 1)(3x^2 + 2x + 1)$

$= \{3x(-x + 1) + 1(-x + 1)\}(3x^2 + 2x + 1)$

$= (-x + 1)(3x + 1)(3x^2 + 2x + 1)$

$= -(x - 1)(3x + 1)(3x^2 + 2x + 1)$

Q.38) $x^4 - (2y - 3z)^2$

Soln.:

$x^4 - (2y - 3z)^2$

$= (x^2)^2 - (2y - 3z)^2$

$= [x^2 - (2y - 3z)][x^2 + (2y - 3z)]$

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

Q.39) $a^2 - b^2 + a - b$

Soln.:

$a^2 - b^2 + a - b = (a^2 - b^2) + (a - b)$

$= (a + b)(a - b) + (a - b)$

$= (a - b)(a + b + 1)$

Q.40) $16a^4 - b^4$

Soln.:

$16a^4 - b^4$

$= (4a^2)^2 - (b^2)^2$

$= (4a^2 + b^2)(4a^2 - b^2)$

$= (4a^2 + b^2)[(2a)^2 - b^2]$

$= (4a^2 + b^2)(2a + b)(2a - b)$

Q.41) $a^4 - 16(b - c)^4$

Soln.:

$a^4 - 16(b - c)^4$

$= (a^2)^2 - [4(b - c)^2]^2$

$= [a^2 + 4(b - c)^2][a^2 - 4(b - c)^2]$

$= [a^2 + 4(b - c)^2] [a^2 - [2(b - c)]^2]$

$= [a^2 + 4(b - c)^2][a + 2(b - c)][a - 2(b - c)]$

$= [a^2 + 4(b - c)^2](a + 2b - 2c)(a - 2b + 2c)$

Q.42) $2a^5 - 32a$

Soln.:

$2a^5 - 32a$

$= 2a(a^4 - 16)$

$= 2a[(a^2)^2 - 4^2]$

$= 2a(a^2 + 4)(a^2 - 4)$

$= 2a(a^2 + 4)(a^2 - 2^2)$

$= 2a(a^2 + 4)(a + 2)(a - 2)$

$= 2a(a - 2)(a + 2)(a^2 + 4)$

Q.43) $a^4b^4 - 81c^4$

Soln.:

$a^4b^4 - 81c^4$

$= (a^2b^2)^2 - (9c^2)^2$

$= (a^2b^2 + 9c^2)(a^2b^2 - 9c^2)$

$= (a^2b^2 + 9c^2)[(ab)^2 - (3c)^2]$

$= (a^2b^2 + 9c^2)(ab + 3c)(ab - 3c)$

Q.44) $xy^9 - yx^9$

Soln.:

$xy^9 - yx^9$

$= xy(y^8 - x^8)$

$= xy[(y^4)^2 - (x^4)^2]$

$= xy(y^4 + x^4)[(y^2)^2 - (x^2)^2]$

$= xy(y^4 + x^4)(y^2 + x^2)(y^2 - x^2)$

$= xy(y^4 + x^4)(y^2 + x^2)(y + x)(y - x)$

Q.45) $x^3 - x$

Soln.:

$x^3 - x = x(x^2 - 1)$

$= x(x - 1)(x + 1)$

Q.46) $18a^2x^2 - 32$

Soln.:

$18a^2x^2 - 32$

$= 2(9a^2x^2 - 16)$

$= 2[(3ax)^2 - 4^2]$

$= 2(3ax - 4)(3ax + 4)$