RD SHARMA
Solutions
Class 8 Maths
Chapter 7
Ex 7.2

Factorize the following :

Q.1) $3x - 9$

Soln.:

The greatest common factor of the terms 3x and -9 of the expression $3x - 9$ is 3.

Now,

$3x = 3x$

and

$-9 = 3(-3)$

Hence, the expression $3x - 9$ can be factorised as $3(x - 3)$.

Q.2) $5x - 15x^2$

Soln.:

The greatest common factor of the terms 5x and $15x^2$ of the expression $5x - 15x^2$ is 5x.

Now,

$5x = 5x.(1)$

and

$-15x^2 = 5x.(-3x)$

Hence, the expression $5x - 15x^2$ can be factorised as $5x(1 - 3x)$

Q.3) $20a^{12}b^2 - 15a^8b^4$

Soln.:

The greatest common factor of the terms

$20a^{12}b^2$ and $-15a^8b^4$ of the expression $20a^{12}b^2 - 15a^8b^4$ is $5a^8b^2$.

$20a^{12}b^2 = 5x4xa^8xa^4xb^2 = 5a^8xb^2x4a^4$ and $-15a^8xb^4 = 5x(-3)xa^8xb^2xb^2 = 5a^8b^2\ x(-3)b^2$

Hence, the expression $20a^{12}b^2 - 15a^8b^4$ can be factorised as $5a^8b^2(4a^4 - 3b^2)$

Q.4) $72x^6y^7 - 96x^7y^6$

Soln.:

The greatest common factor of the terms $72x^6y^7$ and $-96x^7y^6$ of the expression $72x^6y^7 - 96x^7y^{64}$ is $24x^6y^6$

Now,

$72x^6y^7 = 24x^6y^6 . 3y$

And, $-96x^7y^{64}$ is $24x^6y^6 . -4x$

Hence, the expression $72x^6y^7 - 96x^7y^6$ can be factorised as $24x^6y^6 . (3y - 4x)$.

Q.5) $20x^3 - 40x^2 + 80x$

Soln.:

The greatest common factor of the terms $20x^3$, $-40x^2$ and 80x of the expression $20x^3 - 40x^2 + 80x$ is 20x.

Now, $20x^3 = 20x . x^2$

$-40x^2 = 20x . -2x$

And, $80x = 20x . 4$

Hence, the expression $20x^3 - 40x^2 + 80x$ can be factorised as $20x(x^2 - 2x + 4)$

Q.6) $2x^3y^2 – 4x^2y^3 + 8xy^4$

Soln.:

The greatest common factor of the terms $2x^3y^2$, $-4x^2y^3$ and $8xy^4$ of the expression

$2x^3y^2 – 4x^2y^3 + 8xy^4$ is $2xy^2$.

Now,

$2x^3y^2 = 2xy^2 . x^2$

$-4x^2y^3 = 2xy^2 . (-2xy)$

$8xy^4 = 2xy^2 . 4y^2$

Hence, the expression $2x^3y^2 – 4x^2y^3 + 8xy^4$ can be factorised as $2xy^2(x^2– 2xy + 4y^2)$

Q.7) $10m^3n^2 + 15m^4n – 20m^2n^3$

Soln.:

The greatest common factor of the terms 10^3n^2, $15m^4n$ and $-20m^2n^3$ of the expression

$10m^3n^2 + 15m^4n – 20m^2n^3$ is $5m^2n$.

Now,

$10m^3n^2 = 5m^2n . 2mn$

$15m^4n = 5m^2n . 3m^2$

$-20m^2n^3 = 5m^2n . -4n^2$

Hence, $10m^3n^2 + 15m^2n – 20m^2n^3$ can be factorised as $5m^2n(2mn + 3m^2 – 4n^2)$

Q.8) $2a^4b^4 – 3a^3b^5 + 4a^2b^5$

Soln.:

The greatest common factor of the terms $2a^4b^4$, $-3a^3b^5$ and $4a^2b^5$ of the expression

$2a^4b^4 – 3a^3b^5 + 4a^2b^5$ is a^2b^5.

Now,

$2a^4b^4 = a^2b^5 . 2a^2$

$-3a^3b^5 = a^2b^4 . (-3ab)$

$4a^2b^5 = a^2b^4 . 4b$

Hence, $2a^4b^4 – 3a^3b^5 + 4a^2b^5$ can be factorised as $a^2b^4(2a^2 – 3ab + 4b)$

Q.9) $28a^2 + 14a^2b^2 – 21a^4$

Soln.:

The greatest common factor of the terms$28a^2$, $14a^2b^2$ and $21a^4$ of the expression

$28a^2 + 14a^2b^2 – 21a^4$ is $7a^2$.

Also, we can write $28a^2 = 7a^2. 4$, $14a^2b^2 = 7a^2 . 2b^2$ and $21a^4 = 7a^2 . 3a^2$.

Therefore, $28a^2 + 14a^2b^2 – 21a^4 = 7a^2. 4 + 7a^2 . 2b^2 – 7a^2 . 3a^2$

$= 7a^2 (4 + 2b^2 – 3a^2)$

Q.10) $a^4b – 3a^2b^2 – 6ab^3$

Soln.:

The greatest common factor of the terms a^4b, $3a^2b^2$ and $6ab^3$ of the expression

$a^4b – 3a^2b^2 – 6ab^3$ is ab.

Also, we can write $a^4b = ab . a^3$, $3a^2b^2 = ab . 3ab$ and $6ab^3 = ab . 6b^2$.

Therefore, $a^4b - 3a^2b^2 - 6ab^3 = ab \,.\, a^3 - ab \,.\, 3ab - ab \,.\, 6b^2$.

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

Q.11) $2L^2mn - 3Lm^2n + 4Lmn^2$

Soln.:

The greatest common factor of the terms $2L^2mn$, $3Lm^2n$ and $4Lmn^2$ of the expression

$2L^2mn - 3Lm^2n + 4Lmn^2$ is Lmn.

Also, we can write $2L^2mn = Lmn \,.\, 2L$, $3Lm^2n = Lmn \,.\, 3m$ and $4Lmn^2 = Lmn \,.\, 4n$

Therefore, $2L^2mn - 3Lm^2n + 4Lmn^2 = (Lmn \,.\, 2L) - (Lmn \,.\, 3m) + (Lmn \,.\, 4n)$

$= Lmn(2L - 3m + 4n)$

Q.12) $x^4y^2 - x^2y^4 - x^4y^4$

Soln.:

The greatest common factor of the terms x^4y^2, x^2y^4 and x^4y^4 of the expressinon

$x^4y^2 - x^2y^4 - x^4y^4$ is x^2y^2

Also, we can write $x^4y^2 = (x^2y^2 \,.\, x^2)$, $x^2y^4 = (x^2y^2 \,.\, y^2)$ and $x^4y^4 = (x^2y^2 .\, x^2y^2)$

Therefore, $x^4y^2 - x^2y^4 - x^4y^4 = (x^2y^2 \,.\, x^2) - (x^2y^2 \,.\, y^2) - (x^2y^2 \,.\, x^2y^2)$

$= x^2y^2\,(x^2 - y^2 - x^2y^2)$

Q.13) $9x^2y + 3axy$

Soln.:

The greatest common factor of the terms $9x^2y$ and $3axy$ of the expression $9x^2y + 3axy$ is 3xy.

Also, we can write $9x^2y = 3xy \,.\, 3x$ and $3axy = 3xy \,.\, a$

Therefore, $9x^2y + 3axy = (3xy \,.\, 3x) + (3xy \,.\, a)$

$= 3xy\,(3x + a)$

Q.14) $16m - 4m^2$

Soln.:

The greatest common factor of the terms 16m and $4m^2$ of the expression $16m - 4m^2$ is 4m.

Also, we can write $16m = 4m \,.\, 4$ and $4m^2 = 4m \,.\, m$

Therefore, $16m - 4m^2 = (4m \,.\, 4) - (4m \,.\, m)$

$= 4m(4 - m)$

Q.15) $-4a^2 + 4ab - 4ca$

Soln.:

The greatest common factor of the terms $-4a^2$, 4ab and -4ca of the expression

$-4a^2 + 4ab - 4ca$ is -4a.

Also, we can write $-4a^2 = (-4a \,.\, a)$, $4ab = -4a \,.\, (-b)$,and $4ca = (-4a \,.\, c)$

Therefore, $-4a^2 + 4ab - 4ca = (-4a \,.\, a) + (-4a \,.\, (-b)) - (4a \,.\, c)$

$= -4a\,(a - b + c)$

Q.16) $x^2yz + xy^2z + xyz^2$

Soln.:

The greatest common factor of the terms x^2yz , xy^2z and xyz^2 of the expression

$x^2yz + xy^2z + xyz^2$ is xyz.

Also, we can write $x^2yz = (xyz . x)$, $(xy^2z = xyz . y)$, $xyz^2 = (xyz . z)$

Therefore, $x^2yz + xy^2z + xyz^2 = (xyz . x) + (xyz . y) + (xyz . z)$

$= xyz(x + y + z)$

Q.17) $ax^2y + bxy^2 + cxyz$

Soln.:

The greatest common factor of the terms ax^2y , bxy^2 and cxyz of the expression

$ax^2y + bxy^2 + cxyz$ is xy.

Also, we can write $ax^2y = (xy . ax)$, $bxy^2 = (xy . by)$, $cxyz = (xy . cz)$

Therefore, $ax^2y + bxy^2 + cxyz = (xy . ax) + (xy . by) + (xy . cz)$

$= xy (ax + by + cz)$