

Exercise 12.1 (Revised) - Chapter 14 - Factorisation - Ncert Solutions class 8 - Maths

Updated On 11-02-2025 By Lithanya

Chapter 12: Factorisation - NCERT Solutions for Class 8 Maths

Ex 12.1 Question 1.

Find the common factors of the given terms.

(i) $12x, 36$

(ii) $2y, 22xy$

(iii) $14pq = 28p^2q^2$

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

(v) $6abc, 24ab^2 = 12a^2b$

(vi) $16x^3 = -4x^2 = 32x$

(vii) $10pq = 20qr = 30rp$

(viii) $3x^2y^3 = 10x^3y^2 = 6x^2y^2z$

Answer.

(i) $12x = 2 \times 2 \times 3 \times x$

$36 = 2 \times 2 \times 3 \times 3$

Hence, the common factors are 2,2 and $3 = 2 \times 2 \times 3 = 12$

(ii) $2y = 2xy$

$22xy = 2 \times 11 \times x \times y$

Hence, the common factors are 2 and $y = 2 \times y = 2y$

(iii) $14pq = 2 \times 7 \times p \times q$

$28p^2q^2 = 2 \times 2 \times 7 \times p \times p \times q \times q$

Hence, the common factors are $2 \times 7 \times p \times q = 14pq$

(iv) $2x = 2 \times x \times 1$

$3x^2 = 3 \times x \times x \times 1$

$4 = 2 \times 2 \times 1$

Hence, the common factor is 1 .

(v) $6abc = 2 \times 3 \times a \times b \times c$

$24ab^2 = 2 \times 2 \times 2 \times 3 \times a \times b \times b$

$12a^2b = 2 \times 2 \times 3 \times a \times a \times b$

Hence, the common factors are $2 \times 3 \times a \times b = 6ab$

(vi) $16x^3 = 2 \times 2 \times 2 \times 2 \times x \times x \times x$

$-4x^2 = (-1) \times 2 \times 2 \times x \times x$

$32x = 2 \times 2 \times 2 \times 2 \times 2 \times x$

Hence the common factors are $2 \times 2 \times x = 4x$

(vii) $10pq = 2 \times 5 \times p \times q$

$20qr = 2 \times 2 \times 5 \times q \times r$

$30\mu p = 2 \times 3 \times 5 \times r \times p$

Hence the common factors are $2 \times 5 = 10$

(viii) $3x^2y^3 = 3 \times x \times x \times y \times y \times y$

$10x^3y^2 = 2 \times 5 \times x \times x \times x \times y \times y$

$6x^2y^2z = 2 \times 3 \times x \times x \times y \times y \times z$

Hence the common factors are $x \times x \times y \times y = x^2y^2$

Ex 12.1 Question 2.

Factorize the following expressions.

(i) $7x - 42$

(ii) $6p - 12q$

(iii) $7a^2 + 14a$

(iv) $-16z + 20z^3$

(v) $20l^2m + 30alm$

(vi) $5x^2y - 15xy^2$

(vii) $10a^2 - 15b^2 + 20c^2$

(viii) $-4a^2 + 4ab - 4ca$

(ix) $x^2yz + xy^2z + xyz^2$

(x) $ax^2y + bxy^2 + cxyz$

Answer.

(i) $7x - 42 = 7 \times x - 2 \times 3 \times 7$

Taking common factors from each term,

$= 7(x - 2 \times 3)$

$= 7(x - 6)$

(ii) $6p - 12q = 2 \times 3 \times p - 2 \times 2 \times 3 \times q$

Taking common factors from each term,

$= 2 \times 3(p - 2q)$

$= 6(p - 2q)$

(iii) $7a^2 + 14a = 7 \times a \times a + 2 \times 7 \times a$

Taking common factors from each term,

$= 7 \times a(a + 2)$

$= 7a(a + 2)$

(iv)

$-16z + 20z^3$

$= (-1) \times 2 \times 2 \times 2 \times 2 \times z + 2 \times 2 \times 5 \times z \times z \times z$

Taking common factors from each term,

$= 2 \times 2 \times z(-2 \times 2 + 5 \times z \times z)$

$= 4z(-4 + 5z^2)$

(v)

$20l^2m + 30alm$

$= 2 \times 2 \times 5 \times 1 \times 1 \times m + 2 \times 3 \times 5 \times a \times 1 \times m$

Taking common factors from each term,

$= 2 \times 5 \times l \times m(2 \times l + 3 \times a)$

$= 10lm(2l + 3a)$

(vi) $5x^2y - 15xy^2 = 5 \times x \times x \times y + 3 \times 5 \times x \times y \times y$ change the image with image_3310_1

Taking common factors from each term,

$= 5 \times x \times y(x - 3y)$

$= 5xy(x - 3y)$

(vii)

$10a^2 - 15b^2 + 20c^2$

$= 2 \times 5 \times a \times a - 3 \times 5 \times b \times b + 2 \times 2 \times 5 \times c \times c$

Taking common factors from each term,

$= 5(2 \times a \times a - 3 \times b \times b + 2 \times 2 \times c \times c)$

$= 5(2a^2 - 3b^2 + 4c^2)$

(viii)

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

$= (-1) \times 2 \times 2 \times a \times a + 2 \times 2 \times a \times b - 2 \times 2 \times c \times a$

Taking common factors from each term,

$= 2 \times 2 \times a(-a + b - c)$

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

(ix)

$$\begin{aligned} & x^2yz + xy^2z + xyz^2 \\ &= x \times x \times y \times z + x \times y \times y \times z + x \times y \times z \times z \end{aligned}$$

Taking common factors from each term,

$$= x \times y \times z(x + y + z)$$

(x)

$$\begin{aligned} & ax^2y + bxy^2 + coyz \\ &= a \times x \times x \times y + b \times x \times y \times y + c \times x \times y \times z \end{aligned}$$

Taking common factors from each term,

$$\begin{aligned} &= x \times y(a \times x + b \times y + cz) \\ &= xy(ax + by + cz) \end{aligned}$$

Ex 12.1 Question 3.

Factorize:

(i) $x^2 + xy + 8x + 8y$

(ii) $15xy - 6x + 5y - 2$

(iii) $ax + bx - ay - by$

(iv) $15pq + 15 + 9q + 25p$

(v) $z - 7 + 7xy - xyz$

Answer.

$$\begin{aligned} \text{(i)} \quad & x^2 + xy + 8x + 8y = x(x + y) + 8(x + y) \\ &= (x + y)(x + 8) \end{aligned}$$

$$\begin{aligned} \text{(ii)} \quad & 15xy - 6x + 5y - 2 = 3x(5y - 2) + 1(5y - 2) \\ &= (5y - 2)(3x + 1) \end{aligned}$$

$$\begin{aligned} \text{(iii)} \quad & ax + bx - ay - by = (ax + bx) - (ay + by) = x(a + b) - y(a + b) \\ &= (a + b)(x - y) \end{aligned}$$

$$\begin{aligned} \text{(iv)} \quad & 15pq + 15 + 9q + 25p = 15pq + 25p + 9q + 15 \\ &= 5p(3q + 5) + 3(3q + 5) \\ &= (3q + 5)(5p + 3) \end{aligned}$$

$$\begin{aligned} \text{(v)} \quad & z - 7 + 7xy - xyz = 7xy - 7 - xyz + z \\ &= 7(xy - 1) - z(xy - 1) \\ &= (xy - 1)(7 - z) = (-1)(1 - xy)(-1)(z - 7) \\ &= (1 - xy)(z - 7) \end{aligned}$$



Exercise 12.2 (Revised) - Chapter 14 - Factorisation - Ncert Solutions class 8 - Maths

Updated On 11-02-2025 By Lithanya

Chapter 12: Factorisation - NCERT Solutions for Class 8 Maths

Ex 12.2 Question 1.

Factorize the following expressions:

(i) $a^2 + 8a + 16$

(ii) $p^2 - 10p + 25$

(iii) $25m^2 + 30m + 9$

(iv) $49y^2 + 84yz + 36z^2$

(v) $4x^2 - 8x + 4$

(vi) $121b^2 - 88bc + 16c^2$

(vii) $(l + m)^2 - 4lm$

[Hint: Expand $(I + m)^2$ first]

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

Answer.

(i) $a^2 + 8a + 16 = a^2 + (4 + 4)a + 4 \times 4$

Using identity $x^2 + (a + b)x + ab = (x + a)(x + b)$,

Here $x = a : a = 4$ and $b = 4$

$$a^2 + 8a + 16 = (a + 4)(a + 4) = (a + 4)^2$$

(ii) $p^2 - 10p + 25 = p^2 + (-5 - 5)p + (-5)(-5)$

Using identity $x^2 + (a + b)x + ab = (x + a)(x + b)$,

Here $x = p, a = -5$ and $b = -5$

$$p^2 - 10p + 25 = (p - 5)(p - 5) = (p - 5)^2$$

(iii) $25m^2 + 30m + 9 = (5m)^2 + 2 \times 5m \times 3 + (3)^2$

Using identity $a^2 + 2ab + b^2 = (a + b)^2$, here $a = 5m, b = 3$

$$25m^2 + 30m + 9 = (5m + 3)^2$$

(iv) $49y^2 + 84yz + 36z^2 = (7y)^2 + 2 \times 7y \times 6z + (6z)^2$

Using identity $a^2 + 2ab + b^2 = (a + b)^2$, here $a = 7y, b = 6z$

$$49y^2 + 84yz + 36z^2 = (7y + 6z)^2$$

(v) $4x^2 - 8x + 4 = (2x)^2 - 2 \times 2x \times 2 + (2)^2$

Using identity $a^2 - 2ab + b^2 = (a - b)^2$, here $a = 2x, b = 2$

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

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

(vi) $121b^2 - 88bc + 16c^2 = (11b)^2 - 2 \times 11b \times 4c + (4c)^2$

Using identity $a^2 - 2ab + b^2 = (a - b)^2$, here $a = 11b, b = 4c$

$$121b^2 - 88bc + 16c^2 = (11b - 4c)^2$$

(vii) $(l + m)^2 - 4lm$



$$\begin{aligned}
 &= l^2 + 2 \times l \times m + m^2 - 4lm \left[\because (a+b)^2 = a^2 + 2ab + b^2 \right] \\
 &= l^2 + 2lm + m^2 - 4lm \\
 &= l^2 - 2lm + m^2 \\
 &= (l-m)^2 \left[\because (a-b)^2 = a^2 - 2ab + b^2 \right] \\
 &= a^4 + 2a^2b^2 + b^4 = (a^2)^2 + 2 \times a^2 \times b^2 + (b^2)^2 \\
 \text{(viii)} \quad &= (a^2 + b^2)^2 \left[\because (a+b)^2 = a^2 + 2ab + b^2 \right]
 \end{aligned}$$

Ex 12.2 Question 2.

Factorize:

- (i) $4p^2 - 9q^2$
- (ii) $63a^2 - 112b^2$
- (iii) $49x^2 - 36$
- (iv) $16x^5 - 144x^2$
- (v) $(l+m)^2 - (l-m)^2$
- (vi) $9x^2y^2 - 16$
- (vii) $(x^2 - 2xy + y^2) - z^2$
- (viii) $25a^2 - 4b^2 + 28bc - 49c^2$

Answer.

$$\begin{aligned}
 \text{(i)} \quad &4p^2 - 9q^2 = (2p)^2 - (3q)^2 \\
 &= (2p - 3q)(2p + 3q) \left[\because a^2 - b^2 = (a-b)(a+b) \right] \\
 \text{(ii)} \quad &63a^2 - 112b^2 = 7(9a^2 - 16b^2) \\
 &= 7[(3a)^2 - (4b)^2] \\
 &= 7(3a - 4b)(3a + 4b) \left[\because a^2 - b^2 = (a-b)(a+b) \right] \\
 \text{(iii)} \quad &49x^2 - 36 = (7x)^2 - (6)^2 \\
 &= (7x - 6)(7x + 6) \left[\because a^2 - b^2 = (a-b)(a+b) \right] \\
 \text{(iv)} \quad &16x^5 - 144x^3 = 16x^3(x^2 - 9) \\
 &= 16x^3[(x)^2 - (3)^2] \\
 &= 16x^3(x - 3)(x + 3) \left[\because a^2 - b^2 = (a-b)(a+b) \right] \\
 \text{(v)} \quad &(l+m)^2 - (l-m)^2 \\
 &= [(l+m) + (l-m)][(l+m) - (l-m)] \left[\because a^2 - b^2 = (a-b)(a+b) \right] \\
 &= (l+m+l-m)(l+m-l+m) \\
 &= (2l)(2m) = 4lm \\
 \text{(vi)} \quad &9x^2y^2 - 16 = (3xy)^2 - (4)^2 \\
 &= (3xy - 4)(3xy + 4) \left[\because a^2 - b^2 = (a-b)(a+b) \right] \\
 \text{(vii)} \quad &(x^2 - 2xy + y^2) - z^2 = (x-y)^2 - z^2 \left[\because (a-b)^2 = a^2 - 2ab + b^2 \right] \\
 &= (x-y-z)(x-y+z) \left[\because a^2 - b^2 = (a-b)(a+b) \right] \\
 \text{(viii)} \quad &25a^2 - 4b^2 + 28bc - 49c^2 \\
 &= 25a^2 - (4b^2 - 28bc + 49c^2) \\
 &= 25a^2 - [(2b)^2 - 2 \times 2b \times 7c + (7c)^2] \\
 &= 25a^2 - (2b - 7c)^2 \left[\because (a-b)^2 = a^2 - 2ab + b^2 \right] \\
 &= (5a)^2 - (2b - 7c)^2 \\
 &= [5a - (2b - 7c)][5a + (2b - 7c)] \left[\because a^2 - b^2 = (a-b)(a+b) \right] \\
 &= (5a - 2b + 7c)(5a + 2b - 7c)
 \end{aligned}$$

Ex 12.2 Question 3.

Factorize the expressions:

- (i) $ax^2 + bx$
- (ii) $7p^2 + 21q^2$
- (iii) $2x^3 + 2xy^2 + 2xz^2$
- (iv) $am^2 + bm^2 + bn^2 + an^2$
- (v) $(Im + l) + m + 1$
- (vi) $y(y + z) + 9(y + z)$
- (vii) $5y^2 - 20y - 8z + 2yz$
- (viii) $10ab + 4a + 5b + 2$
- (ix) $6xy - 4y + 6 - 9x$

Answer.

- (i) $ax^2 + bx = x(ax + b)$
- (ii) $7p^2 + 21q^2 = 7(p^2 + 3q^2)$
- (iii) $2x^3 + 2xy^2 + 2xz^2 = 2x(x^2 + y^2 + z^2)$

$$\begin{aligned}
 \text{(iv)} \quad & am^2 + bm^2 + bn^2 + an^2 \\
 &= m^2(a + b) + n^2(a + b) \\
 &= (a + b)(m^2 + n^2) \\
 \text{(v)} \quad & (Im + l) + m + 1 = l(m + 1) + 1(m + 1) \\
 &= (m + 1)(l + 1) \\
 \text{(vi)} \quad & y(y + z) + 9(y + z) = (y + z)(y + 9) \\
 \text{(vii)} \quad & 5y^2 - 20y - 8z + 2yz \\
 &= 5y^2 - 20y + 2yz - 8z \\
 &= 5y(y - 4) + 2z(y - 4) \\
 &= (y - 4)(5y + 2z) \\
 \text{(viii)} \quad & 10ab + 4a + 5b + 2 \\
 &= 2a(5b + 2) + 1(5b + 2) \\
 &= (5b + 2)(2a + 1) \\
 \text{(ix)} \quad & 6xy - 4y + 6 - 9x \\
 &= 6xy - 9x - 4y + 6 \\
 &= 3x(2y - 3) - 2(2y - 3) \\
 &= (2y - 3)(3x - 2)
 \end{aligned}$$

Ex 12.2 Question 4.

Factorize:

$$\begin{aligned}
 \text{(i)} \quad & a^4 - b^4 \\
 \text{(ii)} \quad & p^4 - 81
 \end{aligned}$$

$$\begin{aligned}
 \text{(iii)} \quad & x^4 - (y + z)^4 \\
 \text{(iv)} \quad & x^4 - (x - z)^4 \\
 \text{(v)} \quad & a^4 - 2a^2b^2 + b^4
 \end{aligned}$$

$$\begin{aligned}
 \text{Ans. (i)} \quad & a^4 - b^4 = (a^2)^2 - (b^2)^2 \\
 &= (a^2 - b^2)(a^2 + b^2) \quad [\because a^2 - b^2 = (a - b)(a + b)] \\
 &= (a - b)(a + b)(a^2 + b^2) \quad [\because a^2 - b^2 = (a - b)(a + b)] \\
 & \quad p^4 - 81 = (p^2)^2 - (9)^2 \\
 &= (p^2 - 9)(p^2 + 9) \quad [\because a^2 - b^2 = (a - b)(a + b)] \\
 \text{(ii)} \quad &= (p^2 - 3^2)(p^2 + 9) \\
 &= (p - 3)(p + 3)(p^2 + 9) \quad [\because a^2 - b^2 = (a - b)(a + b)] \\
 \text{(iii)} \quad & x^4 - (y + z)^4 = (x^2)^2 - [(y + z)^2]^2 \\
 &= [x^2 - (y + z)^2][x^2 + (y + z)^2] \quad [\because a^2 - b^2 = (a - b)(a + b)] \\
 &= [x - (y + z)][x + (y + z)][x^2 + (y + z)^2] \quad [\because a^2 - b^2 = (a - b)(a + b)]
 \end{aligned}$$

$$\begin{aligned}
 \text{(iv)} \quad & x^4 - (x - z)^4 = (x^2)^2 - [(x - z)^2]^2 \\
 &= [x^2 - (x - z)^2][x^2 + (x - z)^2] \quad [\because a^2 - b^2 = (a - b)(a + b)] \\
 &= [x - (x - z)][x + (x - z)][x^2 + (x - z)^2] \quad [\because a^2 - b^2 = (a - b)(a + b)] \\
 &= [x - x + z][x + x - z][x^2 + x^2 - 2xz + z^2] \quad [\because (a - b)^2 = a^2 - 2ab + b^2] \\
 &= z(2x - z)(2x^2 - 2xz + z^2) \\
 \text{(v)} \quad & a^4 - 2a^2b^2 + b^4 = (a^2)^2 - 2a^2b^2 + (b^2)^2 \\
 &= (a^2 - b^2)^2 \quad [\because (a - b)^2 = a^2 - 2ab + b^2] \\
 &= [(a - b)(a + b)]^2 \quad [\because a^2 - b^2 = (a - b)(a + b)] \\
 &= (a - b)^2(a + b)^2 \quad [\because (xy)^m = x^m - y^m]
 \end{aligned}$$

Ex 12.2 Question 5.

Factorize the following expressions:

$$\begin{aligned}
 \text{(i)} \quad & p^2 + 6p + 8 \\
 \text{(ii)} \quad & q^2 - 10q + 21 \\
 \text{(iii)} \quad & p^2 + 6p - 16
 \end{aligned}$$

Answer.

$$\begin{aligned}
 \text{(i)} \quad & p^2 + 6p + 8 = p^2 + (4 + 2)p + 4 \times 2 \\
 &= p^2 + 4p + 2p + 4 \times 2 \\
 &= p(p + 4) + 2(p + 4) \\
 &= (p + 4)(p + 2) \\
 \text{(ii)} \quad & q^2 - 10q + 21 = q^2 - (7 + 3)q + 7 \times 3 \\
 &= q^2 - 7q - 3q + 7 \times 3 \\
 &= q(q - 7) - 3(q - 7) \\
 &= (q - 7)(q - 3) \\
 & \quad p^2 + 6p - 16 = p^2 + (8 - 2)p - 8 \times
 \end{aligned}$$

Exercise 12.3 (Revised) - Chapter 14 - Factorisation - Ncert Solutions class 8 - Maths

Updated On 11-02-2025 By Lithanya

Chapter 12: Factorisation - NCERT Solutions for Class 8 Maths

Ex 12.3 Question 1.

Carry out the following divisions:

(i) $28x^4 \div 56x$

(ii) $-36y^3 \div 9y^2$

(iii) $66pq^2r^3 \div 11qr^2$

(iv) $34x^3y^3z^3 \div 51xy^2z^3$

(v) $12a^8b^8 \div (-6a^6b^4)$

Answer.

(i) $28x^4 \div 56x = \frac{28x^4}{56x}$

$$= \frac{28}{56} \times \frac{x^4}{x}$$

$$= \frac{1}{2}x^3 \quad [\because x^m \div x^n = x^{m-n}]$$

(ii) $-36y^3 \div 9y^2 = \frac{-36y^3}{9y^2}$

$$= \frac{-36}{9} \times \frac{y^3}{y^2}$$

$$= -4y \quad [\because x^m \div x^n = x^{m-n}]$$

(iii) $66pq^2r^3 \div 11qr^2$

$$= \frac{66pq^2r^3}{11qr^2}$$

$$= \frac{66}{11} \times \frac{pq^2r^3}{qr^2}$$

$$= 6pqr \quad [\because x^m \div x^n = x^{m-n}]$$

(iv) $34x^3y^3z^3 \div 51xy^2z^3$

$$= \frac{34x^3y^3z^3}{51xy^2z^3}$$

$$= \frac{34}{51} \times \frac{x^3y^3z^3}{xy^2z^3}$$

$$= \frac{2}{3}x^2y \quad [\because x^m \div x^n = x^{m-n}]$$

(v) $12a^8b^8 \div (-6a^6b^4)$

$$= \frac{12a^8b^8}{-6a^6b^4}$$

$$= \frac{12}{-6} \times \frac{a^8b^8}{a^6b^4}$$

$$= -2a^2b^4 \quad [\because x^m \div x^n = x^{m-n}]$$

Ex 12.3 Question 2.



Divide the given polynomial by the given monomial:

(i) $(5x^2 - 6x) \div 3x$

(ii) $(3y^8 - 4y^6 + 5y^4) \div y^4$

(iii) $8(x^3y^2z^2 + x^2y^3z^2 + x^2y^2z^3) \div 4x^2y^2z^2$

(iv) $(x^3 + 2x^2 + 3x) \div 2x$

(v) $(p^3q^6 - p^6q^3) \div p^3q^3$

Answer.

(i) $(5x^2 - 6x) \div 3x$

$$\begin{aligned} &= \frac{5x^2 - 6x}{3x} \\ &= \frac{5x^2}{3x} - \frac{6x}{3x} = \frac{5}{3}x - 2 = \frac{1}{3}(5x - 6) \end{aligned}$$

(ii) $(3y^8 - 4y^6 + 5y^4) \div y^4$

$$\begin{aligned} &= \frac{3y^8 - 4y^6 + 5y^4}{y^4} \\ &= \frac{3y^8}{y^4} - \frac{4y^6}{y^4} + \frac{5y^4}{y^4} = 3y^4 - 4y^2 + 5 \end{aligned}$$

(iii) $8(x^3y^2z^2 + x^2y^3z^2 + x^2y^2z^3) \div 4x^2y^2z^2$

$$\begin{aligned} &= \frac{8(x^3y^2z^2 + x^2y^3z^2 + x^2y^2z^3)}{4x^2y^2z^2} \\ &= \frac{8x^3y^2z^2}{4x^2y^2z^2} + \frac{8x^2y^3z^2}{4x^2y^2z^2} + \frac{8x^2y^2z^3}{4x^2y^2z^2} \\ &= 2x + 2y + 2z \\ &= 2(x + y + z) \end{aligned}$$

(iv) $(x^3 + 2x^2 + 3x) \div 2x$

$$\begin{aligned} &= \frac{x^3 + 2x^2 + 3x}{2x} \\ &= \frac{x^3}{2x} + \frac{2x^2}{2x} + \frac{3x}{2x} = \frac{x^2}{2} + \frac{2x}{2} + \frac{3}{2} \\ &= \frac{1}{2}(x^2 + 2x + 3) \end{aligned}$$

(v) $(p^3q^6 - p^6q^3) \div p^3q^3$

$$\begin{aligned} &= \frac{p^3q^6 - p^6q^3}{p^3q^3} \\ &= \frac{p^3q^6}{p^3q^3} - \frac{p^6q^3}{p^3q^3} = q^3 - p^3 \end{aligned}$$

Ex 12.3 Question 3.

Work out the following divisions:

(i) $(10x - 25) \div 5$

(ii) $(10x - 25) \div (2x - 5)$

(iii) $10y(6y + 21) \div 5(2y + 7)$

(iv) $9x^2y^2(3z - 24) \div 27xy(z - 8)$

(v) $96abc(3a - 12)(5b - 30) \div 144(a - 4)(b - 6)$

Answer.

(i) $(10x - 25) \div 5 = \frac{10x - 25}{5}$

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

(ii) $(10x - 25) \div (2x - 5) = \frac{10x - 25}{(2x - 5)}$

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

(iii) $10y(6y + 21) \div 5(2y + 7)$

$$\begin{aligned} &= \frac{10y(6y + 21)}{5(2y + 7)} \\ &= \frac{2 \times 5 \times y \times 3(2y + 7)}{5(2y + 7)} = 2 \times y \times 3 = 6y \end{aligned}$$

(iv) $9x^2y^2(3z - 24) \div 27xy(z - 8)$

$$\begin{aligned} &= \frac{9x^2y^2(3z - 24)}{27xy(z - 8)} \\ &= \frac{9}{27} \times \frac{xy \times xy \times 3(z - 8)}{xy(z - 8)} = xy \end{aligned}$$

(v) $96abc(3a - 12)(5b - 30) \div 144(a - 4)(b - 6)$



$$\begin{aligned}
 &= \frac{96abc(3a-12)(5b-30)}{144(a-4)(b-6)} \\
 &= \frac{12 \times 4 \times 2 \times abc \times 3(a-4) \times 5(b-6)}{12 \times 4 \times 3(a-4)(b-6)} \\
 &= 10abc
 \end{aligned}$$

Ex 12.3 Question 4.

Divide as directed:

- (i) $5(2x+1)(3x+5) \div (2x+1)$
- (ii) $26xy(x+5)(y-4) \div 13x(y-4)$
- (iii) $52pqr(p+q)(q+r)(r+p) \div 104pq(q+r)(r+p)$
- (iv) $20(y+4)(y^2+5y+3) \div 5(y+4)$
- (v) $x(x+1)(x+2)(x+3) \div x(x+1)$

Answer.

$$\begin{aligned}
 \text{(i)} \quad &5(2x+1)(3x+5) \div (2x+1) \\
 &= \frac{5(2x+1)(3x+5)}{(2x+1)} \\
 &= 5(3x+5) \\
 \text{(ii)} \quad &26xy(x+5)(y-4) \div 13x(y-4) \\
 &= \frac{26xy(x+5)(y-4)}{13x(y-4)} \\
 &= \frac{13 \times 2 \times xy(x+5)(y-4)}{13x(y-4)} = 2y(x+5)
 \end{aligned}$$

$$\begin{aligned}
 \text{(iii)} \quad &52pqr(p+q)(q+r)(r+p) \div 104pq(q+r)(r+p) \\
 &= \frac{52pqr(p+q)(q+r)(r+p)}{52 \times 2 \times pq(q+r)(r+p)} \\
 &= \frac{1}{2}r(p+q)
 \end{aligned}$$

$$\begin{aligned}
 \text{(iv)} \quad &20(y+4)(y^2+5y+3) \div 5(y+4) \\
 &= \frac{20(y+4)(y^2+5y+3)}{5(y+4)} \\
 &= 4(y^2+5y+3)
 \end{aligned}$$

$$\begin{aligned}
 \text{(v)} \quad &x(x+1)(x+2)(x+3) \div x(x+1) \\
 &= \frac{x(x+1)(x+2)(x+3)}{x(x+1)} \\
 &= (x+2)(x+3)
 \end{aligned}$$

Ex 12.3 Question 5.

Factorize the expressions and divide them as directed:

- (i) $(y^2+7y+10) \div (y+5)$
- (ii) $(m^2-14m-32) \div (m+2)$
- (iii) $(5p^2-25p+20) \div (p-1)$
- (iv) $4yz(z^2+6z-16) \div 2y(z+8)$
- (v) $5pq(p^2-q^2) \div 2p(p+q)$
- (vi) $12xy(9x^2-16y^2) \div 4xy(3x+4y)$
- (vii) $39y^3(50y^2-98) \div 26y^2(5y+7)$

Answer.

$$\begin{aligned}
 \text{(i)} \quad & (y^2 + 7y + 10) \div (y + 5) \\
 &= \frac{y^2 + 7y + 10}{(y + 5)} \\
 &= \frac{y^2 + (2 + 5)y + 2 \times 5}{(y + 5)} \\
 &= \frac{y^2 + 2y + 5y + 2 \times 5}{(y + 5)} \\
 &= \frac{(y + 2)(y + 5)}{(y + 5)} \left[\because x^2 + (a + b)x + ab = (x + a)(x + b) \right] \\
 &= y + 2
 \end{aligned}$$

$$\begin{aligned}
 \text{(ii)} \quad & (m^2 - 14m + 32) \div (m + 2) \\
 &= \frac{m^2 - 14m + 32}{(m + 2)} \\
 &= \frac{m^2 + (-16 + 2)m + (-16) \times 2}{(m + 2)} \\
 &= \frac{(m - 16)(m + 2)}{(m + 2)} \left[\because x^2 + (a + b)x + ab = (x + a)(x + b) \right] \\
 &= (m - 16)
 \end{aligned}$$

$$\begin{aligned}
 \text{(iii)} \quad & (5p^2 - 25p + 20) \div (p - 1) \\
 &= \frac{5p^2 - 25p + 20}{(p - 1)} \\
 &= \frac{5p^2 - 20p - 5p + 20}{(p - 1)} \\
 &= \frac{5p(p - 4) - 5(p - 4)}{(p - 1)} \\
 &= \frac{(5p - 5)(p - 4)}{(p - 1)} = \frac{5(p - 1)(p - 4)}{(p - 1)} \\
 &= 5(p - 4)
 \end{aligned}$$

$$\begin{aligned}
 \text{(iv)} \quad & 4yz (z^2 + 6z - 16) \div 2y(z + 8) \\
 &= \frac{4yz (z^2 + 6z - 16)}{2y(z + 8)} \\
 &= \frac{4yz [z^2 + (8 - 2)z + 8 \times (-2)]}{2y(z + 8)} \\
 &= \frac{4yz(z - 2)(z + 8)}{2y(z + 8)} \left[\because x^2 + (a + b)x + ab = (x + a)(x + b) \right] \\
 &= 2z(z - 2)
 \end{aligned}$$

$$\begin{aligned}
 & 5pq (p^2 - q^2) \div 2p(p + q) \\
 &= \frac{5pq (p^2 - q^2)}{2p(p + q)} \\
 \text{(v)} \quad &= \frac{5pq(p - q)(p + q)}{2p(p + q)} \left[\because a^2 - b^2 = (a - b)(a + b) \right] \\
 &= \frac{5}{2}q(p - q)
 \end{aligned}$$

$$\begin{aligned}
 & 12xy (9x^2 - 16y^2) - 4xy(3x + 4y) \\
 &= \frac{12xy (9x^2 - 16y^2)}{4xy(3x + 4y)} \\
 \text{(vi)} \quad &= \frac{12xy [(3x)^2 - (4y)^2]}{4xy(3x + 4y)} \\
 &= \frac{12xy(3x - 4y)(3x + 4y)}{4xy(3x + 4y)} \left[\because a^2 - b^2 = (a - b)(a + b) \right] \\
 &= 3(3x - 4y)
 \end{aligned}$$

$$\begin{aligned}
 \text{(vii)} \quad & 39y^3 (50y^2 - 98) \div 26y^2(5y + 7) \\
 &= \frac{39y^3 (50y^2 - 98)}{26y^2(5y + 7)} \\
 &= \frac{39y^3 \times 2 (25y^2 - 49)}{26y^2(5y + 7)} \\
 &= \frac{39y^2 \times 2 [(5y)^2 - (7)^2]}{26y^2(5y + 7)} \text{ change the image with image_3312_1} \\
 &= \frac{39y^2 \times 2(5y - 7)(5y + 7)}{26y^2(5y + 7)} \left[\because a^2 - b^2 = (a - b)(a + b) \right] \text{ change the image with} \\
 &\text{image_3312_2} \\
 &= 3y(5y - 7)
 \end{aligned}$$