

CBSE Class –VIII Mathematics
NCERT Solutions
CHAPTER - 14
Factorisation (Ex. 14.1)

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) $3x^2y^3, 10x^3y^2, 6x^2y^2z$

Ans. (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) $2y = 2 \times y$

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

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

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

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

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 $x \times x \times y \times y = x^2y^2$

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

Ans.

(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)

$$20l^2m + 30alm$$

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

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)

$$x^2yz + xy^2z + xyz^2$$
$$= x \times x \times y \times z + x \times y \times y \times z + x \times y \times z \times z$$

Taking common factors from each term,

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

(x)

$$ax^2y + bxy^2 + cxyz$$
$$= a \times x \times x \times y + b \times x \times y \times y + c \times x \times y \times z$$

Taking common factors from each term,

$$= x \times y(ax + by + cz)$$
$$= xy(ax + by + cz)$$

3. Factorize:

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

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

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

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

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

Ans. (i) $x^2 + xy + 8x + 8y = x(x + y) + 8(x + y)$

$$= (x + y)(x + 8)$$

(ii) $15xy - 6x + 5y - 2 = 3x(5y - 2) + 1(5y - 2)$

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

(iii) $ax + bx - ay - by = (ax + bx) - (ay + by) = x(a + b) - y(a + b)$

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

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

$$= 5p(3q + 5) + 3(3q + 5)$$

$$= (3q + 5)(5p + 3)$$

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

$$= 7(xy - 1) - z(xy - 1)$$

$$= (xy - 1)(7 - z) = (-1)(1 - xy)(-1)(z - 7)$$

$$= (1 - xy)(z - 7)$$