

# 14. Factorisation

## WE KNOW THAT

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

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

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

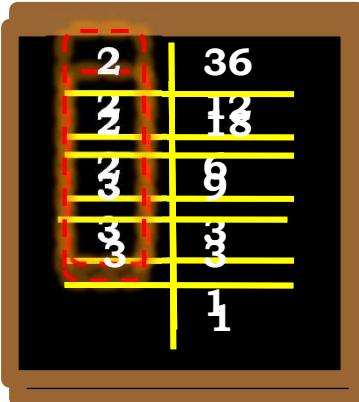
Q.

**Find the common factors of the given terms.  
 $12x, 36$**

Sol.  $\underline{12x} = 2 \times 2 \times 3 \times x$

$\underline{36} = 2 \times 2 \times 3 \times 3$

the common factor =  $\underline{(2 \times 2 \times 3)}$



**Q.**

**Find the common factors of the given terms.**

$$2y, 22xy$$

**Sol.**  $\underline{2y} = 2 \times y$

$$\underline{\underline{22xy}} = 2 \times 11 \times x \times y$$

**the common factor** =  $(\underline{2} \times \underline{y})$



2	22
11	11
	1

**Q.**

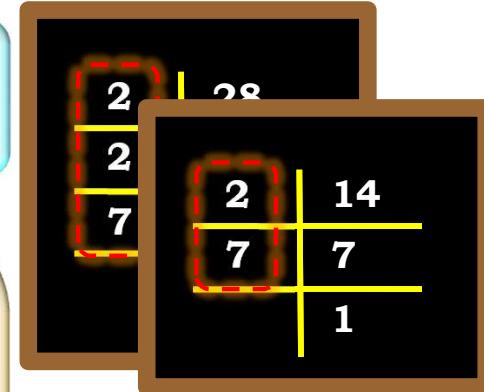
**Find the common factors of the given terms.  
 $14pq$ ,  $28p^2q^2$**

Sol.  $\underline{14pq} = \underline{2} \times \underline{7} \times p \times q$

$\underline{28p^2q^2} = \underline{2} \times \underline{2} \times \underline{7} \times p \times p \times q \times q$

the common factor =  $(\underline{2} \times \underline{7} \times \underline{p} \times \underline{q})$

=  $14pq$



**Q.**

**Find the common factors of the given terms.**

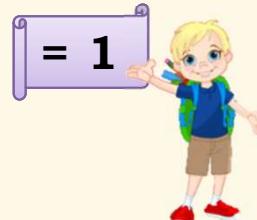
$$2x, 3x^2, 4$$

**Sol.**  $\underline{2x} = \boxed{1} \times \boxed{2} \times x$

$$\underline{3x^2} = \boxed{1} \times \boxed{3} \times x \times x$$

$$\underline{4} = \boxed{1} \times \boxed{2} \times \boxed{2}$$

**the common factor = (1)**



**Q.**

**Find the common factors of the given terms.  
 $6abc$ ,  $24ab^2$ ,  $12a^2b$**

**Sol.**  $6abc = \underline{2} \times 3 \times a \times \underline{b} \times c$

$$24ab^2 = \underline{2} \times \underline{2} \times 2 \times 3 \times a \times b \times \underline{b}$$

$$12a^2b = \underline{2} \times 2 \times \underline{3} \times a \times \underline{a} \times b$$

**the common factor =  $(\underline{2} \times \underline{3} \times a \times \underline{b})$**



2	24
2	$b^2$
3	6
3	3
	1

**Q.**

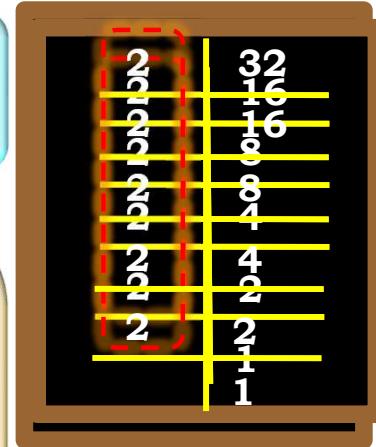
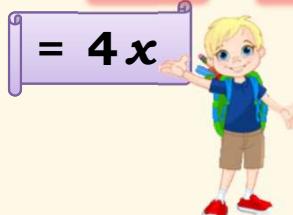
**Find the common factors of the given terms.  
 $16x^3, -4x^2, 32x$**

Sol.  $16x^3 = 2 \times 2 \times 2 \times 2 \times x \times x \times x$

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

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

**the common factor =  $(2 \times 2 \times x)$**



**Q.**

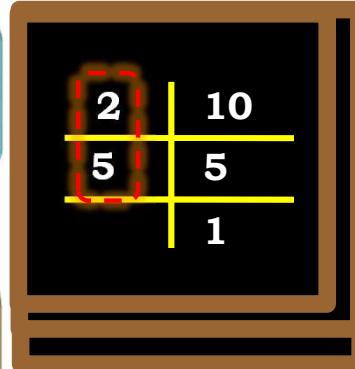
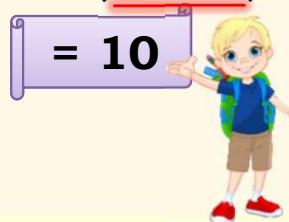
**Find the common factors of the given terms.  
 $10pq$ ,  $20qr$ ,  $30rp$**

**Sol.**  $\underline{10pq} = \underline{2} \times \underline{5} \times p \times q$

$$\underline{20qr} = \underline{2} \times \underline{2} \times \underline{5} \times q \times r$$

$$\underline{30rp} = \underline{2} \times \underline{3} \times \underline{5} \times r \times p$$

**the common factor =  $(\underline{2} \times \underline{5})$**



**Q.**

**Find the common factors of the given terms.**

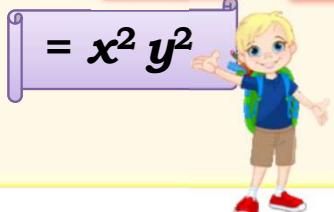
$$3x^2y^3, 10x^3y^2, 6x^2y^2z$$

$$\text{Sol. } \underline{3}x^2\underline{y^3} = 3 \times x \times x \times y \times y \times y$$

$$\underline{10}x^3\underline{y^2} = 2 \times 5 \times x \times x \times x \times y \times y$$

$$\underline{6}x^2\underline{y^2}z = 3 \times 2 \times x \times x \times y \times y \times z$$

$$\text{the common factor} = (\underline{x} \times \underline{x} \times \underline{y} \times \underline{y})$$



2	10
5	5
	1

Q.

Factorise the following expressions.

$$7x - 42$$

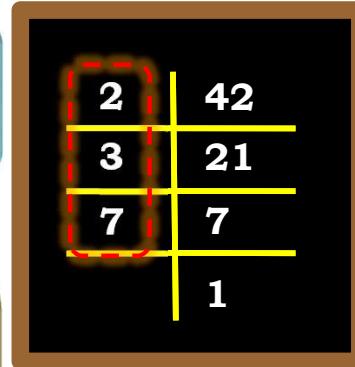
Sol.  $7x = 7 \times x$

$$42 = 2 \times 3 \times 7$$

$$7x - 42 = 7 \times x - 2 \times 3 \times 7$$

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

$$= 7(x - 6)$$



Q.

Factorise the following expressions.

$$6p - 12q$$

Sol.  $6p = 2 \times 3 \times p$

$12q = 2 \times 2 \times 3 \times q$

$$6p - 12q = 2 \times 3 \times p - 2 \times 2 \times 3 \times q$$

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

$$= 6 [ p - 2q ]$$



2	12
2	6
3	3
	1

Q.

Factorise the following expressions.

$$7a^2 + 14a$$

Sol.  $7a^2 = 7 \times a \times a$

$14a = 7 \times 2 \times a$

$$7a^2 + 14a = 7 \times a \times a + 7 \times 2 \times a$$

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

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



Q.

Factorise the following expressions.

$$-16z + 20z^3$$

Sol.  $-16z = (-1) \times 2 \times 2 \times 2 \times 2 \times z$

$$20z^3 = 2 \times 2 \times 5 \times z \times z \times z$$

$$-16z + 20z^3 = (-1) \times 2 \times 2 \times 2 \times 2 \times z + 2 \times 2 \times 5 \times z \times z \times z$$

$$-16z + 20z^3 = (2 \times 2 \times z) [ (-1) \times 4 + 5 \times z \times z]$$

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



2	16
2	8
2	4
2	2
	1

Q.

Factorise the following expressions.

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

Sol.  $20l^2m = 2 \times 2 \times 5 \times l \times l \times m$

$$30alm = 2 \times 3 \times 5 \times a \times l \times m$$

$$20l^2m + 30alm = 2 \times 2 \times 5 \times l \times l \times m + 2 \times 3 \times 5 \times a \times l \times m$$

$$20l^2m + 30alm = (2 \times 5 \times l \times m) [2 \times l + 3 \times a]$$

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



2	20
2	10
5	5
	1

2	30
3	15
5	5
	1

Q.

Factorise the following expressions.

$$5x^2y - 15xy^2$$

Sol.  $5x^2y = 5 \times x \times x \times y$

$$15xy^2 = 5 \times 3 \times x \times y \times y$$

$$5x^2y - 15xy^2 = 5 \times x \times x \times y - 5 \times 3 \times x \times y \times y$$

$$5x^2y - 15xy^2 = (5 \times x \times y) [x - 3 \times y]$$

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



Q.

Factorise the following expressions.

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

Sol.

$$10a^2 = 2 \times 5 \times a \times a$$

$$15b^2 = 3 \times 5 \times b \times b$$

$$20c^2 = 2 \times 2 \times 5 \times c \times c$$

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

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

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

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



2	20
2	10
5	5
	1

Q.

Factorise the following expressions.

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

$$\text{Sol. } -4a^2 = (-1) \times 2 \times 2 \times a \times a$$

$$4ab = 2 \times 2 \times a \times b$$

$$4ca = 1 \times 2 \times 2 \times c \times a$$

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

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

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

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



Q.

Factorise the following expressions.

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

Sol.

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

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

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

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

$$= [x \times x \times y \times z] + [x \times y \times y \times z] + [x \times y \times z \times z]$$

$$= (\underline{x \times y \times z}) [x + y + z]$$

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



Q.

Factorise the following expressions.

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

Sol.  $ax^2y = a \times x \times x \times y$

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

$$cxyz = c \times x \times y \times z$$

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

$$= a \times x \times x \times y + b \times x \times y \times y + c \times x \times y \times z$$

$$= (x \times y) [a \times x + b \times y + c \times z]$$

$$= xy(ax + by + cz)$$



EX\_14.1\_3

**Q.**

**Factorise.**

$$x^2 + xy + 8x + 8y$$

**Sol.**

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



Q.

Factorise.

$$15xy - 6x + 5y - 2$$

$$3 \times 5 \times x \times y \quad 2 \times 3 \times x$$

Sol.  $15xy - 6x + 5y - 2$

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

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



Q.

Factorise.

$$ax + bx - ay - by$$

Sol.

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



Q.

Factorise.

$$15pq + 15 + 9q + 25p$$

$$3 \times 5 \times p \times q \quad 3 \times 5 \times 5 \times p \quad 5 \times 3$$

Sol.

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



**Q.**

**Factorise.**

$$z - 7 - xyz + 7xy$$

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

$$7 \times (x \times y)$$

**Sol.** 
$$z - 7 - xyz + 7xy$$

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

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



EX\_14.2\_1

**Q.**

**Factorise the following expressions.**

$$a^2 + 8a + 16$$

**Sol.**

$$a^2 + 8a + 16$$

$$= (a)^2 + [2 \times a \times (4)] + (4)^2$$

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



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

**Q.**

**Factorise the following expressions.**

$$p^2 - 10p + 25$$

**Sol.**

$$p^2 - 10p + 25$$

$$= (p)^2 - [2 \times (p) \times (5)] + (5)^2$$

$$= (p - 5)^2$$



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

**Q.**

**Factorise the following expressions.**

$$25m^2 + 30m + 9$$

**Sol.**

$$25m^2 + 30m + 9$$

$$= (5m)^2 + [2 \times (5m) \times (3)] + (3)^2$$

$$= (5m + 3)^2$$



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

**Q.**

**Factorise the following expressions.**

$$49y^2 + 84yz + 36z^2$$

Sol.  $49y^2 + 84yz + 36z^2$

$$= (7y)^2 + [2 \times (7y) \times (6z)] + (6z)^2$$

$$= (7y + 6z)^2$$



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

**Q.**

**Factorise the following expressions.**

$$4x^2 - 8x + 4$$

**Sol.**  $4x^2 - 8x + 4$

$$= (2x)^2 - [2 \times (2x) \times (2)] + (2)^2$$

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

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

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



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

**Q.**

**Factorise the following expressions.**

$$121b^2 - 88bc + 16c^2$$

Sol.  $121b^2 - 88bc + 16c^2$

$$= (11b)^2 - [2 \times (11b) \times (4c)] + (4c)^2$$

$$= (11b - 4c)^2$$



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

**Q.**

**Factorise the following expressions.**

$$(l + m)^2 - 4lm \text{ (Hint : Expand } (l + m)^2 \text{ first)}$$

**Sol.**  $(l + m)^2 - 4lm$

$$= l^2 + 2lm + m^2 - 4lm$$

$$= l^2 + \underline{2lm} - \underline{4lm} + m^2$$

$$= l^2 - 2lm + m^2$$

$$= (l)^2 - [2 \times (l) \times (m)] + (m)^2$$

$$= (l - m)^2$$



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

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

**Q.**

**Factorise the following expressions.**

$$a^4 + 2a^2b^2 + b^4$$

**Sol.**

$$a^4 + 2a^2b^2 + b^4$$

$$= (a^2)^2 + [2 \times (a^2) \times (b^2)] + (b^2)^2$$

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



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

**Q.**

**Factorise :**

$$4p^2 - 9q^2$$

**Sol.**

$$4p^2 - 9q^2$$

$$= (2p)^2 - (3q)^2$$

$$= (2p + 3q)(2p - 3q)$$

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



Q.

Factorise :

$$63a^2 - 112b^2$$

$$7 \times 9 \times a^2$$

$$7 \times 16 \times b^2$$

Sol.  $63a^2 - 112b^2$

$$= 7 [9a^2 - 16b^2]$$

$$= 7 (3a)^2 - (4b)^2$$

$$= 7 (3a + 4b) (3a - 4b)$$

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



**Q.**

**Factorise :**

$$49x^2 - 36$$

**Sol.**

$$49x^2 - 36$$

$$= (7x)^2 - (6)^2$$

$$= (7x + 6)(7x - 6)$$



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

Q.

Factorise :

$$16x^5 - 144x^3$$

$$16 \times x^3 \times x^2$$

$$16 \times 9 \times x^3$$

Sol.  $16x^5 - 144x^3$

$$= 16x^3[x^2 - 9]$$

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

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



2	144
2	72
2	36
2	18
9	9
	1

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

**Q.**

**Factorise :**

$$(l + m)^2 - (l - m)^2$$

**Sol.**

$$(l + m)^2 - (l - m)^2$$

$$= (l^2 + 2lm + m^2) - (l^2 - 2lm + m^2)$$

$$= l^2 + 2lm + m^2 - l^2 + 2lm - m^2$$

$$= 4lm$$



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

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

Q.

Factorise :

$$9x^2y^2 - 16$$

Sol.

$$9x^2y^2 - 16$$

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

$$= (3xy + 4) (3xy - 4)$$

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



**Q.**

**Factorise :**

$$(x^2 - 2xy + y^2) - z^2$$

**Sol.**

$$(x^2 - 2xy + y^2) - z^2$$

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

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

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



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

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

**Q.**

**Factorise :**

$$25a^2 - 4b^2 + 28bc - 49c^2$$

**Sol.**  $25a^2 - 4b^2 + 28bc - 49c^2$

$$= 25a^2 - (4b^2 - 28bc + 49c^2)$$

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

$$= (5a)^2 - (2b - 7c)^2$$

$$= \{[5a - (2b - 7c)] [5a + (2b - 7c)]\}$$

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

$$= (5a - 2b + 7c) (5a + 2b - 7c)$$

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

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



EX\_14.2\_2

**Q.**

**Factorise the expressions.**

$$ax^2 + bx$$

**Sol.**  $\underline{ax^2} + \underline{bx}$

$$= x(ax + b)$$



**Q.**

**Factorise the expressions.**

$$7p^2 + 21q^2$$

$$\textcircled{7} \times \textcircled{p^2} \quad \textcircled{7} \times \textcircled{3} \times \textcircled{q^2}$$

**Sol.**  $7p^2 + 21q^2$

$$= 7(p^2 + 3q^2)$$



**Q.**

**Use the formula to find the factors :**

$$2x^3 + 2xy^2 + 2xz^2$$

**Sol.**

$$\underline{2x^3} + \underline{2xy^2} + \underline{2xz^2}$$

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



**Q.**

**Use the formula to find the factors :**

$$am^2 + bm^2 + an^2 + bn^2$$

**Sol.**  $\underline{am^2} + \underline{bm^2} + \underline{an^2} + \underline{bn^2}$

$$= \underline{m^2} \boxed{(a + b)} + \underline{n^2} \boxed{(a + b)}$$

$$= \boxed{(a + b)(m^2 + n^2)}$$



**Q.**

**Use the formula to find the factors :**

$$(lm + l) + m + 1$$

**Sol.**  $lm + l + m + 1$

$$= \underline{l} \boxed{(m + 1)} + \underline{1} \boxed{(m + 1)}$$

$$= \boxed{(m + 1) (l + 1)}$$



**Q.**

**Use the formula to find the factors :**

$$y(y + z) + 9(y + z)$$

**Sol.**  $y(y + z) + 9(y + z)$

$$= (y + z)(y + 9)$$



Q.

Use the formula to find the factors :

$$5y^2 - 20y - 8z + 2yz$$

$$5 \times y^2 \quad 5 \times 2 \times 4 \times z \quad 2 \times y \times z$$

Sol.  $5y^2 - 20y - 8z + 2yz$

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

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



Q.

Use the formula to find the factors :

$$10ab + 4a + 5b + 2$$

$$2 \times 5 \times a \times b \quad 2 \times 2 \times a$$

Sol.  $10ab + 4a + 5b + 2$

$$= 2a (5b + 2) + 1 (5b + 2)$$

$$= (5b + 2)(2a + 1)$$



Q.

Use the formula to find the factors :

$$6xy - 4y + 6 - 9x$$

$$2 \times 3 \times x \times y \quad 2 \times 3 \times 2 \quad 3 \times 3 \times x$$

Sol.  $6xy - 4y + 6 - 9x$

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

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



**Q.**

**Use the formula to find the factors :**

$$a^4 - b^4$$

**Sol.**

$$\underline{a^4} \textcolor{blue}{\circlearrowleft} \underline{-b^4}$$

$$= \frac{(a^2)^2}{a^2} - \frac{(b^2)^2}{b^2}$$

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

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

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



Q.

Use the formula to find the factors :

$$p^4 - 81$$

Sol.  $p^4 - 81$

$$= \frac{(p^2)^2}{a^2} - \frac{9^2}{b^2}$$

$$= (p^2 + 9) (p^2 - 9^2)$$

$$= (p^2 + 9) (p^2 - 3^2)$$

$$= (p^2 + 9) (p + 3)(p - 3)$$

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



**Q.**

**Use the formula to find the factors :**

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

**Sol.**  $x^4 - (y + z)^4$

$$= \frac{(x^2)^2}{a^2} - \frac{[(y + z)^2]^2}{b^2}$$

$$= [x^2 + (y + z)^2] \frac{x^2 - (y + z)^2}{a^2 b^2}$$

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

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

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



Q.

Use the formula to find the factors :

$$x^4 - (x - z)^4$$

Sol.  $\underline{x^4} - \underline{(x - z)^4}$

$$= \frac{(x^2)^2}{a^2} - \frac{[(x - z)^2]^2}{b^2}$$

$$= [\underline{x^2} + \underline{(x - z)^2}] [\underline{x^2} - \underline{(x - z)^2}]$$

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

$$= (x^2 + x^2 - 2xz + z^2) (\cancel{x^2} - \cancel{x^2} + 2xz - z^2)$$

$$= (2x^2 - 2xz + z^2) (\cancel{2xz} - \cancel{z^2})$$

$$= z(2x - z)(2x^2 - 2xz + z^2)$$



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

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

**Q.**

**Use the formula to find the factors :**

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

**Sol.**

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

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

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

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

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



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

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

**Q.**

**Use the formula to find the factors :**

$$p^2 + 6p + 8$$

$$4p + 2p$$

**Sol.**  $p^2 + 6p + 8 \quad 4 \times 2$

$$= p^2 + 4p + 2p + 8$$

$$= p(p + 4) + 2(p + 4)$$

$$= (p + 4)(p + 2)$$



**Q.**

**Use the formula to find the factors :**

$$q^2 - 10q + 21$$

$$-7q - 3q$$

**Sol.** 
$$q^2 - 10q + 21 \quad (-7) \times (-3)$$

$$= q^2 - 7q - 3q + 21$$

$$= q (q - 7) - 3 (q - 7)$$

$$= (q - 7) (q - 3)$$



Q.

Use the formula to find the factors :

$$p^2 + 6p - 16$$

$$+8p - 2p$$

Sol.  $p^2 + 6p - 16$  8 × (-2)

$$= p^2 \cancel{+ 8p} \cancel{- 2p} \cancel{- 16}$$

$$= p(p + 8) - 2(p + 8)$$

$$= (p + 8)(p - 2)$$



## DIVISION OF ALGEBRAIC EXPRESSION

For division of algebraic expression by another expression

- I. We write them in the form of a fraction such that the divisor is the denominator.
- II. Factorise the numerator as well as the denominator.
- III. Cancel the factors common to both the numerator and denominator

Q.

Carry out the following divisions.

$$28x^4 \div 56x$$

Sol.  $28x^4 = 2 \times 2 \times 7 \times x \times x \times x \times x$

$56x = 2 \times 2 \times 2 \times 7 \times x$

$$\frac{28x^4}{56x} = \frac{\cancel{2} \times \cancel{2} \times \cancel{7} \times x \times \cancel{x} \times \cancel{x} \times \cancel{x}}{\cancel{2} \times \cancel{2} \times \cancel{2} \times \cancel{7} \times \cancel{x}}$$

$$= \frac{x \times x \times x}{2}$$

$$= \frac{x^3}{2}$$

$$28x^4 \div 56x = \frac{x^3}{2}$$



2	28
2	14
7	7
	1

2	56
2	28
2	14
7	7
	1

Q.

Carry out the following divisions.

$$-36y^3 \div 9y^2$$

Sol.

$$-36y^3 = -2 \times 2 \times 3 \times 3 \times y \times y \times y$$

$$9y^2 = 3 \times 3 \times y \times y$$

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

$$= \frac{-2 \times 2 \times y}{1}$$

$$= -4y$$

$$36y^3 \div 9y^2 = -\frac{4y}{4y}$$



2	36
2	18
3	9
3	3
	1

3	9
3	3
	1

Q.

Carry out the following divisions.

$$66pq^2r^3 \div 11qr^2$$

Sol.  $\frac{66pq^2r^3}{11qr^2} = \frac{2 \times 3 \times 11 \times p \times q \times q \times r \times r \times r}{1 \times 11 \times q \times r \times r}$

$$\begin{aligned}\frac{66pq^2r^3}{11qr^2} &= \frac{\cancel{2} \times \cancel{3} \times \cancel{11} \times \cancel{p} \times \cancel{q} \times \cancel{q} \times \cancel{r} \times \cancel{r} \times \cancel{r}}{\cancel{1} \times \cancel{11} \times \cancel{q} \times \cancel{r} \times \cancel{r}} \\ &= \frac{2 \times 3 \times p \times q \times r}{1} \\ &= 6pqr\end{aligned}$$

$66pq^2r^3 \div 11qr^2 = 6pqr$



2	66
3	33
11	11
	1

Q.

Carry out the following divisions.

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

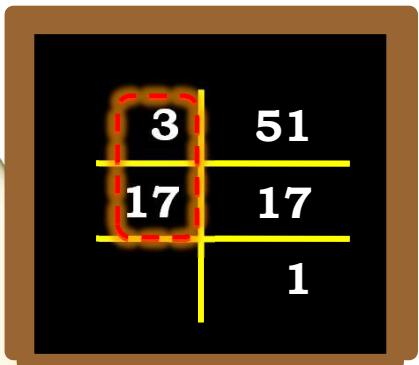
Sol.  $34x^3y^3z^3 = 2 \times 17 \times x \times x \times x \times y \times y \times y \times z \times z \times z$

$$51xy^2z^3 = 3 \times 17 \times x \times y \times y \times z \times z \times z$$

$$\frac{34x^3y^3z^3}{51xy^2z^3} = \frac{\cancel{2} \times \cancel{17} \times \cancel{x} \times \cancel{x} \times \cancel{x} \times \cancel{y} \times \cancel{y} \times \cancel{y} \times z \times z \times z}{\cancel{3} \times \cancel{17} \times \cancel{x} \times \cancel{y} \times \cancel{y} \times \cancel{z} \times \cancel{z} \times \cancel{z}}$$

$$= \frac{2 \times x \times x \times y}{3}$$

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



Q.

Carry out the following divisions.

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

Sol.

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

$$2 \times 2 \times 3 \times a \times b \times b$$

$$\frac{-6a^6b^4}{-2 \times 3 \times a \times a \times a \times a \times a \times a \times b \times b \times b \times b}$$

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

$$\frac{2 \times 2 \times 3 \times a \cancel{\times a} \cancel{\times a} \cancel{\times a} \cancel{\times a} \cancel{\times a} \times a \times a \times b \cancel{\times b} \cancel{\times b} \cancel{\times b} \cancel{\times b} \times b \times b \times b}{-2 \times 3 \times a \cancel{\times a} \cancel{\times a} \cancel{\times a} \cancel{\times a} \cancel{\times a} \times a \times b \cancel{\times b} \cancel{\times b} \cancel{\times b}}$$

$$= \frac{2 \times a \times a \times b \times b \times b \times b}{-1} = -2a^2b^4$$

$$12a^8b^8 \div (-6a^6b^4) = -2a^2b^4$$

2	12
2	6
3	3
	1



Q.

Divide the given polynomial by the given monomial  $(5x^2 - 6x) \div 3x$

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

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

$$= \frac{5x - 6}{3}$$



**Q.**

**Divide the given polynomial by the given monomial  $(3y^8 - 4y^6 + 5y^4) \div y^4$**

**Sol.**  $(3y^8 - 4y^6 + 5y^4) \div y^4$

$$= \frac{3y^8 - 4y^6 + 5y^4}{y^4}$$

$$= \frac{y^4(3y^4 - 4y^2 + 5)}{y^4}$$

$$= (3y^4 - 4y^2 + 5)$$



**Q.**

Divide the given polynomial by the given monomial  $8(x^3y^2z^2 + x^2y^3z^2 + x^2y^2z^3) \div 4x^2y^2z^2$

**Sol.**  $8(x^3y^2z^2 + x^2y^3z^2 + x^2y^2z^3) \div 4x^2y^2z^2$

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

$$= \frac{2 \times 4 \times x^2y^2z^2[x + y + z]}{4x^2y^2z^2}$$

$$= \frac{2 \times [x + y + z]}{1}$$

$$= 2(x + y + z)$$



**Q.**

**Divide the given polynomial by the given monomial  $(x^3 + 2x^2 + 3x) \div 2x$**

**Sol.**  $(x^3 + 2x^2 + 3x) \div 2x$

$$= \frac{x^3 + 2x^2 + 3x}{2x}$$

$$= \frac{\cancel{x}(x^2 + 2x + 3)}{\cancel{2x}}$$

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

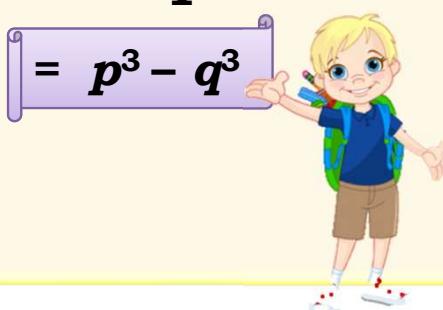


**Q.**

**Divide the given polynomial by the given monomial  $(p^3q^6 - p^6q^3) \div p^3q^3$**

**Sol.**  $(p^3q^6 - p^6q^3) \div p^3q^3$

$$\begin{aligned} &= \frac{p^3q^6 - p^6q^3}{p^3q^3} \\ &= \frac{\cancel{p^3q^3} [q^3 - p^3]}{\cancel{p^3q^3}} \\ &= \frac{p^3 - q^3}{1} \\ &= p^3 - q^3 \end{aligned}$$



**Q.**

**Divide the given polynomial by the given monomial  $(10x - 25) \div 5$**

**Sol.  $(10x - 25) \div 5$**

$$\begin{aligned}&= \frac{10x - 25}{5} \\&= \frac{5 \times 2 \times x - 5 \times 5}{5} \\&= \frac{\cancel{5} (2x - 5)}{\cancel{5}}\end{aligned}$$

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



**Q.**

**Divide the given polynomial by the given monomial  $(10x - 25) \div (2x - 5)$**

**Sol.  $(10x - 25) \div (2x - 5)$**

$$\begin{aligned}&= \frac{10x - 25}{2x - 5} \\&= \frac{[2] \times [5] \times [x] - [5] \times [5]}{2x - 5} \\&= \frac{\cancel{5} (2x - 5)}{\cancel{(2x - 5)}}\end{aligned}$$

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



**Q.**

**Divide the given polynomial by the given monomial  $10y(6y + 21) \div 5(2y + 7)$**

**Sol.**  $10y(6y + 21) \div 5(2y + 7)$

$$= \frac{10y(6y + 21)}{5(2y + 7)}$$

$$= \frac{2 \times 5 \times y (3 \times 2 \times y + 3 \times 7)}{5(2y + 7)}$$

$$= \frac{2 \times 5y \times 3(2y + 7)}{5(2y + 7)}$$

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



Q.

Divide the given polynomial by the given monomial  $9x^2y^2(3z + 24) \div 27xy(z + 8)$

Sol.  $9x^2y^2(3z + 24) \div 27xy(z + 8)$

$$\begin{aligned}9x^2y^2(3z + 24) &= [3 \times 3] \times [x \times x] \times [y \times y] (3z + 2 \times 2 \times 2 \times 3) \\&= 3 \times 3 \times x \times x \times y \times y \times 3(z + 8)\end{aligned}$$

$$[27xy(z + 8)] = 3 \times 3 \times 3 \times x \times y(z + 8)$$

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

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



3	27
3	9
3	3
	1

2	24
2	12
2	6
3	3
	1

Q.

Divide the given polynomial by the given

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

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

$$= \frac{96abc(3a - 12)(5b - 30)}{144(a - 4)(b - 6)}$$

$$= \frac{\cancel{2} \times \cancel{2} \times \cancel{2} \times \cancel{2} \times \cancel{3} \times a \times b \times c \times 3 (a - 4) \times 5 (b - 6)}{\cancel{12} \times \cancel{4} \times \cancel{3} \times (a - 4) (b - 6)}$$

$$= 10abc$$

$$= 10abc$$



2	96
2	48
2	24
2	12
2	6
3	3
	1

**Q.**

**Divide the given polynomial by the given monomial**  $5(2x + 1)(3x + 5) \div (2x + 1)$

**Sol.**  $5(2x + 1)(3x + 5) \div (2x + 1)$

$$= \frac{5(2x + 1)(3x + 5)}{(2x + 1)}$$

$$5(2x + 1)(3x + 5) \div (2x + 1) = 5(3x + 5)$$



Q.

Divide the given polynomial by the given monomial  $26xy(x + 5)(y - 4) \div 13x(y - 4)$

Sol.  $26xy(x + 5)(y - 4) \div 13x(y - 4)$

$$= \frac{26xy(x + 5)(y - 4)}{13x(y - 4)}$$

$$= \frac{\cancel{2} \times \cancel{13} \times \cancel{xy} (x + 5)(y - 4)}{\cancel{13x}(y - 4)}$$

2	26
13	13
	1

$26xy(x + 5)(y - 4) \div 13x(y - 4) = 2y(x + 5)$



**Q.**

Divide the given polynomial by the given

monomial  $52pqr(p + q)(q + r)(r + p) \div 104pq(q + r)(r + p)$

Sol.  $52pqr(p + q)(q + r)(r + p) \div 104pq(q + r)(r + p)$

$$= \frac{52pqr(p + q)(q + r)(r + p)}{104pq(q + r)(r + p)}$$

$$= \frac{\cancel{52} \times \cancel{p} \times \cancel{q} \times \cancel{r}(p + q)(q + r)(r + p)}{\cancel{52} \times \cancel{2} \times \cancel{p} \times \cancel{q}(q + r)(r + p)}$$

$$52pqr(p + q)(q + r)(r + p) \div 104pq(q + r)(r + p) = \frac{r(p + q)}{2}$$

2	104
52	52
	1



Q.

Divide the given polynomial by the given monomial  $20(y + 4)(y^2 + 5y + 3) \div 5(y + 4)$

Sol.  $20(y + 4)(y^2 + 5y + 3) \div 5(y + 4)$

$$= \frac{20(y + 4)(y^2 + 5y + 3)}{5(y + 4)}$$

$$= \frac{2 \times 2 \times \cancel{5}(y + 4)(y^2 + 5y + 3)}{\cancel{5}(y + 4)}$$

$$= 4(y^2 + 5y + 3)$$

2	20
2	10
5	5
	1

$20(y + 4)(y^2 + 5y + 3) \div 5(y + 4) = 4(y^2 + 5y + 3)$



**Q.**

**Divide the given polynomial by the given monomial  $x(x + 1)(x + 2)(x + 3) \div x(x + 1)$**

**Sol.**  $x(x + 1)(x + 2)(x + 3) \div x(x + 1)$

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

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

$x(x + 1)(x + 2)(x + 3) \div x(x + 1) = (x + 2)(x + 3)$



**Q.**

Divide the given polynomial by the given

monomial  $5y + 2y$   $7y + 10 \div y + 5$

**Sol.**

$$\begin{aligned} & y^2 + 7y + 10 \div y + 5 \\ &= \frac{y^2 + 7y + 10}{y + 5} \quad 5 \times 2 \\ &= \frac{y^2 + 5y + 2y + 10}{y + 5} \\ &= \frac{y(y + 5) + 2(y + 5)}{y + 5} \\ &= \frac{(y + 5)(y + 2)}{y + 5} \\ &= y + 2 \end{aligned}$$

$$y^2 + 7y + 10 \div y + 5 = y + 2$$



**Q.**

Divide the given polynomial by the given

monomial  $(m^2 - 14m - 32) \div (m + 2)$

$$-16m + 2m$$

**Sol.**

$$(m^2 - 14m - 32) \div (m + 2)$$

$$= \frac{m^2 - 14m - 32}{m + 2}$$

$$16 \times 2$$

$$= \frac{m^2 - 16m + 2m + 32}{m + 2}$$

$$= \frac{m(m - 16) + 2(m + 16)}{m + 2}$$

$$= \frac{(m - 16)(m + 2)}{m + 2}$$

$$= m - 16$$

$$= m - 16$$



**Q.**

Divide the given polynomial by the given

monomial  $(5p^2 - 25p + 20) \div (p - 1)$

- 20 - 5

Sol.  $(5p^2 - 25p + 20) \div (p - 1)$

$$= \frac{5p^2 - 25p + 20}{p - 1}$$

$$= \frac{5p^2 - 20p - 5p + 20}{p - 1}$$

$$= \frac{5p(p - 4) - 5(p - 4)}{p - 1}$$

$$= \frac{(5p - 5)(p - 4)}{p - 1}$$

$$= \frac{5(p - 1)(p - 4)}{p - 1}$$

$$= 5(p - 4)$$

$$= 5(p - 4)$$



Q.

Divide the given polynomial by the given

monomial  $4xyz(z^2 + 6z - 16) \div 2y(z + 8)$

$-2 \times z + 8 \mid z \times + 8$

Sol.  $4xyz(z^2 + 6z - 16) \div 2y(z + 8)$

$$\begin{aligned} 4xyz(z^2 + 6z - 16) &= 2 \times 2 \times (x \times y \times z)(z^2 + 8z - 2z - 16) \\ &= 2 \times 2 \times (x \times y \times z)(z(z + 8) - 2(z + 8)) \\ &= 2 \times 2 \times x \times y \times z (z + 8) (z - 2) \end{aligned}$$

$$\frac{4xyz(z^2 + 6z - 16)}{2y(z + 8)} = \frac{\cancel{2} \times \cancel{2} \times x \times \cancel{y} \times z (z + 8) (z - 2)}{\cancel{2} \cancel{y} (z + 8)}$$

$$= 2xz(z - 2)$$



**Q.**

**Divide the given polynomial by the given monomial**  $5pq(p^2 - q^2) \div 2p(p + q)$

**Sol.**

$$= \frac{5pq(p^2 - q^2)}{2p(p + q)}$$
$$= \frac{5pq(p - q)(p + q)}{2p(p + q)}$$

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

$$= \frac{5q(p - q)}{2}$$



Q.

Divide the given polynomial by the given monomial  $12xy(9x^2 - 16y^2) \div 4xy(3x + 4y)$

Sol.  $12xy(9x^2 - 16y^2) \div 4xy(3x + 4y)$

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

$$12xy(9x^2 - 16y^2) = 2 \times 2 \times 3 \times x \times y [(3x)^2 - (4y)^2]$$

$$= 2 \times 2 \times 3 \times x \times y (3x - 4y)(3x + 4y)$$

$$4xy(3x + 4y) = 2 \times 2 \times x \times y (3x + 4y)$$

$$\frac{12xy(9x^2 - 16y^2)}{4xy(3x + 4y)} = \frac{\cancel{2} \times \cancel{2} \times \cancel{3} \times \cancel{x} \times \cancel{y} (3x - 4y)(3x + 4y)}{(\cancel{2} \times \cancel{2} \times \cancel{x} \times \cancel{y})(3x + 4y)}$$
$$= 3(3x - 4y)$$

$12xy(9x^2 - 16y^2) \div 4xy(3x + 4y) = 3(3x - 4y)$



2	12
2	6
3	3
	1

Q.

Divide the given polynomial by the given

$$\text{monomial } 39y^3(50y^2 - 98) \div 26y^2(5y + 7)$$

Sol.

$$39y^3(50y^2 - 98) = 3 \times 13 \times y \times y \times y (2 \times 5 \times 5 \times 2 \times 7 \times 7) \div (2 \times 13 \times 5 \times 5 \times 2 \times 7 \times 1)$$
$$= 3 \times 13 \times y \times y \times y \times 2 [(5y)^2 - 7^2]$$
$$= 3 \times 13 \times y \times y \times y \times 2 (5y + 7)(5y - 7)$$

$$26y^2(5y + 7) = 2 \times 13 \times y \times y (5y + 7)$$

$$\frac{39y^3(50y^2 - 98)}{26y^2(5y + 7)} = \frac{\cancel{3} \times \cancel{13} \times \cancel{y} \times \cancel{y} \times \cancel{y} \times \cancel{2} (5y + 7)(5y - 7)}{\cancel{2} \times \cancel{13} \times \cancel{y} \times \cancel{y} \times \cancel{2} (5y + 7)}$$

$$39y^3(50y^2 - 98) \div 26y^2(5y + 7) = 3y(5y - 7)$$



**Q.**

**Find and correct the errors in the following mathematical statements.  $4(x - 5) = 4x - 5$**

**Sol.**

$$4(x - 5) = 4x \cancel{-} 5$$

$$\text{LHS} = \cancel{4}(x - 5)$$

$$= 4x - 20 \checkmark$$

$$4(x - 5) = 4x - 20$$



**Q.**

**Find and correct the errors in the following mathematical statements.  $2x + 3y = 5xy$**

**Sol.**

$$2x + 3y = 5\cancel{x}y$$

$$\text{LHS} = 2x + 3y$$

$$= 2x + 3y \checkmark$$

$$2x + 3y = 2x + 3y$$



**Q.**

**Find and correct the errors in the following mathematical statements.  $x + 2x + 3x = 5x$**

**Sol.**

$$x + 2x + 3x = \cancel{5x}$$

$$\begin{aligned}\text{LHS} &= \underline{x} + \underline{2x} + \underline{3x} \\&= 3x + 3x \\&= 6x \checkmark\end{aligned}$$

$$x + 2x + 3x = 6x$$



**Q.**

**Find and correct the errors in the following mathematical statements.  $5y + 2y + y - 7y = 0$**

**Sol.**

$$5y + 2y + y - 7y = \text{X}$$

$$\begin{aligned}\text{LHS} &= \underline{5y + 2y} + \underline{y - 7y} \\&= 7y - 6y \\&= 1y \checkmark\end{aligned}$$

$$5y + 2y + y - 7y = 1y$$



**Q.**

**Find and correct the errors in the following mathematical statements.  $3x + 2x = 5x^2$**

**Sol.**

$$3x + 2x = 5x^2$$

$$\text{LHS} = \underline{3x + 2x}$$

$$= 5x \checkmark$$

$$3x + 2x = 5x$$



**Q.**

**Find and correct the errors in the following mathematical statements.  $(2x)^2 + 4(2x) + 7 = 2x^2 + 8x + 7$**

**Sol.**

$$\begin{aligned}(2x)^2 + 4(2x) + 7 &= 2x^2 + \cancel{4}x + 7 \\ \text{LHS} &= \underline{(2x)^2} + \underline{4(2x)} + \underline{7} \\ &= 4x^2 + 8x + 7 \quad \checkmark\end{aligned}$$

$$(2x)^2 + 4(2x) + 7 = 4x^2 + 8x + 7$$



**Q.**

**Find and correct the errors in the following mathematical statements.  $(2x)^2 + 5x = 4x + 5x = 9x$**

**Sol.**

$$(2x)^2 + 5x = 4x \cancel{+} 5x = 9x$$

$$\underline{(2x)^2} + \underline{5x} = 4x^2 + 5x \checkmark$$

$$2x^2 + 5x = 4x^2 + 5x$$



**Q.**

**Find and correct the errors in the following mathematical statements.  $(3x + 2)^2 = 3x^2 + 6x + 4$**

Sol.  $(3x + 2)^2 = 3x^2 + \cancel{6}x + 4$

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

$$\text{LHS} = \underline{(3x + 2)^2}$$

$$= \underline{(3x)^2} + \underline{2 \times 3x \times 2} + \underline{(2)^2}$$

$$= 9x^2 + 12x + 4 \checkmark$$

  $(3x + 2)^2 = 9x^2 + 12x + 4$



**Q.**

**Substituting  $x = -3$**

$$x^2 + 5x + 4 = (-3)^2 + 5(-3) + 4 = 9 + 2 + 4 = \text{1} \cancel{6}$$

**Sol.**  $x^2 + 5x + 4 = (-3)^2 + 5(-3) + 4$

$$\begin{aligned}\text{LHS} &= \underline{(-3)^2} + \underline{5(-3)} + 4 \\ &= \text{9} - 15 + 4 \\ &= 13 - 15\end{aligned}$$


$$x^2 + 5x + 4 = -2 \quad \checkmark$$

**Q.**

**Substituting  $x = -3$**

$$x^2 - 5x + 4 = (-3)^2 + 5(-3) + 4 = 9 - 15 + 4 = \textcolor{red}{\cancel{-2}}$$

**Sol.**  $x^2 + 5x + 4 = (-3)^2 + 5(-3) + 4$

$$\begin{aligned}\text{LHS} &= \underline{(-3)^2} - \underline{5(-3)} + 4 \\ &= \textcolor{pink}{9} + \textcolor{pink}{15} + \textcolor{pink}{4} \\ &= 24 + 4\end{aligned}$$

$$x^2 - 5x + 4 = 28$$



Q.

Substituting  $x = -3$

$$x^2 + 5x = (-3)^2 + 5(-3) = -9 - 15 = -\cancel{2}4$$

Sol.  $x^2 + 5x = (-3)^2 + 5(-3)$

LHS  $= \underline{(-3)^2} + \underline{5(-3)}$

$$= 9 - 15$$

$$= -6$$

$x^2 + 5x = -6$



**Q.**

**Find and correct the errors in the following mathematical statements.  $(y - 3)^2 = y^2 - 9$**

**Sol.**

$$(y - 3)^2 = y^2 \cancel{-} 9$$

$$\text{LHS} = (y - 3)^2$$

$$= \underline{(y)^2} - \underline{2 \times y \times 3} + \underline{(3)^2}$$

$$(y - 3)^2 = y^2 - 6y + 9 \checkmark$$

$$(y - 3)^2 = y^2 - 6y + 9$$



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

**Q.**

**Find and correct the errors in the following mathematical statements.  $(z + 5)^2 = z^2 + 25$**

**Sol.**  $(z + 5)^2 = z^2 \cancel{+} 25$

$$\text{LHS} = (z + 5)^2$$

$$= \underline{(z)^2} + \underline{2 \times z \times 5} + \underline{(5)^2}$$

$$(y - 3)^2 = z^2 + 10z + 25 \quad \checkmark$$

$$(y - 3)^2 = z^2 + 10z + 25$$

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



**Q.**

**Find and correct the errors in the following mathematical statements.  $(2a + 3b)(a - b) = 2a^2 - 3b^2$**

**Sol.**

$$(2a + 3b)(a - b) = 2a^2 \cancel{- 3b^2}$$

$$\begin{aligned} \text{LHS} &= \underline{(2a + 3b)} \underline{(a - b)} \\ &= 2a(a - b) + 3b(a - b) \\ &= \underline{2a^2} - \underline{2ab} + \underline{3ab} - \underline{3b^2} \end{aligned}$$

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



**Q.**

**Find and correct the errors in the following mathematical statements.  $(a + 4)(a + 2) = a^2 + 8$**

**Sol.**  $(a + 4)(a + 2) = a^2 \cancel{+} 8$

$$\begin{aligned}\text{LHS} &= (a + 4)(a + 2) \\&= \cancel{a(a + 2)} + \cancel{4(a + 2)} \\&= \cancel{a^2} + \cancel{2a} + \cancel{4a} + \cancel{8}\end{aligned}$$

**$(a - 4)(a + 2) = a^2 + 6a + 8$**



**Q.**

**Find and correct the errors in the following mathematical statements.  $(a - 4)(a - 2) = a^2 - 8$**

**Sol.**  $(a - 4)(a - 2) = a^2 \cancel{+} 8$

$$\begin{aligned}\text{LHS} &= (a - 4)(a - 2) \\&= \cancel{a(a - 2)} - \cancel{4(a - 2)} \\&= \cancel{a^2} - \cancel{2a} - \cancel{4a} + \cancel{8}\end{aligned}$$

**$(a - 4)(a - 2) = a^2 - 6a + 8$**



**Q.**

**Find and correct the errors in the following mathematical statements.**  $\frac{3x^2}{3x^2} = 0$

**Sol.**

$$\frac{3x^2}{3x^2} = \textcolor{red}{X}$$

$$\text{LHS} = \frac{\cancel{3x^2}}{\cancel{3x^2}}$$

$$= \frac{1}{1}$$

$$= \textcolor{pink}{1} \checkmark$$

$$\frac{3x^2}{3x^2} = 1$$



**Q.**

**Find and correct the errors in the following mathematical statements.**  $\frac{3x^2 + 1}{3x^2} = 1 + 1 = 2$

**Sol.**

$$\frac{3x^2 + 1}{3x^2} = \text{X}$$

$$\text{LHS} = \frac{3x^2 + 1}{3x^2}$$

$$= \frac{\cancel{3x^2}}{\cancel{3x^2}} + \frac{1}{3x^2}$$

$$= 1 + \frac{1}{3x^2} \quad \checkmark$$


$$\frac{3x^2 + 1}{3x^2} = 1 + \frac{1}{3x^2}$$

**Q.**

**Find and correct the errors in the following mathematical statements.**  $\frac{3x}{3x+2} = \frac{1}{2}$

**Sol.**

$$\frac{3x}{3x+2} = \frac{1}{2}$$

$$\text{LHS} = \frac{3x}{3x+2}$$

$$= \frac{3x}{3x+2}$$

$$\frac{3x}{3x+2} = \frac{3x}{3x+2}$$



**Q.**

**Find and correct the errors in the following mathematical statements.**  $\frac{3}{4x + 3} = \frac{1}{4x}$

**Sol.**

$$\frac{3}{4x + 3} = \frac{1}{\cancel{+x}}$$

$$\text{LHS} = \frac{3}{4x + 3}$$

$$= \frac{3}{4x + 3} \quad \checkmark$$

$$\frac{3}{4x + 3} = \frac{3}{4x + 3}$$



**Q.**

**Find and correct the errors in the following mathematical statements.**  $\frac{4x + 5}{4x} = 5$

**Sol.**  $\frac{4x + 5}{4x} = \text{X}$

$$\begin{aligned}\text{LHS} &= \frac{4x + 5}{4x} \\ &= \frac{\cancel{4x}^1}{\cancel{4x}^1} + \frac{5}{4x} \\ &= 1 + \frac{5}{4x}\end{aligned}$$



$$\frac{4x + 5}{4x} = 1 + \frac{5}{4x}$$

**Q.**

**Find and correct the errors in the following mathematical statements.**  $\frac{7x + 5}{5} = 7x$

**Sol.**

$$\frac{7x + 5}{5} = 7x \quad \text{X}$$

$$\text{LHS} = \frac{7x + 5}{5}$$

$$= \frac{7x}{5} + \frac{5}{5} \quad \text{1}\overline{\text{5}}$$

$$= 1 + \frac{7x}{5} \quad \text{✓}$$

$$\frac{7x + 5}{5} = 1 + \frac{7x}{5}$$

