Write the factors of the following monomials:

(1) $7p$
(2) $6m$
(3) $9xy$
(4) $22ab$
(5) p^2q
(6) $10xy^2$
(7) $5a^2$
(8) $15m^2n$
(9) $30a^2b^2$
(10) $12x^2$

ANSWER:

(1) $7p$
$= 7 \times p$
Hence, factors of $7p$ are 7 and p.

(2) $6m$
$= 2 \times 3 \times m$
Hence, factors of $6m$ are 2, 3 and m.

(4) $22ab$
$= 2 \times 11 \times a \times b$
Hence, factors of $22ab$ are 2, 11, a and b.

(5) p^2q
$= p \times p \times q$
Hence, factors of p^2q are p, p and q.

(6) $10xy^2$
$= 2 \times 5 \times x \times y \times y$
Hence, factors of $10xy^2$ are 2, 5, x, y and y.

(7) $5a^2$
$= 5 \times a \times a$
Hence, factors of $5a^2$ are 5, a and a.

(8) $15m^2n$
$= 3 \times 5 \times m \times m \times n$
Hence, factors of $15m^2n$ are 3, 5, m, m and n.

(9) $30a^2b^2$
$= 2 \times 3 \times 5 \times a \times a \times b \times b$
Hence, factors of $30a^2b^2$ are 2, 3, 5, a, a, b and b.

(10) $12x^3$
$= 2 \times 2 \times 3 \times x \times x \times x$
Hence, factors of $12x^3$ are 2, 2, 3, x, x and x.

Find the common factors of the following monomials by inspection only.

(1) $6m^2n^2, 10m^2n$
(2) $38a^3b^2, 57ab^2$
(3) $11x^2y^3, xy^2$
(4) $35p^2q^2r, 40p^3q^2, 50pq^2r$
(5) $15x^3y^3, 39x^2z^2, 48xy^2z^3$

ANSWER:

(1) $6m^2n^2, 10m^2n$
The highest common factor of 6 and 10 is 2
Common factor of m^2 and m^2 is m^2
Common factor of n^2 and n is n
Hence, the common factor of the monomial $6m^2n^2$and $10m^2n$ is $2m^2n$

(2) $38a^3b^2, 57ab^2$
The highest common factor of 38 and 57 is 19
Common factor of a^3 and a is a
Common factor of b^2 and b^2 is b^2
Hence, the common factor of the monomial $38a^3b^2$and $57ab^2$ is $19ab^2$

(3) $11x^2y^3, xy^2$
The highest common factor of 11 and 1 is

(3) $11x^2y^3, xy^2$
The highest common factor of 11 and 1 is 1
Common factor of x^2 and x is x
Common factor of y^3 and y^2 is y^2
Hence, the common factor of the monomial $11x^2y^3$ and xy^2 is $1xy^2 = xy^2$

(4) $35p^2q^2r, 40q^3r^2, 50pq^2r$
The highest common factor of 35, 40 and 50 is 5
Common factor of p^2, p^0 and p is $p^0 = 1$
Common factor of q^2, q^3 and q^2 is q^2
Common factor of r, r^2 and r is r
Hence, the common factor of the monomial $35p^2q^2r$, $40q^3r^2$ and $50pq^2r$ is $5q^2r$

(5) $15x^3y^3, 39x^2z^2, 48xy^2z^3$
The highest common factor of 15, 39 and 48 is 3
Common factor of x^3, x^2 and x is x
Common factor of y^3, y^0 and y^2 is $y^0 = 1$
Common factor of z^0, z^2 and z^3 is $z^0 = 1$
Hence, the common factor of the monomial $15x^3y^3$, $39x^2z^2$ and $48xy^2z^3$ is 3x (1) (1) = $3x$

Factorise:

(1) $4a + 8b$

ANSWER:

$4a + 8b$
$4a = \underline{2} \times \underline{2} \times a$
$8b = \underline{2} \times \underline{2} \times 2 \times b$
Here, 2 and 2 are the common factors of the given terms.
Hence, $4a + 8b = 2 \times 2\,(a + 2 \times b)$
$= 4(a + 2b)$

Factorise:

(2) $5m + 15n$

ANSWER:

$5m + 15n$
$5m = \underline{5} \times m$
$15n = 3 \times \underline{5} \times n$
Here, 5 is the common factor of the given terms.
Hence, $5m + 15n = 5\ (m + 3 \times n)$
$= 5\ (m + 3n)$

Factorise:

(3) $abp - abq$

ANSWER:

$abp - abq$
$abp = \underline{a} \times \underline{b} \times p$
$abq = \underline{a} \times \underline{b} \times q$
Here, a and b are the common factors of the given terms.
Hence, $abp - abq = a \times b\,(p - q)$
$= ab\,(p - q)$

Factorise:

(4) $x^2 + x^3$

ANSWER:

$x^2 + x^3$

$x^2 = \underline{x} \times \underline{x}$

$x^3 = \underline{x} \times \underline{x} \times x$

Here, x and x are the common factors of the given terms.

Hence, $x^2 + x^3$

$= x \times x\,(1 + x)$

$= x^2\,(1 + x)$

Factorise:

(5) $mnx + mny$

ANSWER:

$mnx + mny$

$mnx = \underline{m} \times \underline{n} \times x$

$mny = \underline{m} \times \underline{n} \times y$

Here, m and n are the common factors of the given terms.

Hence, $mnx + mny = m \times n\,(x + y)$

$= mn\,(x + y)$

Factorise:

(6) $4x^2y + 3xy^2$

ANSWER:

$4x^2y + 3xy^2$

$4x^2y = 2 \times 2 \times \underline{x} \times x \times \underline{y}$

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

Here, x and y are the common factors of the given terms.

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

$= xy\,(4x + 3y)$

Factorise:

(7) $15p^2q - 20q$

ANSWER:

$15p^2q - 20q$
$15p^2q = 3 \times \underline{5} \times p \times p \times \underline{q}$
$20q = 2 \times 2 \times \underline{5} \times \underline{q}$
Here, 5 and q are the common factors of the given terms.
Hence, $15p^2q - 20q = 5 \times q\,(3 \times p \times p - 2 \times 2)$
$= 5q\,(3p^2 - 4)$

Factorise:

(8) $a^2bc + abc^2$

ANSWER:

$a^2bc + abc^2$

$a^2bc = \underline{a} \times a \times \underline{b} \times \underline{c}$

$abc^2 = \underline{a} \times \underline{b} \times \underline{c} \times c$

Here a, b and c are the common factors of the given terms.

Hence, $a^2bc + abc^2 = a \times b \times c\,(a + c)$

$= abc\,(a + c)$

Factorise:

(9) $18m^2n - 27m^3$

ANSWER:

$18m^2n - 27m^3$

$18m^2n = 2 \times \underline{3} \times \underline{3} \times \underline{m} \times \underline{m} \times n$

$27m^3 = \underline{3} \times \underline{3} \times 3 \times \underline{m} \times \underline{m} \times m$

Here 3, 3, m and m are the common factors of the given terms.

Hence, $18m^2n - 27m^3 = 3 \times 3 \times m \times m\,(2 \times n - 3 \times m)$

$= 9m^2\,(2n - 3m)$

Factorise:

(10) $24p^3q^2 + 28p^2q^3$

ANSWER:

$24p^3q^2 + 28p^2q^3$

$24p^3q^2 = \underline{2} \times \underline{2} \times 2 \times 3 \times \underline{p} \times \underline{p} \times p \times \underline{q} \times \underline{q}$

$28p^2q^3 = \underline{2} \times \underline{2} \times 7 \times \underline{p} \times \underline{p} \times \underline{q} \times \underline{q} \times q$

Here 2, 2, p, p, q and q are the common factors of the given terms.

Hence, $24p^3q^2 + 28p^2q^3 = 2 \times 2 \times p \times p \times q \times q\,(2 \times 3 \times p + 7 \times q)$

$= 4p^2q^2\,(6p + 7q)$