EXERCISE 19(A)

1. Fill in the blanks:
(i) 5 + 4 = …….. and 5x + 4x = ……
(ii) 12 + 18 = ……. and $12x^2y + 18x^2y$ = ……..
(iii) 7 + 16 = …….. and 7a + 16b = …….
(iv) 1 + 3 = ……. and $x^2y + 3xy^2$ = ……
(v) 7 – 4 = …… and 7ab – 4ab = ……
Solution:
(i) 5 + 4 = **9** and 5x + 4x = **9x**
(ii) 12 + 18 = **30** and $12x^2y + 18x^2y$ = **$30x^2y$**
(iii) 7 + 16 = **23** and 7a + 16b = **7a + 16b**
(iv) 1 + 3 = **4** and $x^2y + 3xy^2$ = **$x^2y + 3xy^2$**
(v) 7 – 4 = **3** and 7ab – 4ab = **3ab**

2. Fill in the blanks:
(i) The sum of -2 and -5 = …… and the sum of -2x and -5x = …….
(ii) The sum of 8 and -3 = …… and the sum of 8ab and -3ab = ……
(iii) The sum of -15 and -4 = …… and the sum of -15x and -4y = ……..
(iv) 15 + 8 + 3 = …….. and 15x + 8y + 3x = ……
(v) 12 – 9 + 15 = …… and 12ab – 9ab + 15ba = …….
Solution:
(i) The sum of -2 and -5 = **- 7** and the sum of -2x and -5x = **- 7x**
(ii) The sum of 8 and -3 = **5** and the sum of 8ab and -3ab = **5ab**
(iii) The sum of -15 and -4 = **- 19** and the sum of -15x and -4y = **- 15x – 4y**
(iv) 15 + 8 + 3 = **26** and 15x + 8y + 3x = **18x + 8y**
(v) 12 – 9 + 15 = **18** and 12ab – 9ab + 15ba = **18ab**

3. Add:
(i) 8xy and 3xy
(ii) 2xyz, xyz and 6xyz
(iii) 2a, 3a and 4b
(iv) 3x and 2y
(v) 5m, 3n and 4p
Solution:
(i) 8xy and 3xy
The addition of 8xy and 3xy is calculated as follows
8xy + 3xy = 11xy
(ii) 2xyz, xyz and 6xyz

The addition of 2xyz, xyz and 6xyz is calculated as follows
2xyz + xyz + 6xyz = 9xyz
(iii) 2a, 3a and 4b
The addition of 2a, 3a and 4b is calculated as follows
2a + 3a + 4b = 5a + 4b
(iv) 3x and 2y
The addition of 3x and 2y is calculated as follows
3x + 2y = 3x + 2y
(v) 5m, 3n and 4p
The addition of 5m, 3n and 4p is calculated as follows
5m + 3n + 4p = 5m + 3n + 4p

4. Evaluate:
(i) 6a – a – 5a – 2a
(ii) 2b – 3b – b + 4b
(iii) 3x – 2x – 4x + 7x
(iv) 5ab + 2ab – 6ab + ab
(v) 8x – 5y – 3x + 10y
Solution:
(i) 6a – a – 5a – 2a
The value of given expression is calculated as below
6a – a – 5a – 2a = (6 – 1 – 5 – 2) a
We get,
= (5 – 5 – 2) a
= - 2a
Therefore, 6a – a – 5a – 2a = - 2a
(ii) 2b – 3b – b + 4b
The given of given expression is calculated as below
2b – 3b – b + 4b = 2b + 4b – (3 + 1) b
We get,
= 6b – 4b
= 2b
Therefore, 2b – 3b – b + 4b = 2b
(iii) 3x – 2x – 4x + 7x
The given expression is calculated as below
3x – 2x – 4x + 7x = 3x + 7x – 2x – 4x
= (3 + 7) x – (2 + 4) x
= 10x – 6x
= 4x

Therefore, 3x – 2x – 4x + 7x = 4x
(iv) 5ab + 2ab – 6ab + ab
The given expression is calculated as below
5ab + 2ab – 6ab + ab = 5ab + 2ab + ab – 6ab
We get,
= 8ab – 6ab
= 2ab
Therefore, 5ab + 2ab – 6ab + ab = 2ab
(v) 8x – 5y – 3x + 10y
The given expression is calculated as below
8x – 5y – 3x + 10y = 8x – 3x + 10y – 5y
= 5x + 5y
Therefore, 8x – 5y – 3x + 10y = 5x + 5y

5. Evaluate:
(i) -7x + 9x + 2x – 2x
(ii) 5ab – 2ab – 8ab + 6ab
(iii) -8a – 3a + 12a + 13a – 6a
(iv) 19abc – 11abc – 12abc + 14abc
Solution:
(i) -7x + 9x + 2x – 2x
The values of given expression is calculated as follows
-7x + 9x + 2x – 2x = 9x + 2x – 7x – 2x
= 11x – 9x
We get,
= 2x
Hence, -7x + 9x + 2x – 2x = 2x
(ii) 5ab – 2ab – 8ab + 6ab
The value of given expression is calculated as follows
5ab – 2ab – 8ab + 6ab = 5ab + 6ab – 2ab – 8ab
We get,
= 11ab – 10ab
= ab
Hence, 5ab – 2ab – 8ab + 6ab = ab
(iii) -8a – 3a + 12a + 13a – 6a
The value of given expression is calculated as follows
-8a – 3a + 12a + 13a – 6a = 12a + 13a – (8a + 3a + 6a)
= 25a – 17a
= 8a

Hence, -8a – 3a + 12a + 13a – 6a = 8a
(iv) 19abc – 11abc – 12abc + 14abc
The value of given expression is calculated as follows
19abc – 11abc – 12abc + 14abc = abc (19 – 11 – 12 + 14)
= abc (33 – 23)
= 10abc
Hence, 19abc – 11abc – 12abc + 14abc = 10abc

6. Subtract the first term from the second:
(i) 4ab, 6ba
(ii) 4.8b, 6.8b
(iii) 3.5abc, 10.5abc
(iv) 3(1 / 2) mn, 8(1 / 2)nm
Solution:
(i) 4ab, 6ba
The subtraction of first term from the second term is calculated as below
6ba – 4ab = 2ab
(ii) 4.8b, 6.8b
The subtraction of first term from the second term is calculated as below
6.8b – 4.8b = 2b
(iii) 3.5abc, 10.5abc
The subtraction of first term from the second term is calculated as below
10.5abc – 3.5abc = 7abc
(iv) 3(1 / 2) mn, 8(1 / 2)nm
The subtraction of first term from the second term is calculated as below
8(1 / 2)nm – 3 (1 / 2) mn = (17 / 2)nm – (7 / 2)mn
We get,
= [(17mn – 7mn) / 2]
= (10 / 2)mn
= 5mn

7. Simplify:
(i) $2a^2b^2 + 5ab^2 + 8a^2b^2 – 3ab^2$
(ii) 4a + 3b – 2a – b
(iii) 2xy + 4yz + 5xy + 3yz – 6xy
(iv) ab + 15ab – 11ab – 2ab
(v) $6a^2 – 3b^2 + 2a^2 + 5b^2 – 4a^2$
Solution:

(i) $2a^2b^2 + 5ab^2 + 8a^2b^2 – 3ab^2$

The simplified form of the given expression is calculated as follows

$2a^2b^2 + 5ab^2 + 8a^2b^2 – 3ab^2 = 2a^2b^2 + 8a^2b^2 + 5ab^2 – 3ab^2$

We get,

$= 10a^2b^2 + 2ab^2$

Therefore, $2a^2b^2 + 5ab^2 + 8a^2b^2 – 3ab^2 = 10a^2b^2 + 2ab^2$

(ii) $4a + 3b – 2a – b$

The simplified form of the given expression is calculated as follows

$4a + 3b – 2a – b = 4a – 3a + 3b – b$

$= 2a + 2b$

Therefore, $4a + 3b – 2a – b = 2a + 2b$

(iii) $2xy + 4yz + 5xy + 3yz – 6xy$

The simplified form of the given expression is calculated as follows

$2xy + 4yz + 5xy + 3yz – 6xy = 2xy + 5xy – 6xy + 4yz + 3yz$

$= xy + 7yz$

Therefore, $2xy + 4yz + 5xy + 3yz – 6xy = xy + 7yz$

(iv) $ab + 15ab – 11ab – 2ab$

The simplified form of the given expression is calculated as follows

$ab + 15ab – 11ab – 2ab = 16ab – 13ab$

$= 3ab$

Therefore, $ab + 15ab – 11ab – 2ab = 3ab$

(v) $6a^2 – 3b^2 + 2a^2 + 5b^2 – 4a^2$

The simplified form of the given expression is calculated as follows

$6a^2 – 3b^2 + 2a^2 + 5b^2 – 4a^2 = 6a^2 + 2a^2 – 4a^2 + 5b^2 – 3b^2$

We get,

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

Therefore, $6a^2 – 3b^2 + 2a^2 + 5b^2 – 4a^2 = 4a^2 + 2b^2$

EXERCISE 19(B)

1. Find the sum of:

(i) $3a + 4b + 7c, - 5a + 3b – 6c$ and $4a – 2b – 4c$

(ii) $2x^2 + xy – y^2, - x^2 + 2xy + 3y^2$ and $3x^2 – 10xy + 4y^2$

(iii) $x^2 – x + 1, -5x^2 + 2x – 2$ and $3x^2 – 3x + 1$

(iv) $a^2 – ab + bc, 2ab + bc – 2a^2$ and $- 3bc + 3a^2 + ab$

(v) $4x^2 + 7 – 3x, 4x – x^2 + 8$ and $– 10 + 5x – 2x^2$

Solution:

(i) $3a + 4b + 7c, - 5a + 3b – 6c$ and $4a – 2b – 4c$

The sum of $3a + 4b + 7c, - 5a + 3b – 6c$ and $4a – 2b – 4c$ is calculated as shown below

$(3a + 4b + 7c) + (-5a + 3b – 6c) + (4a – 2b – 4c)$

$= 3a + 4a – 5a + 4b + 3b – 2b + 7c – 6c – 4c$

We get,

$= 2a +5b – 3c$

Hence, the sum of $3a + 4b + 7c, - 5a + 3b – 6c$ and $4a – 2b – 4c$ is $3c$

(ii) $2x^2 + xy – y^2, - x^2 + 2xy + 3y^2$ and $3x^2 – 10xy + 4y^2$

The sum of $2x^2 + xy – y^2, - x^2 + 2xy + 3y^2$ and $3x^2 – 10xy + 4y^2$ is calculated as shown below

$(2x^2 + xy – y^2) + (- x^2 + 2xy + 3y^2) + (3x^2 – 10xy + 4y^2)$

$= 2x^2 – x^2 + 3x^2 + xy + 2xy – 10xy + 3y^2 + 4y^2 – y^2$

We get,

$= 4x^2 – 7xy + 6y^2$

Hence, the sum of $2x^2 + xy – y^2, - x^2 + 2xy + 3y^2$ and $3x^2 – 10xy + 4y^2$ is $4x^2 – 7xy + 6y^2$

(iii) $x^2 – x + 1, -5x^2 + 2x – 2$ and $3x^2 – 3x + 1$

The sum of $(x^2 – x + 1), (- 5x^2 + 2x – 2)$ and $(3x^2 – 3x + 1)$ is calculated as shown below

$(x^2 – x + 1) + (- 5x^2 + 2x – 2) + (3x^2 – 3x + 1)$

$= x^2 – 5x^2 + 3x^2 + 2x – x – 3x + 1 +1 – 2$

$= - x^2 – 2x$

Hence, the sum of $(x^2 – x + 1), (- 5x^2 + 2x – 2)$ and $(3x^2 – 3x + 1)$ is $- x^2 – 2x$

(iv) $a^2 – ab + bc, 2ab + bc – 2a^2$ and $- 3bc + 3a^2 + ab$

The sum of $(a^2 – ab + bc), (2ab + bc – 2a^2)$ and $(- 3bc + 3a^2 + ab)$ is calculated as shown below

$(a^2 – ab + bc) + (2ab + bc – 2a^2) + (- bc + 3a^2 + ab)$
$= a^2 – 2a^2 + 3a^2 + 2ab + ab – ab + bc + bc – bc$
We get,
$= 2a^2 + 2ab + bc$
Hence, the sum of $(a^2 – ab + bc)$, $(2ab + bc – 2a^2)$ and $(- 3bc + 3a^2 + ab)$ is $2a^2 + 2ab + bc$
(v) $4x^2 + 7 – 3x$, $4x – x^2 + 8$ and $– 10 + 5x – 2x^2$
The sum of $(4x^2 + 7 – 3x)$, $(4x – x^2 + 8)$ and $(- 10 + 5x – 2x^2)$ is calculated as shown below
$(4x^2 + 7 – 3x) + (4x – x^2 + 8) + (- 10 + 5x – 2x^2)$
$= 4x^2 – x^2 – 2x^2 + 7 + 8 – 10 + 4x + 5x – 3x$
We get,
$= x^2 + 5 + 6x$
Hence, the sum of $(4x^2 + 7 – 3x)$, $(4x – x^2 + 8)$ and $(- 10 + 5x – 2x^2)$ is $x^2 + 5 + 6x$

2.Add the following expressions:
(i) $– 17x^2 – 2xy + 23y^2$, $- 9y^2 + 15x^2 + 7xy$ and $13x^2 + 3y^2 – 4xy$
(ii) $– x^2 – 3xy + 3y^2 + 8$, $3x^2 – 5y^2 – 3 + 4xy$ and $– 6xy + 2x^2 – 2 + y^2$
(iii) $a^3 – 2b^3 + a$, $b^3 – 2a^3 + b$ and $– 2b + 2b^3 – 5a + 4a^3$
Solution:
(i) The sum of $(– 17x^2 – 2xy + 23y^2)$, $(- 9y^2 + 15x^2 + 7xy)$ and $(13x^2 + 3y^2 – 4xy)$ is calculated as follows
$(– 17x^2 – 2xy + 23y^2) + (- 9y^2 + 15x^2 + 7xy) + (13x^2 + 3y^2 – 4xy)$
$= - 17x^2 + 15x^2 + 13x^2 – 2xy – 4xy + 7xy + 23y^2 + 3y^2 – 9y^2$
We get,
$= 11x^2 + xy + 17y^2$
Therefore, the sum of $(– 17x^2 – 2xy + 23y^2)$, $(- 9y^2 + 15x^2 + 7xy)$ and $(13x^2 + 3y^2 – 4xy)$ is $11x^2 + xy + 17y^2$
(ii) $– x^2 – 3xy + 3y^2 + 8$, $3x^2 – 5y^2 – 3 + 4xy$ and $– 6xy + 2x^2 – 2 + y^2$
The sum of $(– x^2 – 3xy + 3y^2 + 8)$, $(3x^2 – 5y^2 – 3 + 4xy)$ and $(– 6xy + 2x^2 – 2 + y^2)$ is calculated as follows
$(– x^2 – 3xy + 3y^2 + 8) + (3x^2 – 5y^2 – 3 + 4xy) + (– 6xy + 2x^2 – 2 + y^2)$
$= - x^2 + 3x^2 + 2x^2 – 3xy – 6xy + 4xy + 3y^2 + y^2 – 5y^2 + 8 – 3 – 2$
We get,
$= 4x^2 – 5xy – y^2 + 3$
Therefore, the sum of $(– x^2 – 3xy + 3y^2 + 8)$, $(3x^2 – 5y^2 – 3 + 4xy)$ and $(– 6xy + 2x^2 – 2 + y^2)$ is $4x^2 – 5xy – y^2 + 3$

(iii) $a^3 – 2b^3 + a$, $b^3 – 2a^3 + b$ and $– 2b + 2b^3 – 5a + 4a^3$
The sum of $(a^3 – 2b^3 + a)$, $(b^3 – 2a^3 + b)$ and $(– 2b + 2b^3 – 5a + 4a^3)$ is calculated as follows
$(a^3 – 2b^3 + a) + (b^3 – 2a^3 + b) + (– 2b + 2b^3 – 5a + 4a^3)$
$= a^3 + 4a^3 – 2a^3 – 2b^3 + b^3 + 2b^3 + a – 5a + b – 2b$
We get,
$= 3a^3 + b^3 – 4a – b$
Therefore, the sum of $(a^3 – 2b^3 + a)$, $(b^3 – 2a^3 + b)$ and $(– 2b + 2b^3 – 5a + 4a^3)$ is $3a^3 + b^3 – 4a – b$

3. Evaluate:
(i) 3a – (a + 2b)
(ii) (5x – 3y) – (x + y)
(iii) (8a + 15b) – (3b – 7a)
(iv) (8x + 7y) – (4y – 3x)
(v) 7 – (4a – 5)
Solution:
(i) 3a – (a + 2b)
The value of the given expression is calculated as below
3a – (a + 2b)
= 3a – a – 2b
= 2a – 2b
Taking 2 as common, we get
= 2(a – b)
(ii) (5x – 3y) – (x + y)
The value of the given expression is calculated as below
(5x – 3y) – (x + y)
= 5x – x – 3y – y
= 4x – 4y
Taking 4 as common, we get
= 4(x – y)
(iii) (8a + 15b) – (3b – 7a)
The value of the given expression is calculated as below
(8a + 15b) – (3b – 7a)
= 8a + 7a + 15b – 3b
On calculation, we get
= 15a + 12b
(iv) (8x + 7y) – (4y – 3x)
The value of the given expression is calculated as below

(8x + 7y) – (4y – 3x)
= 8x + 3x + 7y – 4y
On further calculation, we get
= 11x + 3y
(v) 7 – (4a – 5)
The value of the given expression is calculated as below
7 – (4a – 5)
= 7 – 4a + 5
We get,
= 12 – 4a

4. Subtract:
(i) 5a – 3b + 2c from a – 4b – 2c
(ii) 4x – 6y + 3z from 12x + 7y – 21z
(iii) 5 – a – 4b + 4c from 5a – 7b + 2c
(iv) – 8x – 12y + 17z from x – y – z
(v) 2ab + cd – ac – 2bd from ab – 2cd + 2ac + bd
Solution:
(i) 5a – 3b + 2c from a – 4b – 2c
The value of the subtraction is calculated as follows
(a – 4b – 2c) – (5a – 3b + 2c)
= a – 5a – 4b + 3b – 2c – 2c
We get,
= - 4a – b – 4c
(ii) 4x – 6y + 3z from 12x + 7y – 21z
The value of the subtraction is calculated as follows
(12x + 7y – 21z) – (4x – 6y + 3z)
= 12x – 4x + 7y + 6y – 21z – 3z
On further calculation, we get
= 8x + 13y – 24z
(iii) 5 – a – 4b + 4c from 5a – 7b + 2c
The value of the subtraction is calculated as follows
(5a – 7b + 2c) – (5 – a – 4b + 4c)
= 5a + a – 7b + 4b + 2c – 4c – 5
We get,
=6a – 3b – 2c – 5
(iv) – 8x – 12y + 17z from x – y – z
The value of the subtraction is calculated as follows
(x – y – z) – (- 8x – 12y + 17z)

= x + 8x + 12y – y – z – 17z
We get,
= 9x + 11y – 18z
(v) 2ab + cd – ac – 2bd from ab – 2cd + 2ac + bd
The value of the subtraction is calculated as follows
(ab – 2cd + 2ac + bd) – (2ab + cd – ac – 2bd)
= ab – 2ab – 2cd – cd + 2ac + ac + bd + 2bd
On calculating further, we get
= - ab – 3cd + 3ac + 3bd

5.
(i) Take – ab + bc – ca from bc – ca + ab.
(ii) Take 5x + 6y – 3z from 3x + 5y – 4z.
(iii) Take (-3 / 2) p + q – r from (1 / 2)p – (1 / 3)q – (3 / 2) r
(iv) Take 1 – a + a^2 from a^2 + a + 1
Solution:
(i) The value of the subtraction is calculated as,
(bc – ca + ab) – (-ab + bc – ca)
= bc – bc – ca + ca + ab + ab
We get,
= 2ab
Hence, (bc – ca + ab) – (-ab + bc – ca) = 2ab
(ii) The value of the subtraction is calculated as,
(3x + 5y – 4z) – (5x + 6y – 3z)
= 3x – 5x + 5y – 6y – 4z + 3z
On simplification, we get
= - 2x – y – z
Hence, (3x + 5y – 4z) – (5x + 6y – 3z) = - 2x – y – z
(iii) The value of the subtraction is calculated as,
[(1 / 2)p – (1 / 3)q – (3 / 2) r] – [(-3 / 2) p + q – r]
= (1 / 2)p + (3 / 2)p – (1 / 3)q – q – (3 / 2)r + r
We get,
= [(3p + 9p – 2q – 6q – 9r + 6r) / 6]
On further calculation, we get
= 2p – (4 / 3)q – (1 / 2)r
Hence, [(1 / 2)p – (1 / 3)q – (3 / 2) r] – [(-3 / 2) p + q – r] = 2p – (4 / 3)q – (1 / 2)r
(iv) The value of the subtraction is calculated as,
(a^2 + a + 1) – (1 – a + a^2)
= a^2 – a^2 + a + a + 1 – 1

We get,
= a + a
= 2a

6. From the sum of x + y – 2z and 2x – y + z subtract x + y + z.
Solution:
The value of terms as per the question is calculated as follows
(x + y – 2z) + (2x – y + z) - (x + y + z)
= x + 2x – x + y – y – y – 2z – z + z
We get,
= 2x – y – 2z
Therefore, (x + y – 2z) + (2x – y + z) - (x + y + z) = 2x – y – 2z

7. From the sum of 3a – 2b + 4c and 3b – 2c subtract a – b – c.
Solution:
The value of terms as per the question is calculated as shown below
(3a – 2b + 4c) + (3b – 2c) – (a – b – c)
= 3a – 2b + 4c + 3b – 2c – a + b + c
On further calculation, we get
= 3a – a + 3b + b – 2b + 4c + c – 2c
= 2a + 2b + 3c
Hence, (3a – 2b + 4c) + (3b – 2c) – (a – b – c) = 2a + 2b + 3c

8. Subtract x – 2y – z from the sum of 3x – y + z and x + y – 3z.
Solution:
The value of terms as per the question is calculated as follows
(3x – y + z) + (x + y – 3z) – (x – 2y – z)
= 3x + x – x – y + y + 2y + z – 3z + z
We get,
= 3x + 2y – z
Therefore, (3x – y + z) + (x + y – 3z) – (x – 2y – z) = 3x + 2y – z

9. Subtract the sum of x + y and x – z from the sum of x – 2z and x + y + z
Solution:
The value of terms as per the question is calculated as follows
(x – 2z) + (x + y + z) – {(x + y) + (x – z)}
On further calculation, we get
= x + x – x –x + y – y + z + z – 2z
We get,

= 0
Therefore, (x – 2z) + (x + y + z) – {(x + y) + (x – z)} = 0

10. By how much should x + 2y – 3z be increased to get 3x?
Solution:
The terms calculated as per the question is as follows
3x – (x + 2y – 3z)
= 3x – x – 2y + 3z
We get,
= 2x – 2y + 3z

11. The sum of two expressions is $5x^2 – 3y^2$. If one of them is $3x^2 + 4xy – y^2$, find the other.
Solution:
The other expression is calculated as follows
$(5x^2 – 3y^2) – (3x^2 + 4xy – y^2)$
$= 5x^2 – 3x^2 – 4xy – 3y^2 + y^2$
We get,
$= 2x^2 – 4xy – 2y^2$

12. The sum of two expressions is $3a^2 + 2ab – b^2$. If one of them is $2a^2 + 3b^2$, find the other.
Solution:
The other expression is calculated as follows
$(3a^2 + 2ab – b^2) – (2a^2 + 3b^2)$
On simplification, we get
$=3a^2 – 2a^2 – b^2 – 3b^2 + 2ab$
$= a^2- 4b^2 + 2ab$

EXERCISE 19(C)

1. Fill in the blanks:

(i) 6 × 3 = ……. and 6x × 3x = ……

(ii) 6 × 3 = …….. and $6x^2 \times 3x^3$ = ……

(iii) 5 × 4 = ……. and 5x × 4y = ……

(iv) 4 × 7 = ……. and 4ax × 7x = …….

(v) 6 × 2 = ……. and 6xy × 2xy = ……..

Solution:

(i) 6 × 3 = 18

Hence,

6x × 3x = 6 × 3 × x × x

We get,

$= 18 \times x^2$

$= 18x^2$

Therefore, 6 × 3 = 18 and $6x \times 3x = 18x^2$

(ii) 6 × 3 = 18

Hence,

$6x^2 \times 3x^3 = 6 \times 3 \times x^{2+3}$

$= 18 \times x^5$

$= 18x^5$

Therefore, 6 × 3 = 18 and $6x^2 \times 3x^3 = 18x^5$

(iii) 5 × 4 = 20 and 5x × 4y = 5 × 4 × x × y

= 20xy

Therefore, 5 × 4 = 20 and 5x × 4y = 20xy

(iv) 4 × **7** = 28

Hence,

4ax × 7x = 4 × **7** × a × x × x

$= 28 \times a \times x^2$

$= 28ax^2$

Therefore, 4 × 7 = 28 and $4ax \times 7x = 28ax^2$

(v) 6 × 2 = 12

Hence,

$6xy \times 2xy = 6 \times 2 \times x^{1+1} \times y^{1+1}$

$= 12 \times x^2 \times y^2$

$= 12x^2y^2$

Therefore, 6 × 2 = 12 and $6xy \times 2xy = 12x^2y^2$

2. Fill in the blanks:
(i) $4x \times 6x \times 2 =$ ……
(ii) $3ab \times 6ax =$ ……
(iii) $x \times 2x^2 \times 3x^3 =$ ……
(iv) $5 \times 5a^3 =$ ……
(v) $6 \times 6x^2 \times 6x^2y^2 =$ ……
Solution:
(i) $4x \times 6x \times 2 = 4 \times 6 \times 2 \times x \times x$
$= 48 \times x^2$
We get,
$= 48x^2$
Hence, $4x \times 6x \times 2 = 48x^2$
(ii) $3ab \times 6ax = 3 \times 6 \times a \times a \times b \times x$
$= 18 \times a^2 \times b \times x$
We get,
$= 18a^2bx$
Hence, $3ab \times 6ax = 18a^2bx$
(iii) $x \times 2x^2 \times 3x^3 = 2 \times 3 \times x \times x^2 \times x^3$
$= 6 \times x^{1+2+3}$
$= 6 \times x^6$
$= 6x^6$
Hence, $x \times 2x^2 \times 3x^3 = 6x^6$
(iv) $5 \times 5a^3 = 5 \times 5 \times a^3$
$= 25 \times a^3$
We get,
$= 25a^3$
Hence, $5 \times 5a^3 = 25a^3$
(v) $6 \times 6x^2 \times 6x^2y^2 = 6 \times 6 \times 6 \times x^2 \times x^2 \times y^2$
$= 216 \times x^{2+2} \times y^2$
$= 216 \times x^4 \times y^2$
We get,
$= 216x^4y^2$
Hence, $6 \times 6x^2 \times 6x^2y^2 = 216x^4y^2$

3. Find the value of:
(i) $3x^3 \times 5x^4$
(ii) $5a^2 \times 7a^7$
(iii) $3abc \times 6ac^3$
(iv) $a^2b^2 \times 5a^3b^4$

(v) $2x^2y^3 \times 5x^3y^4$

Solution:

(i) $3x^3 \times 5x^4$

$3x^3 \times 5x^4 = 3 \times 5 \times x^3 \times x^4$

$= 15 \times x^{3+4}$

We get,

$= 15 \times x^7$

$= 15x^7$

Hence, the value of $3x^3 \times 5x^4$ is $15x^7$

(ii) $5a^2 \times 7a^7$

$5a^2 \times 7a^7 = 5 \times 7 \times a^2 \times a^7$

$= 35 \times a^{2+7}$

$= 35 \times a^9$

We get,

$= 35a^9$

Hence, the value of $5a^2 \times 7a^7$ is $35a^9$

(iii) $3abc \times 6ac^3$

$3abc \times 6ac^3 = 3 \times 6 \times a \times a \times b \times c \times c^3$

$=18 \times a^{1+1} \times b \times c^{1+3}$

$= 18 \times a^2 \times b \times c^4$

We get,

$= 18a^2bc^4$

Hence, the value of $3abc \times 6ac^3$ is $18a^2bc^4$

(iv) $a^2b^2 \times 5a^3b^4$

$a^2b^2 \times 5a^3b^4 = 5 \times a^2 \times a^3 \times b^2 \times b^4$

$= 5 \times a^{2+3} \times b^{2+4}$

$= 5 \times a^5 \times b^6$

We get,

$= 5a^5b^6$

Hence, the value of $a^2b^2 \times 5a^3b^4$ is $5a^5b^6$

(v) $2x^2y^3 \times 5x^3y^4$

$2x^2y^3 \times 5x^3y^4 = 2 \times 5 \times x^2 \times x^3 \times y^3 \times y^4$

$= 10 \times x^{2+3} \times y^{3+4}$

We get,

$= 10 \times x^5 \times y^7$

$= 10x^5y^7$

Hence, the value of $2x^2y^3 \times 5x^3y^4$ is $10x^5y^7$

4. Multiply:
(i) a + b by ab
(ii) 3ab – 4b by 3ab
(iii) 2xy – 5by by 4bx
(iv) 4x + 2y by 3xy
(v) 1 + 4x by x
Solution:
(i) a + b by ab
The multiplication of a + b by ab is calculated as,
$(a + b) \times ab = a \times ab + b \times ab$
$= a^{1+1}b + ab^{1+1}$
We get,
$= a^2b + ab^2$
Hence, (a + b) by ab = $a^2b + ab^2$
(ii) 3ab – 4b by 3ab
The multiplication of 3ab – 4b by 3ab is calculated as,
$(3ab – 4b) \times 3ab = 3ab \times 3ab – 4b \times 3ab$
$= 9a^{1+1}b^{1+1} – 12ab^{1+1}$
We get,
$= 9a^2b^2 – 12ab^2$
Therefore, (3ab – 4b) by 3ab = $9a^2b^2 – 12ab^2$
(iii) 2xy – 5by by 4bx
The multiplication of 2xy – 5by by 4bx is calculated as,
$(2xy – 5by) \times 4bx = 2xy \times 4bx – 5by \times 4bx$
$= 8bx^{1+1}y – 20b^{1+1}xy$
We get,
$= 8bx^2y – 20b^2xy$
Therefore, (2xy – 5by) by 4bx = $8bx^2y – 20b^2xy$
(iv) 4x + 2y by 3xy
The multiplication of 4x + 2y by 3xy is calculated as,
$(4x + 2y) \times 3xy = 4x \times 3xy + 2y \times 3xy$
On simplification, we get
$= 12x^{1+1}y + 6xy^{1+1}$
$= 12x^2y + 6xy^2$
Therefore, (4x + 2y) by 3xy = $12x^2y + 6xy^2$
(v) 1 + 4x by x
The multiplication of (1 + 4x) by x is calculated as,
$(1 + 4x) \times x = 1 \times x + 4x \times x$
On simplification, we get

$= x + 4x^{1+1}$
$= x + 4x^2$
Therefore, $(1 + 4x)$ by $x = x + 4x^2$

5. Multiply:
(i) – x + y – z and – 2x
(ii) xy – yz and x^2yz^2
(iii) 2xyz + 3xy and – $2y^2z$
(iv) – $3xy^2$ + $4x^2y$ and – xy
(v) 4xy and – x^2y – $3x^2$ y^2
Solution:
(i) – x + y – z and – 2x
The multiplication of the given expression is calculated as,
$(- x + y – z) \times - 2x = - x \times - 2x + y \times - 2x – z \times - 2x$
On further calculation, we get
$= 2x^{1+1} – 2xy + 2xz$
$= 2x^2 – 2xy + 2xz$
Hence, the multiplication of (- x + y – z) and – 2x is $2x^2 – 2xy + 2xz$
(ii) xy – yz and x^2yz^2
The multiplication of the given expression is calculated as,
$(xy – yz) \times (x^2yz^2) = xy \times x^2yz^2 – yz \times x^2yz^2$
We get,
$= x^{1+2}y^{1+1}z^2 – x^2y^{1+1}z^{1+2}$
$= x^3y^2z^2 – x^2y^2z^3$
Hence, the multiplication of (xy – yz) and $x^2yz^2 = x^3y^2z^2 – x^2y^2z^3$
(iii) 2xyz + 3xy and – $2y^2z$
The multiplication of the given expression is calculated as,
$(2xyz + 3xy) \times - 2y^2z = 2xyz \times - 2y^2z + 3xy \times - 2y^2z$
On further calculation, we get
$= - 4xy^{1+2}z^{1+1} – 6xy^{1+2}z$
$= - 4xy^3z^2 – 6xy^3z$
Hence, the multiplication of 2xyz + 3xy and $– 2y^2z = - 4xy^3z^2 – 6xy^3z$
(iv) $– 3xy^2 + 4x^2y$ and – xy
The multiplication of the given expression is calculated as,
$(- 3xy^2 + 4x^2y) \times - xy = 3x^{1+1}y^{2+1} – 4x^{2+1}y^{1+1}$
On calculation, we get
$= 3x^2y^3 – 4x^3y^2$
Hence, the multiplication of $– 3xy^2 + 4x^2y$ and $– xy = 3x^2y^3 – 4x^3y^2$
(v) 4xy and – x^2y – $3x^2$ y^2

The multiplication of the given expression is calculated as,
$(- x^2y – 3x^2y^2) \times 4xy = - x^2y \times 4xy – 3x^2y^2 \times 4xy$
On further calculation, we get
$= - 4x^{2+1}y^{1+1} – 12x^{2+1}y^{2+1}$
$= - 4x^3y^2 – 12x^3y^3$
Hence, the multiplication of 4xy and $– x^2y – 3x^2 y^2 = - 4x^3y^2 – 12x^3y^3$

6. Multiply:
(i) 3a + 4b – 5c and 3a
(ii) – 5xy and $– xy^2 – 6x^2y$
Solution:
(i) 3a + 4b – 5c and 3a
The multiplication of the given expression is calculated as,
$(3a + 4b – 5c) \times 3a = 3a \times 3a + 4b \times 3a – 5c \times 3a$
On further calculation, we get
$= 9a^{1+1} + 12ab – 15ac$
$= 9a^2 + 12ab – 15ac$
Therefore, the multiplication of 3a + 4b – 5c and $3a = 9a^2 + 12ab – 15ac$
(ii) $– 5xy$ and $– xy^2 – 6x^2y$
The multiplication of the given expression is calculated as,
$- 5xy \times (- xy^2 – 6x^2y) = - 5xy \times - xy^2 – 5xy \times - 6x^2y$
On further calculation, we get
$= 5x^{1+1}y^{1+2} + 30x^{1+2}y^{1+1}$
$= 5x^2y^3 + 30x^3y^2$
Therefore, the multiplication of $– 5xy$ and $– xy^2 – 6x^2y = 5x^2y^3 + 30x^3y^2$

7. Multiply:
(i) x + 2 and x + 10
(ii) x + 5 and x – 3
(iii) x – 5 and x + 3
(iv) x – 5 and x – 3
(v) 2x + y and x + 3y
Solution:
(i) x + 2 and x + 10
The given expression is calculated as follows
$(x + 2) \times (x + 10) = x \times (x + 10) + 2 \times (x + 10)$
We get,
$= x^2 + 10x + 2x + 20$
$= x^2 + 12x + 20$

Hence, the multiplication of (x + 2) and (x + 10) = $x^2 + 12x + 20$
(ii) x + 5 and x – 3
The given expression is calculated as follows
(x + 5) × (x – 3) = x × (x – 3) + 5 × (x – 3)
On simplification, we get
= $x^2 – 3x + 5x – 15$
= $x^2 + 2x – 15$
Hence, the multiplication of (x + 5) and (x – 3) = $x^2 + 2x – 15$
(iii) x – 5 and x + 3
The given expression is calculated as follows
(x – 5) × (x + 3) = x × (x + 3) – 5 × (x + 3)
On further calculation, we get
= $x^2 + 3x – 5x – 15$
= $x^2 – 2x - 15$
Hence, the multiplication of (x – 5) and (x + 3) = $x^2 – 2x – 15$
(iv) x – 5 and x – 3
The given expression is calculated as,
(x – 5) × (x – 3) = x × (x – 3) – 5 × (x – 3)
On further calculation, we get
= $x^2 – 3x – 5x + 15$
= $x^2 – 8x + 15$
Hence, the multiplication of (x – 5) and (x – 3) = $x^2 – 8x + 15$
(v) 2x + y and x + 3y
The given expression is calculated as,
(2x + y) × (x + 3y) = 2x × (x + 3y) + y × (x + 3y)
On simplification, we get
= $2x^2 + 6xy + xy + 3y^2$
= $2x^2 + 7xy + 3y^2$
Hence, the multiplication of (2x + y) and (x + 3y) = $2x^2 + 7xy + 3y^2$

8. Multiply:
(i) 3abc and – $5a^2b^2c$
(ii) x – y + z and -2x
(iii) 2x – 3y – 5z and -2y
(iv) – 8xyz + 10 x^2yz^3 and xyz
(v) xyz and – $13xy^2z + 15x^2yz – 6xyz^2$
Solution:
(i) 3abc and – $5a^2b^2c$
The given expression is calculated as follows,

$3abc \times -5a^2b^2c = 3 \times -5 \times a \times a^2 \times b \times b^2 \times c \times c$
On further calculation, we get
$= -15 \times a^{1+2} \times b^{1+2} \times c^{1+1}$
$= -15 \times a^3 \times b^3 \times c^2$
$= -15a^3b^3c^2$
Therefore, the multiplication of 3abc and $-5a^2b^2c = -15a^3b^3c^2$
(ii) $x - y + z$ and -2x
The given expression is calculated as follows,
$(x - y + z) \times -2x = x \times -2x - y \times -2x + z \times -2x$
On simplification, we get
$= -2x^{1+1} + 2xy - 2xz$
$= -2x^2 + 2xy - 2xz$
Therefore, the multiplication of $x - y + z$ and $-2x = -2x^2 + 2xy - 2xz$
(iii) $2x - 3y - 5z$ and -2y
The given expression is calculated as follows,
$(2x - 3y - 5z) \times -2y = 2x \times -2y - 3y \times -2y - 5z \times -2y$
On further calculation, we get
$= -4xy + 6y^{1+1} + 10yz$
$= -4xy + 6y^2 + 10yz$
Therefore, the multiplication of $2x - 3y - 5z$ and $-2y = -4xy + 6y^2 + 10yz$
(iv) $-8xyz + 10\,x^2yz^3$ and xyz
The given expression is calculated as follows,
$(-8xyz + 10x^2yz^3) \times xyz = -8xyz \times xyz + 10x^2yz^3 \times xyz$
On further calculation, we get
$= -8x^{1+1}y^{1+1}z^{1+1} + 10x^{2+1}y^{1+1}z^{3+1}$
$= -8x^2y^2z^2 + 10x^3y^2z^4$
Therefore, the multiplication of $-8xyz + 10\,x^2yz^3$ and $xyz = -8x^2y^2z^2 + 10x^3y^2z^4$
(v) xyz and $-13xy^2z + 15x^2yz - 6xyz^2$
The given expression is calculated as follows,
$xyz \times (-13xy^2z + 15x^2yz - 6xyz^2) = xyz \times -13xy^2z + xyz \times 15x^2yz - xyz \times 6xyz^2$
On simplification, we get
$= -13x^{1+1}y^{1+2}z^{1+1} + 15x^{1+2}y^{1+1}z^{1+1} - 6x^{1+1}y^{1+1}z^{1+2}$
We get,
$= -13x^2y^3z^2 + 15x^3y^2z^2 - 6x^2y^2z^3$
Therefore, the multiplication of xyz and $-13xy^2z + 15x^2yz - 6xyz^2 = -13x^2y^3z^2 + 15x^3y^2z^2 - 6x^2y^2z^3$

9. Find the product of:
(i) xy – ab and xy + ab
(ii) 2abc – 3xy and 2abc + 3xy
(iii) a + b – c and 2a – 3b
(iv) 5x – 6y – 7z and 2x + 3y
(v) 5x – 6y – 7z and 2x + 3y + z
Solution:
(i) xy – ab and xy + ab
The product of the given expression is calculated as,
$(xy – ab) \times (xy + ab) = xy \times (xy + ab) – ab \times (xy + ab)$
On simplification, we get
$= xy \times xy + xy \times ab – ab \times xy – ab \times ab$
$= x^2y^2 + abxy – abxy – a^2b^2$
$= x^2y^2 – a^2b^2$
Hence, the product of (xy – ab) and (xy + ab) = $x^2y^2 – a^2b^2$
(ii) 2abc – 3xy and 2abc + 3xy
The product of the given expression is calculated as,
$(2abc – 3xy) \times (2abc + 3xy)$
$= 2abc \times (2abc + 3xy) – 3xy \times (2abc + 3xy)$
We get,
$= 2abc \times 2abc + 2abc \times 3xy – 3xy \times 2abc – 3xy \times 3xy$
$= 4a^2b^2c^2 + 6abcxy – 6abcxy – 9x^2y^2$
$= 4a^2b^2c^2 – 9x^2y^2$
Hence, the product of 2abc – 3xy and 2abc + 3xy = $4a^2b^2c^2 – 9x^2y^2$
(iii) a + b – c and 2a – 3b
The product of the given expression is calculated as,
$(a + b – c) \times (2a – 3b)$
$= a \times (2a – 3b) + b \times (2a – 3b) – c \times (2a – 3b)$
$= a \times 2a – a \times 3b + b \times 2a – b \times 3b – c \times 2a + c \times 3b$
$= 2a^{1+1} – 3ab + 2ab – 3b^{1+1} – 2ac + 3bc$
We get,
$= 2a^2 – ab – 3b^2 – 2ac + 3bc$
Hence, the product of a + b – c and 2a – 3b = $2a^2$ - ab – $3b^2$ – 2ac + 3bc
(iv) 5x – 6y – 7z and 2x + 3y
The product of the given expression is calculated as,
$(5x – 6y – 7z) \times (2x + 3y)$
$= (5x – 6y – 7z) \times 2x + (5x – 6y – 7z) \times 3y$
$= 5x \times 2x – 6y \times 2x – 7z \times 2x + 5x \times 3y – 6y \times 3y – 7z \times 3y$
We get,

$= 10x^2 – 12xy – 14xz + 15xy – 18y^2 – 21yz$
$= 10x^2 + 3xy – 14xz – 18y^2 – 21yz$
Hence, the product of $5x – 6y – 7z$ and $2x + 3y = 10x^2 + 3xy – 14xz – 18y^2 – 21yz$
(v) $5x – 6y – 7z$ and $2x + 3y + z$
The product of the given expression is calculated as,
$(5x – 6y – 7z) \times (2x + 3y + z)$
$= (5x – 6y – 7z) \times 2x + (5x – 6y – 7z) \times 3y + (5x – 6y – 7z) \times z$
$= 5x \times 2x – 6y \times 2x – 7z \times 2x + 5x \times 3y – 6y \times 3y – 7z \times 3y + 5x \times z – 6y \times z – 7z \times z$
We get,
$= 10x^2 – 12xy – 14xz + 15xy – 18y^2 – 21yz + 5xz – 6yz – 7z^2$
$= 10x^2 – 12xy + 15xy – 14xz + 5xz – 18y^2 – 21yz – 6yz – 7z^2$
$= 10x^2 + 3xy – 9xz – 18y^2 – 27yz – 7z^2$
Hence, the product of $5x – 6y – 7z$ and $2x + 3y + z = 10x^2 + 3xy – 9xz – 18y^2 – 27yz – 7z^2$

EXERCISE 19(D)

1. Divide:
(i) 3a by a
(ii) 15x by 3x
(iii) 16m by 4
(iv) $20x^2$ by 5x
(v) $30p^2$ by $10p^2$
Solution:
(i) 3a by a
3a ÷ a
This can be written as,
3a / a = (3 × a) / a
= 3
Hence, 3a ÷ a = 3
(ii) 15x by 3x
15x ÷ 3x
15x / 3x = (15 × x) / (3x × x)
This can be written as,
= (3 × 5 × x) / (3 × x)
We get,
= 5
Hence, 15x ÷ 3x = 5
(iii) 16m by 4
16m ÷ 4
16m / 4 = (16 × m) / 4
This can be written as,
= (4 × 4 × m) / 4
We get,
= 4m
Hence, 16m ÷ 4 = 4m
(iv) $20x^2$ by 5x
$20x^2$ ÷ 5x
$20x^2$ / 5x = (20 × x^2) / (5 × x)
This can be written as,
= (4 × 5 × x^{2-1}) / 5
= 4 × x
= 4x
Hence, $20x^2$ ÷ 5x = 4x
(v) $30p^2$ by $10p^2$

$30p^2 \div 10p^2 = (30 \times p^2) / (10 \times p^2)$
This can be written as,
$= (3 \times 10 \times p^{2-2}) / 10$
$= 3 \times p^0$
$= 3 \times 1$
$= 3$
Hence, $30p^2 \div 10p^2 = 3$

2. Simplify:
(i) $2x^5 \div x^2$
(ii) $6a^8 \div 3a^3$
(iii) $20xy \div - 5xy$
(iv) $– 24a^2b^2c^2 \div 6ab$
(v) $– 5x^2y \div xy^2$
Solution:
(i) $2x^5 \div x^2$
$= (2 \times x^5) / x^2$
$= 2 \times x^{5-2}$
$= 2 \times x^3$
We get,
$= 2x^3$
Hence, $2x^5 \div x^2 = 2x^3$
(ii) $6a^8 \div 3a^3$
$= (6 \times a^8) / (3 \times a^3)$
This can be written as,
$= (2 \times 3 \times a^{8-3}) / 3$
We get,
$= 2 \times a^5$
$= 2a^5$
Hence, $6a^8 \div 3a^3 = 2a^5$
(iii) $20xy \div - 5xy$
$= (20 \times x \times y) / (- 5 \times x \times y)$
This can be written as,
$= (4 \times 5) / - 5$
We get,
$= - 4$
Hence, $20xy \div - 5xy = - 4$
(iv) $– 24a^2b^2c^2 \div 6ab$

$= (- 24 \times a^2 \times b^2 \times c^2) / (6 \times a \times b)$
This can be written as,
$= (-4 \times 6 \times a^{2-1} \times b^{2-1} \times c^2) / 6$
We get,
$= - 4 \times a \times b \times c^2$
$= - 4abc^2$
Hence, $– 24a^2b^2c^2 \div 6ab = - 4abc^2$
(v) $– 5x^2y \div xy^2$
$= (- 5 \times x^2 \times y) / (x \times y^2)$
This can be written as,
$= (- 5 \times x^{2-1}) / y^{2-1}$
We get,
$= (- 5 \times x) / y$
$= - 5x / y$
Hence, $– 5x^2y \div xy^2 = - 5x / y$

3. Divide:
(i) (- 3m / 4) by 2m
(ii) $– 15p^6q^8$ by $- 5p^6q^7$
(iii) $– 21m^5n^7$ by $14m^2n^2$
(iv) $36a^4x^5y^6$ by $4x^2a^3y^2$
(v) $20x^3a^6$ by 5xy
Solution:
(i) (- 3m / 4) by 2m
$= - 3m / 4 \div 2m = - 3m / 4 \times 1 / 2m$
$= - (3 \times m) / (4 \times 2 \times m)$
We get,
$= - 3 / 8$
Hence, $(- 3m / 4) \div 2m = - 3 / 8$
(ii) $– 15p^6q^8$ by $- 5p^6q^7$
$- 15p^6q^8 \div - 5p^6q^7 = (- 15 \times p^6 \times q^8) / (- 5 \times p^6 \times q^7)$
This can be written as,
$= (3 \times 5 \times q^{8-7}) / 5$
We get,
$= 3 \times q$
$= 3q$
Hence, $- 15p^6q^8 \div - 5p^6q^7 = 3q$
(iii) $– 21m^5n^7$ by $14m^2n^2$
$- 21m^5n^7 \div 14m^2n^2 = (- 21 \times m^5 \times n^7) / (14 \times m^2 \times n^2)$

This can be written as,
$= (- 3 \times 7 \times m^{5-2} \times n^{7-2}) / (2 \times 7)$
$= (- 3 \times m^3 \times n^5) / 2$
We get,
$= - 3m^3n^5 / 2$
Hence, $- 21m^5n^7 \div 14m^2n^2 = - 3m^3n^5 / 2$
(iv) $36a^4x^5y^6$ by $4x^2a^3y^2$
$36a^4x^5y^6 \div 4x^2a^3y^2 = (36 \times a^4 \times x^5 \times y^6) / (4 \times x^2 \times a^3 \times y^2)$
This can be written as,
$= (4 \times 9 \times a^{4-3} \times x^{5-2} \times y^{6-2}) / 4$
$= 9 \times a^1 \times x^3 \times y^4$
We get,
$= 9ax^3y^4$
Hence, $36a^4x^5y^6 \div 4x^2a^3y^2 = 9ax^3y^4$
(v) $20x^3a^6$ by $5xy$
$20x^3a^6 \div 5xy = (20 \times x^3 \times a^6) / (5 \times x \times y)$
This can be written as,
$= (4 \times 5 \times x^{3-1} \times a^6) / (5 \times y)$
We get,
$= (4 \times x^2 \times a^6) / y$
$= 4x^2a^6 / y$
Hence, $20x^3a^6 \div 5xy = 4x^2a^6 / y$

4. Simplify:
(i) $(- 15m^5n^2) / (- 3m^5)$
(ii) $35x^4y^2 / - 15x^2y^2$
(iii) $(- 24x^6y^2) / (6x^6y)$
Solution:
(i) $(-15m^5n^2) / (- 3m^5) = (-15 \times m^5 \times n^2) / (- 3 \times m^5)$
This can be written as,
$= (3 \times 5 \times m^{5-5} \times n^2) / 3$
$= 5 \times m^0 \times n^2$
$= 5 \times 1 \times n^2$
$= 5n^2$
Hence, $(-15m^5n^2) / (- 3m^5) = 5n^2$
(ii) $35x^4y^2 / - 15x^2y^2$
$35x^4y^2 / - 15x^2y^2 = (35 \times x^4 \times y^2) / (- 15 \times x^2 \times y^2)$
This can be written as,
$= - (5 \times 7 \times x^{4-2} \times y^{2-2}) / (3 \times 5)$

$= - (7 \times x^2 \times y^0) / 3$
We get,
$= - 7x^2y / 3$
Hence, $35x^4y^2 / - 15x^2y^2 = - 7x^2y / 3$
(iii) $(- 24x^6y^2) / (6x^6y)$
$(- 24x^6y^2) / (6x^6y) = (- 25 \times x^6 \times y^2) / (6 \times x^6 \times y)$
This can be written as,
$= (- 4 \times 6 \times x^{6-6} \times y^{2-1}) / 6$
$= - 4 \times x^0 \times y^1$
$= - 4y$
Hence, $(- 24x^6y^2) / (6x^6y) = - 4y$

5. Divide:
(i) $9x^3 – 6x^2$ by $3x$
(ii) $6m^2 – 16m^3 + 10m^4$ by $– 2m$
(iii) $15x^3y^2 + 25x^2y^3 – 36x^4y^4$ by $5x^2y^2$
(iv) $36a^3x^5 – 24a^4x^4 + 18a^5x^3$ by $– 6a^3x^3$
Solution:
(i) $9x^3 – 6x^2$ by $3x$
$9x^3 – 6x^2 \div 3x = (9 \times x^3 – 6 \times x^2) / (3 \times x)$
Separating the terms, we get
$= (9 \times x^3) / (3 \times x) – (6 \times x^2) / (3 \times x)$
We get,
$= 3 \times x^{3-1} – 2 \times x^{2-1}$
$= 3x^2 – 2x$
Hence, $9x^3 – 6x^2 \div 3x = 3x^2 – 2x$
(ii) $6m^2 – 16m^3 + 10m^4$ by $– 2m$
$6m^2 – 16m^3 + 10m^4 \div - 2m = (6 \times m^2 - 16 \times m^3 + 10 \times m^4) / - 2 \times m$
Separating the terms, we get
$= (6 \times m^2 / - 2 \times m) – (16 \times m^3) / (- 2 \times m) + (10 \times m^4) / (- 2 \times m)$
$= - 3 \times m^{2-1} + 8 \times m^{3-1} – 5 \times m^{4-1}$
$= - 3 \times m + 8 \times m^2 – 5 \times m^3$
We get,
$= - 3m + 8m^2 – 5m^3$
Hence, $6m^2 – 16m^3 + 10m^4 \div - 2m = - 3m + 8m^2 – 5m^3$
(iii) $15x^3y^2 + 25x^2y^3 – 36x^4y^4$ by $5x^2y^2$
$15x^3y^2 + 25x^2y^3 – 36x^4y^4 \div 5x^2y^2 = (15x^3y^2 + 25x^2y^3 – 36x^4y^4) / (5x^2y^2)$
$= (15 \times x^3 \times y^3) / (5 \times x^2 \times y^2) + (25 \times x^2 \times y^3) / (5 \times x^2 \times y^2) – (36 \times x^4 \times y^4) / (5 \times x^2 \times y^2)$

On further calculation, we get

$= 3 \times x^{3-2} \times y^{2-2} + 5 \times x^{2-2} \times y^{3-2} – (36 \times x^{4-2} \times y^{4-2}) / 5$

We get,

$= 3 \times x^{1} \times y^{0} + 5 \times x^{0} \times y^{1} – (36 \times x^{2} \times y^{2}) / 5$

$= 3x + 5y – (36x^2y^2) / 5$

Hence, $15x^3y^2 + 25x^2y^3 – 36x^4y^4 \div 5x^2y^2 = 3x + 5y – (36x^2y^2) / 5$

(iv) $36a^3x^5 – 24a^4x^4 + 18a^5x^3$ by $– 6a^3x^3$

$36a^3x^5 – 24a^4x^4 + 18a^5x^3 \div (– 6a^3x^3) = (36a^3x^5 – 24a^4x^4 + 18a^5x^3) / - 6a^3x^3$

$= (36.a^3.x^5) / (-6.a^3.x^3) – (24.a^4.x^4) / (-6.a^3.x^3) + (18.a^5.x^3) / (-6.a^3.x^3)$

We get,

$= - 6.x^{5-3} + 4.a^{4-3}.x^{4-3} – 3.a^{5-3}$

$= - 6x^2 + 4ax – 3a^2$

Hence, $36a^3x^5 – 24a^4x^4 + 18a^5x^3 \div (– 6a^3x^3) = - 6x^2 + 4ax – 3a^2$