EXERCISE 6.2 PAGE NO: 6.5

1. Add the following algebraic expressions:
(i) $3a^2b$, $-4a^2b$, $9a^2b$
(ii) 2/3a, 3/5a, -6/5a
(iii) $4xy^2 – 7x^2y$, $12x^2y -6xy^2$, $-3x^2y + 5xy^2$
(iv) 3/2a – 5/4b + 2/5c, 2/3a - 7/2b + 7/2c, 5/3a + 5/2b – 5/4c
(v) 11/2xy + 12/5y + 13/7x, -11/2y – 12/5x – 137xy
(vi) $7/2x^3 – 1/2x^2 + 5/3$, $3/2x^3 + 7/4x^2 – x + 1/3$, $3/2x^2 -5/2x -2$
Solution:
(i) $3a^2b$, $-4a^2b$, $9a^2b$
Let us add the given expression
$3a^2b + (-4a^2b) + 9a^2b$
$3a^2b – 4a^2b + 9a^2b$
$8a^2b$

(ii) 2/3a, 3/5a, -6/5a
Let us add the given expression
2/3a + 3/5a + (-6/5a)
2/3a + 3/5a - 6/5a
Let us take LCM for 3 and 5 which is 15
(2×5)/(3×5)a + (3×3)/(5×3)a – (6×3)/(5×3)a
10/15a + 9/15a – 18/15a
(10a+9a-18a)/15
a/15

(iii) $4xy^2 – 7x^2y$, $12x^2y -6xy^2$, $-3x^2y + 5xy^2$
Let us add the given expression
$4xy^2 – 7x^2y + 12x^2y – 6xy^2 – 3x^2y + 5xy^2$
Upon rearranging
$12x^2y – 3x^2y – 7x^2y – 6xy^2 + 5xy^2 + 4xy^2$
$3xy^2 + 2x^2y$

(iv) 3/2a – 5/4b + 2/5c, 2/3a - 7/2b + 7/2c, 5/3a + 5/2b – 5/4c
Let us add the given expression
3/2a – 5/4b + 2/5c + 2/3a - 7/2b + 7/2c + 5/3a + 5/2b – 5/4c
Upon rearranging
3/2a + 2/3a + 5/3a – 5/4b - 7/2b + 5/2b + 2/5c + 7/2c – 5/4c
By taking LCM for (2 and 3 is 6), (4 and 2 is 4), (5,2 and 4 is 20)

(9a+4a+10a)/6 + (-5b-14b+10b)/4 + (8c+70c-25c)/20
23a/6 – 9b/4 + 53c/20
(v) 11/2xy + 12/5y + 13/7x, -11/2y – 12/5x – 13/7xy
Let us add the given expression
11/2xy + 12/5y + 13/7x + -11/2y – 12/5x – 13/7xy
Upon rearranging
11/2xy – 13/7xy + 13/7x – 12/5x + 12/5y -11/2y
By taking LCM for (2 and 7 is 14), (7 and 5 is 35), (5 and 2 is 10)
(11xy-12xy)/14 + (65x-84x)/35 + (24y-55y)/10
51xy/14 – 19x/35 – 31y/10

(vi) $7/2x^3 – 1/2x^2 + 5/3, 3/2x^3 + 7/4x^2 – x + 1/3, 3/2x^2$ -5/2x - 2
Let us add the given expression
$7/2x^3 – 1/2x^2 + 5/3 + 3/2x^3 + 7/4x^2 – x + 1/3 + 3/2x^2$ -5/2x – 2
Upon rearranging
$7/2x^3 + 3/2x^3 – 1/2x^2 + 7/4x^2 + 3/2x^2$ – x - 5/2x + 5/3 + 1/3 – 2
$10/2x^3 + 11/4x^2$ – 7/2x + 0/6
$5x^3 + 11/4x^2$ -7/2x

2. Subtract:
(i) -5xy from 12xy
(ii) $2a^2$ from $-7a^2$
(iii) 2a-b from 3a-5b
(iv) $2x^3 - 4x^2 + 3x + 5$ from $4x^3 + x^2 + x + 6$
(v) $2/3y^3 – 2/7y^2 – 5$ from $1/3y^3 + 5/7y^2 + y – 2$
(vi) 3/2x – 5/4y – 7/2z from 2/3x + 3/2y – 4/3z
(vii) $x^2y – 4/5xy^2 + 4/3xy$ from $2/3x^2y + 3/2xy^2$ - 1/3xy
(viii) ab/7 -35/3bc + 6/5ac from 3/5bc – 4/5ac
Solution:
(i) -5xy from 12xy
Let us subtract the given expression
12xy - (- 5xy)
5xy + 12xy
17xy

(ii) $2a^2$ from $-7a^2$
Let us subtract the given expression
$(-7a^2) - 2a^2$
$-7a^2 - 2a^2$

$-9a^2$

(iii) 2a-b from 3a-5b
Let us subtract the given expression
(3a – 5b) - (2a – b)
3a - 5b - 2a + b
a – 4b

(iv) $2x^3 - 4x^2 + 3x + 5$ from $4x^3 + x^2 + x + 6$
Let us subtract the given expression
$(4x^3 + x^2 + x + 6) - (2x^3 – 4x^2 + 3x + 5)$
$4x^3 + x^2 + x + 6 - 2x^3 + 4x^2 – 3x – 5$
$2x^3 + 5x^2 – 2x + 1$

(v) $2/3y^3 – 2/7y^2 – 5$ from $1/3y^3 + 5/7y^2 + y – 2$
Let us subtract the given expression
$1/3y^3 + 5/7y^2 + y – 2 – 2/3y^3 + 2/7y^2 + 5$
Upon rearranging
$1/3y^3 – 2/3y^3 + 5/7y^2 + 2/7y^2 + y – 2 + 5$
By grouping similar expressions we get,
$-1/3y^3 + 7/7y^2 + y + 3$
$-1/3y^3 + y^2 + y + 3$

(vi) 3/2x – 5/4y – 7/2z from 2/3x + 3/2y – 4/3z
Let us subtract the given expression
2/3x + 3/2y – 4/3z – (3/2x – 5/4y – 7/2z)
Upon rearranging
2/3x – 3/2x + 3/2y + 5/4y – 4/3z + 7/2z
By grouping similar expressions we get,
LCM for (3 and 2 is 6), (2 and 4 is 4), (3 and 2 is 6)
(4x-9x)/6 + (6y+5y)/4 + (-8z+21z)/6
-5x/6 + 11y/4 + 13z/6

(vii) $x^2y – 4/5xy^2 + 4/3xy$ from $2/3x^2y + 3/2xy^2 - 1/3xy$
Let us subtract the given expression
$2/3x^2y + 3/2xy^2 – 1/3xy – (x^2y – 4/5xy^2 + 4/3xy)$
Upon rearranging
$2/3x^2y – x^2y + 3/2xy^2 + 4/5xy^2 – 1/3xy – 4/3xy$
By grouping similar expressions we get,

LCM for (3 and 1 is 3), (2 and 5 is 10), (3 and 3 is 3)
$-1/3x^2y + 23/10xy^2 – 5/3xy$

(viii) ab/7 -35/3bc + 6/5ac from 3/5bc – 4/5ac
Let us subtract the given expression
3/5bc – 4/5ac – (ab/7 – 35/3bc + 6/5ac)
Upon rearranging
3/5bc + 35/3bc – 4/5ac – 6/5ac – ab/7
By grouping similar expressions we get,
LCM for (5 and 3 is 15), (5 and 5 is 5)
(9bc+175bc)/15 + (-4ac-6ac)/5 – ab/7
184bc/15 + -10ac/5 – ab/7
– ab/7 + 184bc/15 – 2ac

3. Take away:
(i) $6/5x^2 - 4/5x^3 + 5/6 + 3/2x$ from $x^3/3 – 5/2x^2 + 3/5x + 1/4$
(ii) $5a^2/2 + 3a^3/2 + a/3 – 6/5$ from $1/3a^3 – 3/4a^2 – 5/2$
(iii) $7/4x^3 + 3/5x^2 + 1/2x + 9/2$ from $7/2 – x/3 – x^2/5$
(iv) $y^3/3 + 7/3y^2 + 1/2y + 1/2$ from $1/3 – 5/3y^2$
(v) 2/3ac – 5/7ab + 2/3bc from 3/2ab -7/4ac – 5/6bc
Solution:
(i) $6/5x^2 - 4/5x^3 + 5/6 + 3/2x$ from $x^3/3 – 5/2x^2 + 3/5x + 1/4$
Let us subtract the given expression
$1/3x^3 – 5/2x^2 + 3/5x + 1/4 – (6/5x^2 – 4/5x^3 + 5/6 + 3/2x)$
Upon rearranging
$1/3x^3 + 4/5x^3 – 5/2x^2 – 6/5x^2 + 3/5x – 3/2x + 1/4 – 5/6$
By grouping similar expressions we get,
LCM for (3 and 5 is 15), (2 and 5 is 10), (5 and 2 is 10), (4 and 6 is 24)
$17/15x^3 – 37/10x^2 – 9/10x – 14/24$
$17/15x^3 – 37/10x^2 – 9/10x – 7/12$

(ii) $5a^2/2 + 3a^3/2 + a/3 – 6/5$ from $1/3a^3 – 3/4a^2 – 5/2$
Let us subtract the given expression
$1/3a^3 – 3/4a^2 – 5/2 – (5/2a^2 + 3/2a^3 + a/3 – 6/5)$
Upon rearranging
$1/3a^5 – 3/2a^3 – 3/4a^2 – 5/2a^2 – a/3 – 5/2 + 6/5$
By grouping similar expressions we get,
LCM for (3 and 2 is 6), (4 and 2 is 4), (2 and 5 is 10)

$(2a^3 – 9a^3)/6 – (3a^2 + 10a^2)/4 – a/3 + (-25+12)/10$
$-7/6a^3 – 13/4a^2 – a/3 – 13/10$

(iii) $7/4x^3 + 3/5x^2 + 1/2x + 9/2$ from $7/2 – x/3 – x^2/5$
Let us subtract the given expression
$7/2 – x/3 – 1/5x^2 – (7/4x^3 + 3/5x^2 + 1/2x + 9/2)$
Upon rearranging
$-7/4x^3 – 1/5x^2 – 3/5x^2 - x/3 – x/2 + 7/2 – 9/2$
By grouping similar expressions we get,
LCM for (3 and 2 is 6)
$-7/4x^3 – 4/5x^2 - (2x-3x)/6 + (7-9)/2$
$-7/4x^3 – 4/5x^2 – 5/6x – 1$

(iv) $y^3/3 + 7/3y^2 + 1/2y + 1/2$ from $1/3 – 5/3y^2$
Let us subtract the given expression
$1/3 – 5/3y^2 – (1/3y^3 + 7/3y^2 + 1/2y + 1/2)$
Upon rearranging
$-1/3y^3 – 5/3y^2 – 7/3y^2 – 1/2y + 1/3 – 1/2$
By grouping similar expressions we get,
LCM for (3 and 3 is 3), (3 and 2 is 6)
$-1/3y^3 + (-5y^2 – 7y^2)/3 – 1/2y + (2-3)/6$
$-1/3y^3 – 12/3y^2 – 1/2y – 1/6$

(v) $2/3ac – 5/7ab + 2/3bc$ from $3/2ab -7/4ac – 5/6bc$
Let us subtract the given expression
$3/2ab – 7/4ac – 5/6bc – (2/3ac – 5/7ab + 2/3bc)$
Upon rearranging
$3/2ab + 5/7ab – 7/4ac – 2/3ac – 5/6bc – 2/3bc$
By grouping similar expressions we get,
LCM for (2 and 7 is 14), (4 and 3 is 12), (6 and 3 is 6)
$(21ab+10ab)/14 – (21ac-8ac)/12 – (5bc-4bc)/6$
$31/14ab – 29/12ac – 3/2bc$

4. Subtract 3x - 4y - 7z from the sum of x - 3y + 2z and -4x + 9y - 11z.
Solution:
The sum of $x – 3y + 2z$ and $-4x + 9y – 11z$ is
$(x – 3y + 2z) + (-4x + 9y – 11z)$
Upon rearranging
$x – 4x – 3y + 9y + 2z – 11z$

-3x + 6y - 9z
Now, Let us subtract the given expression from -3x + 6y – 9z
(-3x + 6y - 9z) – (3x – 4y – 7z)
Upon rearranging
-3x – 3x + 6y + 4y – 9z + 7z
-6x + 10y – 2z

5. Subtract the sum of $3l - 4m - 7n^2$ and $2l + 3m - 4n^2$ from the sum of $9l + 2m - 3n^2$ and $-3l + m + 4n^2$….
Solution:
Sum of $3l – 4m – 7n^2$ and $2l + 5m – 4n^2$
$3l – 4m – 7n^2 + 2l + 3m – 4n^2$
Upon rearranging
$3l + 2l – 4m + 3m – 7n^2 – 4n^2$
$5l - m – 11n^2$ ……..equation (1)
Sum of $9l + 2m – 3n^2$ and $-3l + m + 4n^2$
$9l + 2m – 3n^2 + (-3l + m + 4n^2)$
Upon rearranging
$9l – 3l + 2m + m – 3n^2 + 4n^2$
$6l + 3m + n^2$ …….equation (2)
Let us subtract equation (i) from (ii), we get
$6l + 3m + n^2 – (5l - m – 11n^2)$
Upon rearranging
$6l – 5l + 3m + m + n^2 + 11n^2$
$l + 4m + 12n^2$

6. Subtract the sum of $2x - x^2 + 5$ and $-4x – 3 + 7x^2$ from 5.
Solution:
Sum of $2x - x^2 + 5$ and $-4x – 3 + 7x^2$ is
$2x - x^2 + 5 + (-4x – 3 + 7x^2)$
$2x - x^2 + 5 - 4x – 3 + 7x^2$
Upon rearranging
$- x^2 + 7x^2 + 2x - 4x + 5 – 3$
$6x^2 -2x + 2$ ……equation (i)
Let us subtract equation (i) from 5 we get,
$5 – (6x^2 -2x + 2)$
$5 – 6x^2 + 2x – 2$
$3 + 2x – 6x^2$

7. Simplify each of the following:

(i) $x^2 – 3x + 5 – 1/2(3x^2 - 5x + 7)$

(ii) [5 – 3x + 2y – (2x - y)] – (3x – 7y + 9)

(iii) $11/2x^2y – 9/4xy^2 + 1/4xy – 1/14y^2x + 1/15yx^2 + 1/2xy$

(iv) $(1/3y^2 – 4/7y + 11) – (1/7y – 3 + 2y^2) – (2/7y – 2/3y^2 + 2)$

(v) $-1/2a^2b^2c + 1/3ab^2c – 1/4abc^2 – 1/5cb^2a^2 + 1/6cb^2a – 1/7c^2ab + 1/8ca^2b$

Solution:

(i) $x^2 – 3x + 5 – 1/2(3x^2 - 5x + 7)$

Upon rearranging

$x^2 – 3/2x^2 – 3x + 5/2x + 5 – 7/2$

By grouping similar expressions we get,

LCM for (1 and 2 is 2)

$(2x^2 – 3x^2)/2 - (6x + 5x)/2 + (10-7)/2$

$-1/2x^2 – 1/2x + 3/2$

(ii) [5 – 3x + 2y – (2x - y)] – (3x – 7y + 9)

5 – 3x + 2y – 2x + y – 3x + 7y – 9

Upon rearranging

– 3x – 2x – 3x + 2y + y + 7y + 5 – 9

By grouping similar expressions we get,

-8x + 10y – 4

(iii) $11/2x^2y – 9/4xy^2 + 1/4xy – 1/14y^2x + 1/15yx^2 + 1/2xy$

Upon rearranging

$11/2x^2y + 1/15x^2y – 9/4xy^2 – 1/14xy^2 + 1/4xy + 1/2xy$

By grouping similar expressions we get,

LCM for (2 and 15 is 30), (4 and 14 is 56), (4 and 2 is 4)

$(165x^2y + 2x^2y)/30 + (-126xy^2 – 4xy^2)/56 + (xy + 2xy)/4$

$167/30x^2y – 130/56xy^2 + 3/4xy$

$167/30x^2y – 65/28xy^2 + 3/4xy$

(iv) $(1/3y^2 – 4/7y + 11) – (1/7y – 3 + 2y^2) – (2/7y – 2/3y^2 + 2)$

Upon rearranging

$1/3y^2 – 2y^2 – 2/3y^2 – 4/7y – 1/7y – 2/7y + 11 + 3 – 2$

By grouping similar expressions we get,

LCM for (3, 1 and 3 is 3), (7, 7 and 7 is 7)

$(y^2 – 6y^2 + 2y^2)/3 - (4y – y – 2y)/7 + 12$

$-3/3y^2 – 7/7y + 12$

$-y^2 – y + 12$

(v) $-1/2a^2b^2c + 1/3ab^2c – 1/4abc^2 – 1/5cb^2a^2 + 1/6cb^2a – 1/7c^2ab + 1/8ca^2b$

Upon rearranging

$-1/2a^2b^2c – 1/5a^2b^2c + 1/3ab^2c + 1/6ab^2c – 1/4abc^2 – 1/7abc^2 + 1/8a^2bc$

By grouping similar expressions we get,

LCM for (2 and 5 is 10), (3 and 6 is 6), (4 and 7 is 28)

$-7/10a^2b^2c + 1/2ab^2c – 11/28abc^2 + 1/8a^2bc$