EXERCISE 6A

Add:

1. **8ab, -5ab, 3ab, -ab**
2. **7x, -3x, 5x, -x, -3x**
3. **3a-3b+4c, 2a+3b-8c, a-6b+c**
4. **5x-8y+2z, 3z-4y-2x, 6y-z-x and 3x-2z-3y**
5. **6ax-2by+3cz, 6by-11ax-cz and 10cz-2ax-3by**
6. **$2x^3-9x^2+8$, $3x^2-6x-5$, $7x^3-10x+1$ and $3+2x-5x^2-4x^3$**
7. **6p+4q-r+3, 2r-5p-6, 11q-7p+2r-1 and 2q-3r+4**
8. **$4x^2-7xy+4y^2-3$, $5+6y^2-8xy+x^2$ and $6-2xy+2x^2-5y^2$**

Solution:

1. Given 8ab, -5ab, 3ab, -ab

   To add the given expression we have arrange them column wise is given below:

   8 ab
   -5 ab
   3 ab
   -ab
   5 ab

2. Given 7x,-3x, 5x, -x, -2x

   To add the given expression we have arrange them column wise is given below:

   7x
   -3x
   5x
   -x
   -2x
   6 x

3. Given 3a-3b+4c, 2a+3b-8c, a-6b+c

   To add the given expression we have arrange them column wise is given below:

   3a-3b+4c
   2a+3b-8c
   a-6b+c
   6a-6b-3c

4. Given 5x-8y+2z, 3z-4y-2x, 6y-z-x and 3x-2z-3y

   To add the given expression we have arrange them column wise is given below:

   5x-8y+2z
   -2x-4y+3z
   -x+6y-z

3x – 3y – 2z

5x-9y+2z

5. Given 6ax-2by+3cz, 6by-11ax-cz and 10cz-2ax-3by
   To add the given expression we have arrange them column wise is given below:
   6ax-2by+3cz
   -11ax+6by-cz
   -2ax-3by+10cz
   -7ax+by+12cz

6. Given $2x^3-9x^2+8$, $3x^2-6x-5$, $7x^3-10x+1$ and $3+2x-5x^2-4x^3$
   To add the given expression we have arrange them column wise is given below:
   $2x^3-9x^2+8$
   $7x^3-10x+1$
   $3x^2-6x-5$
   $-4x^3-5x^2+2x+3$
   $5x^3-11x^2-14x+7$

7. Given 6p+4q-r+3, 2r-5p-6, 11q-7p+2r-1 and 2q-3r+4
   To add the given expression we have arrange them column wise is given below:
   6p+4q-r+3
   -7p+11q+2r-1
   -5p+2r-6
   2q-3r+4
   -6p+17q

8. Given $4x^2-7xy+4y^2-3$, $5+6y^2-8xy+x^2$ and $6-2xy+2x^2-5y^2$
   To add the given expression we have arrange them column wise is given below:
   $4x^2-7xy+4y^2-3$
   $x^2-8xy+6y^2+5$
   $2x^2-2xy-5y^2+6$
   $7x^2+5y^2-17xy+8$

Subtract:

9. $3a^2b$ from $-5a^2b$
10. -8pq from 6pq
11.-2abc from -8abc
12.-16p from -11p
13. 2a-5b+2c-9 from 3a-4b-c+6

Solution:

9. Given $3a^2b$ from $-5a^2b$

According to the rules of subtraction of algebraic equations, we have both expressions with negative sign so we have to add the expressions.

Now arrange the variables in rows
and columns we get

$-5a^2b$
$3a^2b$
-

$-8\,a^2b$

And we have to keep big numerical sign

10. Given -8pq from 6pq

According to the rules of subtraction of algebraic equations, we have negative sign will becomes positive and so we have to keep the big numerical sign.
Now arrange the variables in rows and columns we get

6pq
- 8pq
+

+14 pq

11. Given -2abc from -8abc

According to the rules of subtraction of algebraic equations, we have negative sign will becomes positive and so we have to keep the big numerical sign.
Now arrange the variables in rows and columns we get
- 8abc – (-2abc) = - 8abc + 2abc = + 6abc

-8abc
-2abc
+

+6 abc

12. Given -16p from -11p

According to the rules of subtraction of algebraic equations, we have negative sign will becomes positive and so we have to keep the big numerical sign.
Now arrange the variables in rows and columns we get
-11p – (-16p) = - 11p + 16p = +5p

-16p
-11p
+

+ 5p

13. Given 2a-5b+2c-9 from 3a-4b-c+6

According to the rules of subtraction of algebraic equations, we have negative sign will becomes

positive and so we have to keep the
big numerical sign.
Now arrange the variables in rows and columns we get

3a-4b-c+6
2a-5b+2c-9
- + - +

+ a+b-3c+15

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Find each of the following products:

1. **$(5x + 7) \times (3x + 4)$**
2. **$(4x + 9) \times (x - 6)$**
3. **$(2x + 5) \times (4x - 3)$**
4. **$(3y - 8) \times (5y - 1)$**
5. **$(7x + 2y) \times (x + 4y)$**
6. **$(9x + 5y) \times (4x + 3y)$**
7. **$(3m - 4n) \times (2m - 3n)$**
8. **$(x^2 - a^2) \times (x - a)$**
9. **$(x^2 - y^2) \times (x + 2y)$**
10. **$(3p^2 + q^2) \times (x^2 - y^2)$**
11. **$(2x^2 - 5y^2) \times (x^2 + 3y^2)$**
12. **$(x^3 - y^3) \times (x^2 + y^2)$**
13. **$(x^4 + y^4) \times (x^2 - y^2)$**
14. **$(x^4 + (1/x^4)) \times (x + (1/x))$**

Solution:

1. Given $(5x + 7) \times (3x + 4)$

To find the product of given expression we have to use horizontal method.
In that we have to multiply each term of one expression with each term of another Expression so by multiplying we get,

$(5x + 7) \times (3x + 4)$
$\Rightarrow 5x (3x + 4) + 7 (3x + 4)$
$\Rightarrow 15x^2 + 20x + 21x + 28$
$\Rightarrow 15x^2 + 41x + 28$

2. Given $(4x + 9) \times (x - 6)$

To find the product of given expression we have to use horizontal method.
In that we have to multiply each term of one expression with each term of another Expression so by multiplying we get,

$(4x + 9) \times (x - 6)$
$\Rightarrow 4x (x - 6) + 9 (x - 6)$
$\Rightarrow 4x^2 - 24x + 9x - 54$
$\Rightarrow 4x^2 - 15x - 54$

3. Given $(2x + 5) \times (4x - 3)$

To find the product of given expression we have to use horizontal method.
In that we have to multiply each term of one expression with each term of another

Expression so by multiplying we get,

$(2x + 5) \times (4x - 3)$

$\Rightarrow 2x (4x - 3) + 5 (4x - 3)$

$\Rightarrow 8x^2 - 6x + 20x - 15$

$\Rightarrow 8x^2 + 14x - 15$

4. Given $(3y - 8) \times (5y - 1)$

To find the product of given expression we have to use horizontal method.
In that we have to multiply each term of one expression with each term of another Expression so by multiplying we get,

$(3y - 8) \times (5y - 1)$

$\Rightarrow 3y (5y - 1) - 8 (5y - 1)$

$\Rightarrow 15y^2 - 3y - 40y + 8$

$\Rightarrow 15y^2 - 43y + 8$

5. Given $(7x + 2y) \times (x + 4y)$

To find the product of given expression we have to use horizontal method.
In that we have to multiply each term of one expression with each term of another Expression so by multiplying we get,

$(7x + 2y) \times (x + 4y)$

$\Rightarrow 7x (x + 4y) + 2y (x + 4y)$

$\Rightarrow 7x^2 + 28xy + 2yx + 8y^2$

$\Rightarrow 7x^2 + 30xy + 8y^2$

6. Given $(9x + 5y) \times (4x + 3y)$

To find the product of given expression we have to use horizontal method.
In that we have to multiply each term of one expression with each term of another Expression so by multiplying we get,

$(9x + 5y) \times (4x + 3y)$

$\Rightarrow 9x (4x + 3y) + 5y (4x + 3y)$

$\Rightarrow 36x^2 + 27xy + 20yx + 15y^2$

$\Rightarrow 36x^2 + 47x + 15 y^2$

7. Given $(3m - 4n) \times (2m - 3n)$

To find the product of given expression we have to use horizontal method.
In that we have to multiply each term of one expression with each term of another Expression so by multiplying we get,

$(3m - 4n) \times (2m - 3n)$

$\Rightarrow 3m (2m - 3n) - 4n (2m - 3n)$

$\Rightarrow 6m^2 - 9mn - 8mn + 12n^2$

$\Rightarrow 6m^2 - 17mn + 12 n^2$

8. Given $(x^2 - a^2) \times (x-a)$

To find the product of given expression we have to use horizontal method.
In that we have to multiply each term of one expression with each term of another Expression so by multiplying we get,

$(x^2 - a^2) \times (x-a)$

$\Rightarrow x^2(x-a) - a^2(x-a)$

$\Rightarrow x^3 - ax^2 - a^2x + a^3$

9. Given $(x^2-y^2) \times (x + 2y)$

To find the product of given expression we have to use horizontal method.
In that we have to multiply each term of one expression with each term of another Expression so by multiplying we get,

$(x^2-y^2) \times (x + 2y)$

$\Rightarrow x^2(x + 2y) - y^2(x + 2y)$

$\Rightarrow x^3 + 2x^2y - xy^2 - 2y^3$

10. Given $(3p^2+q^2) \times (2p^2-3q^2)$

To find the product of given expression we have to use horizontal method.
In that we have to multiply each term of one expression with each term of another Expression so by multiplying we get,

$(3p^2+q^2) \times (2p^2-3q^2)$

$\Rightarrow 3p^2 (2p^2-3q^2) + q^2 (2p^2-3q^2)$

$\Rightarrow 6p^4 - 7p^2q^2 - 3q^4$

11. Given $(2x^2-5y^2) \times (x^2+3y^2)$

To find the product of given expression we have to use horizontal method.
In that we have to multiply each term of one expression with each term of another Expression so by multiplying we get,

$(2x^2-5y^2) \times (x^2+3y^2)$

$\Rightarrow 2x^2 (x^2+3y^2) - 5y^2(x^2+3y^2)$

$\Rightarrow 2x^4 + x^2y^2 - 15y^4$

12. Given $(x^3-y^3) \times (x^2 + y^2)$

To find the product of given expression we have to use horizontal method.
In that we have to multiply each term of one expression with each term of another Expression so by multiplying we get,

$(x^3-y^3) \times (x^2 + y^2)$

$\Rightarrow x^3 (x^2 + y^2) - y^3(x^2 + y^2)$

$\Rightarrow x^5 + x^3y^2 - x^2y^3 - y^5$

13. Given $(x^4+y^4) \times (x^2 - y^2)$

To find the product of given expression we have to use horizontal method.
In that we have to multiply each term of one expression with each term of another

Expression so by
multiplying we get,
$(x^4+y^4) \times (x^2 - y^2)$
$\Rightarrow x^4 (x^2 - y^2) + y^4(x^2 - y^2)$
$\Rightarrow x^6 - x^4y^2 + x^2y^4 - y^6$

14. Given $(x^4+(1/x^4) \times (x + (1/x))$
To find the product of given expression we have to use horizontal method.
In that we have to multiply each term of one expression with each term of another
Expression so by multiplying we get,
$(x^4+(1/x^4) \times (x + (1/x))$
$\Rightarrow x^4(x + (1/x)) + (1/x^4) (x + (1/x))$
$\Rightarrow x^5+x^3+(1/x^3)+(1/x^5)$

Find each of the following products:

15. $(x^2 -3x + 7) \times (2x + 3)$
16. $(3x^2 + 5x - 9) \times (3x - 5)$
17. $(x^2 - xy + y^2) \times (x + y)$
18. $(x^2 + xy + y^2) \times (x - y)$

Solution:

15. Given $(x^2 -3x + 7) \times (2x + 3)$
To find the product of given expression we have to use horizontal method.
In that we have to multiply each term of one expression with each term of another
Expression so by multiplying we get,
$(x^2 -3x + 7) \times (2x + 3)$
$\Rightarrow 2x (x^2 -3x + 7) + 3 (x^2 -3x + 7)$
$\Rightarrow 2x^3 - 6x^2 + 14x + 3x^2 - 9x +21$
$\Rightarrow 2x^3 - 3x^2 +5x +21$

16. Given $(3x^2 + 5x - 9) \times (3x - 5)$
To find the product of given expression we have to use horizontal method.
In that we have to multiply each term of one expression with each term of another
Expression so by multiplying we get,
$(3x^2 + 5x - 9) \times (3x - 5)$
$\Rightarrow 3x (3x^2 + 5x - 9) - 5 (3x^2 + 5x - 9)$
$\Rightarrow 9x^3 + 15x^2 - 27x - 15x^2 - 25x +45$
$\Rightarrow 9x^3 - 52x +45$

17. Given $(x^2 - xy + y^2) \times (x + y)$
To find the product of given expression we have to use horizontal method.

In that we have to
multiply each term of one expression with each term of another
Expression so by multiplying we get,

$(x^2 - xy + y^2) \times (x + y)$

$\Rightarrow x (x^2 - xy + y^2) + y (x^2 + xy + y^2)$

$\Rightarrow x^3 - x^2y - y^2x + x^2y + y^2x + y^3$

$\Rightarrow (x^3 + y^3)$

18. Given $(x^2 + xy + y^2) \times (x - y)$

To find the product of given expression we have to use horizontal method.

In that we have to multiply each term of one expression with each term of another
Expression so by multiplying we get,

$(x^2 + xy + y^2) \times (x - y)$

$\Rightarrow x (x^2 + xy + y^2) - y (x^2 + xy + y^2)$

$\Rightarrow x^3 + x^2y + y^2x - x^2y - y^2x + y^3$

$\Rightarrow (x^3 - y^3)$

EXERCISE 6C

1. Divide:

(i) $24x^2y^3$ by 3xy

(ii) $36xyz^2$ by -9xz

(iii) $-72x^2y^2z$ by -12xyz

(iv) $-56mnp^2$ by 7mnp

Solution:

(i) Given $24x^2y^3$ by 3xy

$\Rightarrow 24x^2y^3 / (3xy)$

On dividing monomial by a monomial we have divide same variables of each Expressions

On simplifying we get,

$\Rightarrow 8xy^2$

(ii) Given $36xyz^2$ by -9xz

$\Rightarrow 36xyz^2 / (-9xz)$

On dividing monomial by a monomial we have divide same variables of each Expressions

On simplifying we get

$\Rightarrow -4yz$

(iii) Given $-72x^2y^2z$ by -12xyz

$\Rightarrow -72x^2y^2z / (-12xyz)$

On dividing monomial by a monomial we have divide same variables of each Expressions

On simplifying we get

$\Rightarrow 6xy$

(iv) Given $-56mnp^2$ by 7mnp

$\Rightarrow -56mnp^2 / (7mnp)$

On dividing monomial by a monomial we have divide same variables of each Expressions

On simplifying we get

$\Rightarrow -8p$

2. Divide:

(i) $5m^3-30m^2+45m$ by 5m

(ii) $8x^2y^2-6xy^2+10x^2y^3$ by 2xy

(iii) $9x^2y-6xy+12xy^2$ by -3xy

(iv) $12x^2+8x^3-6x^2$ by $-2x^2$

Solution:

(i) Given $5m^3-30m^2+45m$ by 5m

$\Rightarrow -5m^3-30m^2+45m / (5m)$

On dividing polynomial by a monomial we have divide every variables of polynomial By monomial

On simplifying we get

$\Rightarrow m^2-6m+9$

(ii) Given $8x^2y^2-6xy^2+10x^2y^3$ by 2xy

$\Rightarrow 8x^2y^2-6xy^2+10x^2y^3/ (2xy)$

On dividing polynomial by a monomial we have divide every variables of polynomial By monomial

On simplifying we get

$\Rightarrow 4xy-3y+5xy^2$

(iii) Given $9x^2y-6xy+12xy^2$ by -3xy

$\Rightarrow 9x^2y-6xy+12xy^2 / (-3xy)$

On dividing polynomial by a monomial we have divide every variables of polynomial By monomial

On simplifying we get

$\Rightarrow -3x + 2 - 4y$

(iv) Given $12x^2 + 8x^3-6x^2$ by $-2x^2$

$\Rightarrow 12x^2 + 8x^3-6x^2/ (-2x^2)$

On dividing polynomial by a monomial we have divide every variables of polynomial By monomial

On simplifying we get

$\Rightarrow -6x^2 -4x + 3$

Write the quotient and remainder when we divide:

3. (x^2-4x+4) by $(x-2)$

4. (x^2-4) by $(x+2)$

5. $(x^2+12x+35)$ by $(x+7)$

6. $(15x^2+x-6)$ by $(3x+2)$

7. $(14x^2-53x+45)$ by $(7x-9)$

Solution:

3. Given (x^2-4x+4) by $(x-2)$

On dividing polynomial by a binomial we have divide every variables of polynomial By binomial we get

```
         x − 2
x − 2 ) x² − 4x + 4
        x² − 2x
       −    +
        ----------
           − 2x + 4
           − 2x + 4
           +     −
           --------
                ×
           --------
```

Here quotient is x-2 and remainder is 0

4. Given (x^2-4) by (x+2)

On dividing polynomial by a binomial we have divide every variables of polynomial By binomial

```
         x − 2
x + 2 ) x² − 4
        x² + 2x
        −   −
        --------
           − 2x − 4
           − 2x − 4
           +     +
        -----------
                ×
        -----------
```

Here quotient is x-2 and remainder is 0

5. Given (x^2+12x+35) by (x+7)

On dividing polynomial by a binomial we have divide every variables of polynomial By binomial

```
          x + 5
x + 7 ) x² + 12x + 35
        x² + 7x
       −    −
       -------------
            5x + 35
            5x + 35
            −    −
           ---------
                ×
           ---------
```

Here quotient is x+5 and remainder is 0

6. Given ($15x^2$+x-6) by (3x+2)

On dividing polynomial by a binomial we have divide every variables of polynomial By binomial

$$
\begin{array}{r|l}
 & 5x-3 \\
\hline
3x+2 & 15x^2+x-6 \\
 & 15x^2+10x \\
 & - \quad - \\
\hline
 & -9x-6 \\
 & -9x-6 \\
 & + \quad + \\
\hline
 & \times
\end{array}
$$

Here quotient is 5x-3 and remainder is 0

7. Given ($14x^2$-53x+45) by (7x-9)

On dividing polynomial by a binomial we have divide every variables of polynomial By binomial

$$
\begin{array}{r|l}
 & 2x-5 \\
\hline
7x-9 & 14x^2-53x+45 \\
 & 14x^2-18x \\
 & - \quad + \\
\hline
 & -35x+45 \\
 & -35x+45 \\
 & + \quad - \\
\hline
 & \times
\end{array}
$$

Here quotient is 2x-5 and remainder is 0

EXERCISE 6D

1. **Find each of the following products:**

   (i) $(x + 6)(x + 6)$

   (ii) $(4x + 5y)(4x + 5y)$

   (iii) $(7a + 9b)(7a + 9b)$

   (iv) $((2/3)x + (4/5)y)((2/3)x + (4/5)y)$

   (v) $(x^2+7)(x^2+7)$

   (vi) $((5/6)a^2+2)((5/6)a^2+2)$

Solution:

(i) Given that $(x + 6)(x + 6)$

But we can write the given expression as $(x + 6)(x + 6) = (x + 6)^2$

But we have $(a + b)^2=a^2+2ab+b^2$

On applying above identity in the given expression we get,

$(x + 6)^2= x^2+2 x (6) + 6^2$

$(x + 6)^2= x^2+12 x + 36$

(ii) Given that $(4x + 5y)(4x + 5y)$

But we can write the given expression as $(4x + 5y)(4x + 5y) = (4x + 5y)^2$

But we have $(a + b)^2=a^2+2ab+b^2$

On applying above identity in the given expression we get,

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

$(4x + 5y)^2= 16x^2+40 xy + 25y^2$

(iii) Given that $(7a + 9b)(7a + 9b)$

But we can write the given expression as $(7a + 9b)(7a + 9b) = (7a + 9b)^2$

But we have $(a + b)^2=a^2+2ab+b^2$

On applying above identity in the given expression we get,

$(7a + 9b)^2= (7a)^2+2 (7a)(9b) + (9b)^2$

$(7a + 9b)^2= 49a^2+126 ab + 81b^2$

(iv) Given that $((2/3)x + (4/5)y)((2/3)x + (4/5)y)$

But we can write the given expression as

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

But we have $(a + b)^2=a^2+2ab+b^2$

On applying above identity in the given expression we get,

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

$((2/3)x + (4/5)y)^2= (4/9)x^2 + (16/15)xy + (16/25)y^2$

(v) Given that $(x^2+7)(x^2+7)$

But we can write the given expression as
$(x^2+7)(x^2+7)= (x^2+7)^2$
But we have $(a + b)^2=a^2+2ab+b^2$
On applying above identity in the given expression we get,
$(x^2+7)^2= (x^2)^2+2((x^2)(7) + (7)^2$
$(x^2+7)^2= x^4+14x^2 + 49$

(vi) Given that $((5/6)a^2+2)((5/6)a^2+2)$
But we can write the given expression as
$((5/6)a^2+2)((5/6)a^2+2)= ((5/6)a^2+2)^2$
But we have $(a + b)^2=a^2+2ab+b^2$
On applying above identity in the given expression we get,
$((5/6)a^2+2)^2= ((5/6)a^2)^2+2((5/6)a^2)(2) + (2)^2$
$((5/6)a^2+2)^2= (25/36)a^4 + (10/3)a^2 + 4$

2. Find each of the following products:

(i) $(x - 4)(x - 4)$
(ii) $(2x-3y)(2x-3y)$
(iii) $((3/4)x - (5/6)y)((3/4)x + (5/6)y)$
(iv) $(x - (3/x))(x - (3/x))$
(v) $((1/3)x^2 - 9)((1/3)x^2 - 9)$
(vi) $((1/2)y^2 – (1/3)y)((1/2)y^2 – (1/3)y)$

Solution:

(i) Given $(x - 4)(x - 4)$
But we can write the given expression as $(x - 4)(x -4) = (x - 4)^2$
But we have $(a - b)^2=a^2-2ab+b^2$
On applying above identity in the given expression we get,
$(x - 4)^2= x^2-2x(4) + 4^2$
$(x - 4)^2= x^2-8x + 16$

(ii) Given $(2x-3y)(2x-3y)$
But we can write the given expression as $(2x – 3y)(2x -3y) = (2x – 3y)^2$
But we have $(a - b)^2=a^2-2ab+b^2$
On applying above identity in the given expression we get,
$(2x – 3y)^2= 4x^2-2(2x)(3y) + 9y^2$
$(2x – 3y)^2= 4x^2-12xy + 9y^2$

(iii) Given that $((3/4)x - (5/6)y)((3/4)x + (5/6)y)$
But we can write the given expression as
$((3/4)x - (5/6)y)((3/4)x + (5/6)y)= ((3/4)x - (5/6)y)^2$
But we have $(a - b)^2=a^2-2ab+b^2$

On applying above identity in the given expression we get,
$((3/4)\ x - (5/6)\ y)^2 = ((3/4)\ x)^2 - 2\ ((3/4)\ x)\ ((5/6)\ y) + ((5/6)\ y)^2$
$((3/4)\ x - (5/6)\ y)^2 = (9/16)\ x^2 - (15/12)\ xy + (25/36)y^2$

(iv) Given that $(x - (3/x))\ (x - (3/x))$
But we can write the given expression as
$(x - (3/x))\ (x - (3/x)) = (x - (3/x))^2$
But we have $(a - b)^2 = a^2 - 2ab + b^2$
On applying above identity in the given expression we get,
$(x - (3/x))^2 = (x)^2 - 2\ (x)\ (3/x) + (3/x)^2$
$(x - (3/x))^2 = x^2 - 6 + (9/x^2)$

(v) Given that $((1/3)\ x^2 - 9)\ ((1/3)\ x^2 - 9)$
But we can write the given expression as
$((1/3)\ x^2 - 9)\ ((1/3)\ x^2 - 9) = ((1/3)\ x^2 - 9))^2$
But we have $(a - b)^2 = a^2 - 2ab + b^2$
On applying above identity in the given expression we get,
$((1/3)\ x^2 - 9))^2 = ((1/3)\ x)^2 - 2\ ((1/3)\ x^2)\ (9) + (9)^2$
$((1/3)\ x^2 - 9))^2 = ((1/9)\ x^4) - 6x^2 + 81$

(vi) Given that $((1/2)\ y^2 – (1/3)\ y)\ ((1/2)\ y^2 – (1/3)\ y)$
But we can write the given expression as
$((1/2)\ y^2 – (1/3)\ y)\ ((1/2)\ y^2 – (1/3)\ y) = ((1/2)\ y^2 – (1/3)\ y)^2$
But we have $(a - b)^2 = a^2 - 2ab + b^2$
On applying above identity in the given expression we get,
$((1/2)\ y^2 – (1/3)\ y)^2 = ((1/2)\ y^2)^2 - 2\ ((1/2)\ y^2)\ (1/3)y + (1/3)\ y^2$
$((1/2)\ y^2 – (1/3)\ y)^2 = ((1/4)\ y^4 - (1/3)\ y^3 + (1/9)\ y^2$

3. **Expand:**

(i) $(8a+3b)^2$
(ii) $(7x+2y)^2$
(iii) $(5x+11)^2$
(iv) $((a/2) + (2/a))^2$
(v) $((3x/4) + (2y/9))^2$
(vi) $(9x-10)^2$
(vii) $(x^2y - yz^2)^{-2}$
(viii) $((x/y)-((y/x))^2$

Solution:

(i) Given $(8a+3b)^2$
According to the identity $(a + b)^2 = a^2 + 2ab + b^2$ we have to expand the given expression,
$(8a+3b)^2 = (8a)^2 + 2\ (8a)(3b) + (3b)^2$
$(8a+3b)^2 = 64a^2 + 48ab + 9b^2$

(ii) Given $(7x+2y)^2$

According to the identity $(a + b)^2=a^2+2ab+b^2$ we have to expand the given expression,

$(7x+2y)^2= (7x)^2+2\,(7x)(2y)+(2y)^2$

$(7x+2y)^2= 49x^2+28xy+4y^2$

(iii) Given $(5x+11)^2$

According to the identity $(a + b)^2=a^2+2ab+b^2$ we have to expand the given expression,

$(5x+11)^2= (5x)^2+2\,(5x)(11)+(11)^2$

$(5x+11)^2= 25x^2+110x+121$

(iv) Given $((a/2) + (2/a))^2$

According to the identity $(a + b)^2=a^2+2ab+b^2$ we have to expand the given expression,

$((a/2) + (2/a))^2= (a/2)^2+2\,(a/2)\,(2/a)+ (2/a)^2$

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

(v) Given $((3x/4) + (2y/9))^2$

According to the identity $(a + b)^2=a^2+2ab+b^2$ we have to expand the given expression,

$((3x/4) + (2y/9))^2= (3x/4)^2+2\,(3x/4)\,(2y/9)+ (2y/9)^2$

$((3x/4) + (2y/9))^2= 9x^2/16+ (1/3)\,xy + (4y^2/81)$

(vi) Given $(9x-10)^2$

According to the identity $(a - b)^2=a^2-2ab+b^2$ we have to expand the given expression,

$(9x-10)^2= (9x)^2-2\,(9x)(10)+(10)^2$

$(9x-10)^2= 81x^2-180x+100$

(vii) Given $(x^2y - yz^2)^{-2}$

According to the identity $(a - b)^2=a^2-2ab+b^2$ we have to expand the given expression,

$(x^2y - yz^2)^{-2}= (x^2y)^2-2\,(x^2y)(\,yz^2)+(\,yz^2)^2$

$(x^2y - yz^2)^{-2}= x^4y^2-2x^2y^2z^2+y^2z^4$

(viii) Given $((x/y)-((y/x))^2$

According to the identity $(a - b)^2=a^2-2ab+b^2$ we have to expand the given expression,

$((x/y)-((y/x))^2= (x/y)^2-2\,(x/y)(\,y/x)+(y/x)^2$

$((x/y)-((y/x))^2= x^2/y^2-2+y^2/x^2$

4. **Find each of the following products:**

(i) $(x+3)\,(x-3)$

(ii) $(2x+5)\,(2x-5)$

(iii) $(8+x)\,(8-x)$

(iv) $(7x+11y)\,(7x-11y)$

(v) $(5x^2 + (3/4)y^2)\,(5x^2-(3/4)y^2)$

(vi) ((4x/5)-(5y/3))
((4x/5) + (5y/3))
(vii) ((x + (1/x)) ((x-(1/x))
(viii) ((1/x) + (1/y)) ((1/x)-(1/y))
(ix) (2a + (3/b)) (2a - (3/b))

Solution:

(i) Given (x+3) (x-3)
By using the formula $(a + b) (a - b) = a^2 - b^2$
Applying the formula we get
$(x+3) (x-3) = x^2-3^2$
$(x+3) (x-3) = x^2-9$

(ii) Given (2x+5) (2x-5)
By using the formula $(a + b) (a - b) = a^2 - b^2$
Applying the formula we get
$(2x+5) (2x-5) = (2x)^2-5^2$
$(2x+5) (2x-5)= 4x^2-25$

(iii) Given (8+x) (8-x)
By using the formula $(a + b) (a - b) = a^2 - b^2$
Applying the formula we get
$(8+x) (8-x) = (8)^2-x^2$
$(8+x) (8-x)= 64 - x^2$

(iv) Given (7x+11y) (7x-11y)
By using the formula $(a + b) (a - b) = a^2 - b^2$
Applying the formula we get
$(7x+11y) (7x-11y) = (7x)^2-(11y)^2$
$(7x+11y) (7x-11y)= 49x^2-121y^2$

(v) Given $(5x^2 + (3/4)y^2) (5x^2-(3/4)y^2)$
By using the formula $(a + b) (a - b) = a^2 - b^2$
Applying the formula we get
$(5x^2 + (3/4) y^2) (5x^2-(3/4) y^2)= (5x^2)^2-((3/4) y^2)^2$
$(5x^2 + (3/4) y^2) (5x^2-(3/4) y^2)= 25x^4-(9/16) y^4$

(vi) Given ((4x/5)-(5y/3)) ((4x/5) + (5y/3))
By using the formula $(a + b) (a - b) = a^2 - b^2$
Applying the formula we get
$((4x/5)-(5y/3)) ((4x/5) + (5y/3))= (4x/5)^2-((5y/3)^2$
$((4x/5)-(5y/3)) ((4x/5) + (5y/3))= (16x^2/25)-(25y^2/15)$

(vii) Given ((x + (1/x)) ((x-(1/x))
By using the formula (a + b) (a - b) = a^2 - b^2
Applying the formula we get
((x + (1/x)) ((x-(1/x)) = $(x)^2$-$(1/x)^2$
((x + (1/x)) ((x-(1/x)) = (x^2)-(1/x^2)

(viii) Given ((1/x) + (1/y)) ((1/x)-(1/y))
By using the formula (a + b) (a - b) = a^2 - b^2
Applying the formula we get
((1/x) + (1/y)) ((1/x)-(1/y))= $(1/x)^2$-$(1/y)^2$
((1/x) + (1/y)) ((1/x)-(1/y))= (1/x^2)-(1/y^2)

(ix) Given (2a + (3/b)) (2a - (3/b))
By using the formula (a + b) (a - b) = a^2 - b^2
Applying the formula we get
(2a + (3/b)) (2a - (3/b))= $(2a)^2$-$(3/b)^2$
(2a + (3/b)) (2a - (3/b))= 4a^2-(9/b^2)

5. Using the formula for squaring a binomial, evaluate the following:
(i) $(54)^2$
(ii) $(82)^2$
(iii) $(103)^2$
(iv) $(704)^2$
Solution:
(i) Given $(54)^2$
But we can write 54 as 50+4
And also we know that $(a + b)^2 = a^2+2ab+b^2$
By applying the above identity we get
$(54)^2 = (50+4)^2= 50^2+2(50)(4)+4^2$
$(50+4)^2$=2500+400+16=2916

(ii) Given $(82)^2$
But we can write 82 as 80+2
And also we know that $(a + b)^2 = a^2+2ab+b^2$
By applying the above identity we get
$(82)^2 = (80+2)^2= 80^2+2(80)(2)+2^2$
$(80+2)^2$=6400+320+4=6724

(iii) Given $(103)^2$
But we can write 103 as 100+3
And also we know that $(a + b)^2 = a^2+2ab+b^2$

By applying the above identity we get

$(103)^2 = (100+3)^2 = 100^2+2(100)(3)+3^2$

$(100+3)^2 = 10000+600+9 = 10609$

(iv) Given $(704)^2$

But we can write 704 as 700+4

And also we know that $(a + b)^2 = a^2+2ab+b^2$

By applying the above identity we get

$(704)^2 = (700+4)^2 = 700^2+2(700)(4)+4^2$

$(700+4)^2 = 490000+2800+16 = 495616$

6. using the formula for squaring a binomial, evaluate the following:

(i) $(69)^2$

(ii) $(78)^2$

(iii) $(197)^2$

(iv) $(999)^2$

Solution:

(i) Given $(69)^2$

But we can write 69 as 70-1

And also we know that $(a - b)^2 = a^2-2ab+b^2$

By applying the above identity we get

$(69)^2 = (70-1)^2 = 70^2-2(70)(1)+1^2$

$(70-1)^2 = 4900-140+1 = 4761$

(ii) Given $(78)^2$

But we can write 78 as 80-2

And also we know that $(a - b)^2 = a^2-2ab+b^2$

By applying the above identity we get

$(78)^2 = (80-2)^2 = 80^2-2(80)(2)+2^2$

$(80-2)^2 = 6400-320+4 = 6084$

(iii) Given $(197)^2$

But we can write 197 as 200-3

And also we know that $(a - b)^2 = a^2-2ab+b^2$

By applying the above identity we get

$(197)^2 = (200-3)^2 = 200^2-2(200)(3)+3^2$

$(200-3)^2 = 40000-1200+9 = 38809$

(iv) Given $(999)^2$

But we can write

999 as 1000-1

And also we know that $(a - b)^2 = a^2 - 2ab + b^2$

By applying the above identity we get

$(999)^2 = (1000-1)^2 = 1000^2 - 2(1000)(1) + 1^2$

$(1000-1)^2 = 1000000 - 2000 + 1 = 998001$

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Select the correct answer in each of the following:

1. **The sum of (6a+4b-c+3), (2b-3c+4), (11b-7a+2c-1) and (2c-5a-6) is**
   (a) (4a-6b+2) (b) (-3a+14b-3c+2) (c) (-6a+17b) (d) (-6a+6b+c-4)

Solution:

(c) (-6a+17b)

Explanation:

Given (6a+4b-c+3), (2b-3c+4), (11b-7a+2c-1) and (2c-5a-6)

To add the given expression we have arrange them column wise is given below:

$$\begin{array}{l} 6a + 4b - c + 3 \\ \quad + 2b - 3c + 4 \\ -7a + 11b + 2c - 1 \\ -5a \qquad + 2c - 6 \\ \hline -6a + 17b \\ \hline \end{array}$$

2. $(3q+7p^2-2r^3+4) - (4p^2-2q+7r^3-3)$ =?
(a)$(p^2+2q+5r^3+1)$ (b) $(11p^2+q+5r^3+1)$ (c) $(-3p^2-5q+9r^3-7)$ (d) $(3p^2+5q-9r^3+7)$

Solution:

(d) $(3p^2+5q-9r^3+7)$

Explanation:

Given $(3q+7p^2-2r^3+4) - (4p^2-2q+7r^3-3)$

According to the rules of subtraction of algebraic equations, we have negative sign will Becomes positive and so we have to keep the big numerical sign.

Now arrange the variables in rows we get

$(3q+7p^2-2r^3+4) - (4p^2-2q+7r^3-3) = (3p^2+5q-9r^3+7)$

3. (x+5) (x-3) =?
(a) $x^2+5x-15$ (b) $x^2-3x-15$ (c) $x^2+2x+15$ (d) $x^2+2x-15$

Solution:

(d) $x^2+2x-15$

Explanation:

Given (x+5) (x-3)

By solving in horizontal method we get

(x+5) (x-3) =x (x-3) + 5 (x-3)

(x+5) (x-3) = x^2-
3x+5x-15

(x+5) (x-3) = x^2+2x-15

4. (2x+3) (3x-1) =?
(a) (6x^2+8x-3) (b) (6x^2+7x-3) (c) (6x^2-7x-3) (d) (6x^2-7x+3)

Solution:
(b) (6x^2+7x-3)
Explanation:
Given (2x+3) (3x-1)
By solving in horizontal method we get
(2x+3) (3x-1)= 2x (3x-1) + 3 (3x-1)
(2x+3) (3x-1)= (6x^2+7x-3)

5. (x+4) (x+4) =?
(a) (x^2+16) (b) (x^2+4x+16) (c) (x^2+8x+16) (d) (x^2+16x)

Solution:
(c) (x^2+8x+16)
Explanation:
Given (x+4) (x+4)=$(x+4)^2$
By expanding the given expression by using $(a + b)^2 = a^2+2ab+b^2$ we get
$(x+4)^2 = x^2+2(x)(4)+4^2 = x^2+8x+16$

6. (x-6) (x-6) =?
(a) (x^2-36) (b) (x^2+36) (c) (x^2-6x+36) (d) (x^2-12x+36)

Solution:
(d) (x^2-12x+36)
Explanation:
Given (x-6) (x-6)=$(x-6)^2$
By expanding the given expression by using $(a - b)^2 = a^2-2ab+b^2$ we get
$(x-6)^2 = x^2-2(x)(6)+6^2 = x^2-12x+36$