NCERT solutions for class 8 maths chapter 9 algebraic expressions and identities

topic 9.1

what are expressions?

Question: 1 Give five examples of expressions containing one variable and five examples of expressions containing two variables.

Answer:

Five examples of expressions containing one variable are:

$x^4, y, 3z, p^2, -2q^3$

Five examples of expressions containing two variables are:

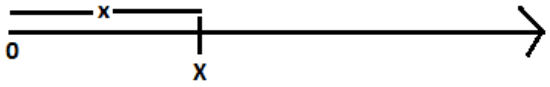
$x + y, 3p - 4q, ab, uv^2, -z^2 + x^3$

Question: 2(i) Show on the number line :

x

Answer:

x on the number line:

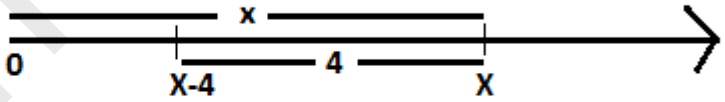


Question: 2(ii) Show on the number line :

$x - 4$

Answer:

x-4 on the number line:

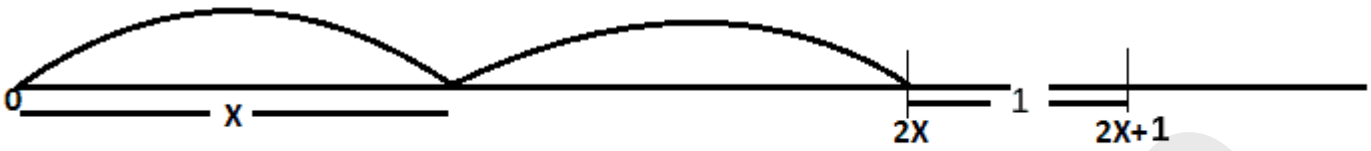


Question: 2(iii) Show on the number line :

2x+1

Answer:

2x+1 on the number line:

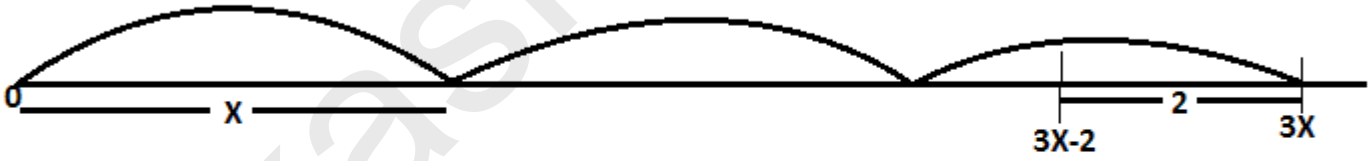


Question: 2(iv) Show on the number line:

$3x - 2$

Answer:

3x - 2 on the number line



NCERT solutions for class 8 maths chapter 9 algebraic expressions and identities topic 9.2 terms, factors and coefficients

Question:1 Identify the coefficient of each term in the expression.

$x^2y^2 - 10x^2y + 5xy^2 - 20$

Answer:

coefficient of each term are given below

NCERT solutions for class 8 maths chapter 9 algebraic expressions and identities topic 9.3 monomials, binomials and polynomials

Question: 1(i) Classify the following polynomials as monomials, binomials, trinomials.

$-z + 5$

Answer:

Binomial since there are two terms with non zero coefficients.

Question: 1(ii) Classify the following polynomials as monomials, binomials, trinomials.

$x + y + z$

Answer:

Trinomial since there are three terms with non zero coefficients.

Question:1(iii) Classify the following polynomials as monomials, binomials, trinomials.

$y + z + 100$

Answer:

Trinomial since there are three terms with non zero coefficients.

Question: 1(iv) Classify the following polynomials as monomials, binomials, trinomials.

$ab - ac$

Answer:

Binomial since there are two terms with non zero coefficients.

Question: 1(v) Classify the following polynomials as monomials, binomials, trinomials.

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Answer:

Monomial since there is only one term.

Question: 2(a) Construct 3 binomials with only x as a variable;

Answer:

Three binomials with the only x as a variable are:

$x + 2,\ x + x^2,\ 3x^3 - 5x^4$

Question: 2(b) Construct 3 binomials with x and y as variables;

Answer:

Three binomials with x and y as variables are:

$x + y,\ x - 7y, xy^2 + 2xy$

Question: 2(c) Construct 3 monomials with x and y as variables;

Answer:

Three monomials with x and y as variables are

$xy,\ 3xy^4,\ -2x^3y^2$

Question: 2(d) Construct 2 polynomials with 4 or more terms .

Answer:

Two polynomials with 4 or more terms are:

$a+b+c+d, x-3xy+2y+4xy^2$

NCERT solutions for class 8 maths chapter 9 algebraic expressions and identities topic 9.4 like and unlike terms

Question:(i) Write two terms which are like

$7xy$

Answer:

$Two\ terms\ like\ 7xy\ are:$
$-3xy\ and\ 5xy$

Question:(ii) Write two terms which are like

$4mn^2$

Answer:

$Two\ terms\ which\ are\ like\ 4mn^2\ are:$
$mn^2\ and\ -3mn^2.$

we can write more like terms

Question:(iii) Write two terms which are like

$2l$

Answer:

$Two\ terms\ which\ are\ like\ 2l\ are:$
$l\ and\ -3l$

NCERT solutions for class 8 maths chapter 9 algebraic expressions and identities-Exercise: 9.1

Question:1(i) Identify the terms, their coefficients for each of the following expressions.

$5xyz^2 - 3zy$

Answer

following are the terms and coefficient

The terms are $5xyz^2\ and\ -3zy$ and the coefficients are 5 and -3.

Question: 1(ii) Identify the terms, their coefficients for each of the following expressions.

$1 + x + x^2$

Answer:

the following is the solution

$The\ terms\ are\ 1,\ x,\ and\ x^2\ and\ the\ coefficients\ are\ 1,\ 1,\ and\ 1\ respectively.$

Question:1(iii) Identify the terms, their coefficients for each of the following expressions.

$4x^2y^2 - 4x^2y^2z^2 + z^2$

Answer:

Question: 1(iv) Identify the terms, their coefficients for each of the following expressions.

$3 - pq + qr - rp$

Answer:

The terms are 3, -pq, qr,and -rp and the coefficients are 3, -1, 1 and -1 respectively.

Question:1(v) Identify the terms, their coefficients for each of the following expressions.

$\frac{x}{2} + \frac{y}{2} - xy$

Answer:

Above are the terms and coefficients

Question: 1(vi) Identify the terms, their coefficients for each of the following expressions.

$0.3a - 0.6ab + 0.5b$

Answer:

The terms are 0.3a, -0.6ab and 0.5b and the coefficients are 0.3, -0.6 and 0.5.

Question: 2(a) Classify the following polynomials as monomials, binomials, trinomials. Which polynomials do not fit in any of these three categories?

$x + y$

Answer:

Binomial.

Question: 2(b) Classify the following polynomials as monomials, binomials, trinomials. Which polynomials do not fit in any of these three categories?

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Answer:

Monomial.

Question: 2(c) Classify the following polynomials as monomials, binomials, trinomials. Which polynomials do not fit in any of these three categories?

$x + x^2 + x^3 + x^4$

Answer:

This polynomial does not fit in any of these three categories.

Question: 2(d) Classify the following polynomials as monomials, binomials, trinomials. Which polynomials do not fit in any of these three categories?

$7 + y - 5x$

Answer:

Trinomial.

Question: 2(e) Classify the following polynomials as monomials, binomials, trinomials. Which polynomials do not fit in any of these three categories?

$2y - 3y^2$

Answer:

Binomial.

Question: 2(f) Classify the following polynomials as monomials, binomials, trinomials. Which polynomials do not fit in any of these three categories?

$2y - 3y^2 + 4y^3$

Answer:

Trinomial.

Question: 2(g) Classify the following polynomials as monomials, binomials, trinomials. Which polynomials do not fit in any of these three categories?

$5x - 4y + 3xy$

Answer:

Trinomial.

Question: 2(h) Classify the following polynomials as monomials, binomials, trinomials. Which polynomials do not fit in any of these three categories?

$4z - 15z^2$

Answer:

Binomial.

Question: 2(i) Classify the following polynomials as monomials, binomials, trinomials. Which polynomials do not fit in any of these three categories?

$ab + bc + cd + da$

Answer:

This polynomial does not fit in any of these three categories.

Question:2(j) Classify the following polynomials as monomials, binomials, trinomials. Which polynomials do not fit in any of these three categories?

pqr

Answer:

Monomial.

Question: 2(k) Classify the following polynomials as monomials, binomials, trinomials. Which polynomials do not fit in any of these three categories?

$p^2q + pq^2$

Answer:

Binomial.

Question: 2(i) Classify the following polynomials as monomials, binomials, trinomials. Which polynomials do not fit in any of these three categories?

$2p + 2q$

Answer:

Binomial.

Question: 3(i) Add the following.

$ab - bc, bc - ca, ca - ab$

Answer:

ab-bc+bc-ca+ca-ab=0.

Question:3 (ii) Add the following.

$a - b + ab, b - c + bc, c - a + ac$

Answer:

$$a - b + ab + b - c + bc + c - a + ac$$
$$= (a - a) + (b - b) + (c - c) + ab + bc + ac$$
$$= ab + bc + ca$$

Question:3 (iii) Add the following

$$2p^2q^2 - 3pq + 4, 5 + 7pq - 3p^2q^2$$

Answer:

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

Question: 3(iv) Add the following.

$$l^2 + m^2 + n^2, n^2 + l^2, 2lm + 2mn + 2nl$$

Answer:

$$l^2 + m^2 + n^2 + n^2 + l^2 + 2lm + 2mn + 2nl$$
$$= 2l^2 + m^2 + 2n^2 + 2lm + 2mn + 2nl$$

Question: 4(a) Subtract $4a - 7ab + 3b + 12$ from $12a - 9ab + 5b - 3$

Answer:

12a-9ab+5b-3-(4a-7ab+3b+12)

=(12-4)a +(-9+7)ab+(5-3)b +(-3-12)

=8a-2ab+2b-15

Question: 4(b) Subtract $3xy + 5yz - 7zx$ from $5xy - 2yz - 2zx + 10xyz$

Answer:

$$5xy - 2yz - 2zx + 10xyz - (3xy + 5yz - 7zx)$$
$$= (5 - 3)xy + (-2 - 5)yz + (-2 + 7)zx + 10xyz$$
$$= 2xy - 7yz + 5zx + 10xyz$$

Question: 4(c) Subtract $4p^2q - 3pq + 5pq^2 - 8p + 7q - 10$ from $18 - 3p - 11q + 5pq - 2pq^2 + 5p^2q$

Answer:

NCERT solutions for class 8 maths chapter 9 algebraic expressions and identities topic 9.7.2 multiplying three or more monomials

Question:1 Find $4x \times 5y \times 7z$. First find $4x \times 5y$ and multiply it by $7z$; or first find $5y \times 7z$ and multiply it by $4x$.

Answer:

We observe that the result is same in both cases and the result **does not** depend on the order in which multiplication has been carried out.

NCERT solutions for class 8 maths chapter 9 algebraic expressions and identities-Exercise: 9.2

Question: 1(i) Find the product of the following pairs of monomials.

$4, 7p$

Answer:

$4 \times 7p = 28p$

Question: 1(ii) Find the product of the following pairs of monomials.

$-4p, 7p$

Answer:

$$\begin{aligned} & -4p \times 7p \\ &= (-4 \times 7)p \times p \\ &= -28p^2 \end{aligned}$$

Question: 1(iii) Find the product of the following pairs of monomials

$-4p, 7pq$

Answer:

$$\begin{aligned} & -4p \times 7pq \\ &= (-4 \times 7)p \times pq \\ &= -28p^2q \end{aligned}$$

Question: 1(iv) Find the product of the following pairs of monomials.

$4p^3, -3p$

Answer:

$$\begin{aligned} & 4p^3 \times (-3p) \\ &= 4 \times (-3)p^3 \times p \\ &= -12p^4 \end{aligned}$$

Question:1(v) Find the product of the following pairs of monomials.

$4p, 0$

Answer:

$4p \times 0 = 0$

Question:2(A) Find the areas of rectangles with the following pairs of monomials as their lengths and breadths respectively.

(p, q)

Answer:

The question can be solved as follows

$$Area = length \times breadth$$
$$= (p \times q)$$
$$= pq$$

Question:2(B) Find the areas of rectangles with the following pairs of monomials as their lengths and breadth respectively.

$(10m, 5n)$

Answer:

the area is calculated as follows

$$Area = length \times breadth$$
$$= 10m \times 5n$$
$$= 50mn$$

Question:2(C) Find the areas of rectangles with the following pairs of monomials as their lengths and breadths respectively.

$(20x^2, 5y^2)$

Answer:

the following is the solution

$$Area = length \times breadth$$
$$= 20x^2 \times 5y^2$$
$$= 100x^2y^2$$

Question:2(D) Find the areas of rectangles with the following pairs of monomials as their lengths and breadths respectively.

$(4x, 3x^2)$

Answer:

area of rectangles is

$$Area = length \times breadth$$
$$= 4x \times 3x^2$$
$$= 12x^3$$

Question:2(E) Find the areas of rectangles with the following pairs of monomials as their lengths and breadths respectively.

$(3mn, 4np)$

Answer:

The area is calculated as follows

$Area = length \times breadth$
$= 3mn \times 4np$
$= 12mn^2p$

Question:3 Complete the table of products.

First monomial $\rightarrow$ / Second monomial $\downarrow$	$2x$	$-5y$	$3x^2$	$-4xy$	$7x^2y$	$-9x^2y^2$
$2x$	$4x^2$	...	...	...	...	...
$-5y$	...	...	$-15x^2y$	...	...	...
$3x^2$	...	...	...	...	...	...
$-4xy$	...	...	...	...	...	...
$7x^2y$	...	...	...	...	...	...
$-9x^2y^2$	...	...	...	...	...	...

Answer:

First monomial $\rightarrow$	$2x$	$-5y$	$3x^2$	$-4xy$	$7x^2y$	$-9x^2y^2$

Second monomial ↓						
$2x$	$4x^2$	$-10xy$	$6x^3$	$-8x^2y$	$14x^3y$	$-18x^3y^2$
$-5y$	$-10xy$	$25y^2$	$-15x^2y$	$20xy^2$	$-35x^2y^2$	$45x^2y^3$
$3x^2$	$6x^3$	$-15x^2y$	$9x^4$	$-12x^3y$	$21x^4y$	$-27x^4y^2$
$-4xy$	$-8x^2y$	$20xy^2$	$-12x^3y$	$16x^2y^2$	$-28x^3y$	$36x^3y^3$
$7x^2y$	$14x^3y$	$-35x^2y^2$	$21x^4y$	$-28x^3y^2$	$49x^4y^2$	$-63x^4y^3$
$-9x^2y^2$	$-18x^3y^2$	$45x^2y^3$	$-27x^4y^2$	$36x^3y^3$	$-63x^4y^3$	$81x^4y^4$

Question:4(i) Obtain the volume of rectangular boxes with the following length, breadth and height respectively.

$5a, 3a^2, 7a^4$

Answer:

$$Volume = length \times breadth \times height$$
$$= 5a \times 3a^2 \times 7a^4$$
$$= 15a^3 \times 7a^4$$
$$= 105a^7$$

Question:4(ii) Obtain the volume of rectangular boxes with the following length, breadth and height respectively.

$2p, 4q, 8r$

Answer:

the volume of rectangular boxes with the following length, breadth and height is

$$Volume = length \times breadth \times height$$
$$= 2p \times 4q \times 8r$$
$$= 8pq \times 8r$$
$$= 64pqr$$

Question:4(iii) Obtain the volume of rectangular boxes with the following length, breadth and height respectively.

$xy, 2x^2y, 2xy^2$

Answer:

the volume of rectangular boxes with the following length, breadth and height is

Question:4(iv) Obtain the volume of rectangular boxes with the following length, breadth and height respectively.

$a, 2b, 3c$

Answer:

the volume of rectangular boxes with the following length, breadth and height is

$$Volume = length \times breadth \times height$$
$$= a \times 2b \times 3c$$
$$= 2ab \times 3c$$
$$= 6abc$$

Question:5(i) Obtain the product of

xy, yz, zx

Answer:

the product

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

Question:5(ii) Obtain the product of

$a, -a^2, a^3$

Answer:

the product

$$a \times (-a^2) \times a^3$$
$$= -a^3 \times a^3 = -a^6$$

Question:5(iii) Obtain the product of

$2,\ 4y,\ 8y^2,\ 16y^3$

Answer:

the product

$$2 \times 4y \times 8y^2 \times 16y^3$$
$$= 8y \times 8y^2 \times 16y^3$$
$$= 64y^3 \times 16y^3$$
$$= 1024y^6$$

Question:5(iv) Obtain the product of

$a, 2b, 3c, 6abc$

Answer:

the product

$$a \times 2b \times 3c \times 6abc$$
$$= 2ab \times 3c \times 6abc$$
$$= 6abc \times 6abc$$
$$= 36a^2b^2c^2$$

Question:5(v) Obtain the product of

$m, -mn, mnp$

Answer:

the product

$$m \times (-mn) \times mnp$$
$$= -m^2n \times mnp$$
$$= -m^3n^2p$$

NCERT solutions for class 8 maths chapter 9 algebraic expressions and identities topic 9.8.1 multiplying a monomial by a binomial

Question:(i) Find the product

$2x(3x + 5xy)$

Answer:

Using distributive law,

$2x(3x + 5xy) = 6x^2 + 10x^2y$

Question:(ii) Find the product

$a^2(2ab - 5c)$

Answer:

Using distributive law,

We have : $a^2(2ab - 5c) = 2a^3b - 5a^2c$

NCERT solutions for class 8 maths chapter 9 algebraic expressions and identities topic 9.8.2 multiplying a monomial by a trinomial

Question:1 Find the product:

$(4p^2 + 5p + 7) \times 3p$

Answer:

By using distributive law,

$(4p^2 + 5p + 7) \times 3p = 12p^3 + 15p^2 + 21p$

NCERT solutions for class 8 maths chapter 9 algebraic expressions and identities-Exercise: 9.3

Question:1(i) Carry out the multiplication of the expressions in each of the following pairs.

$4p, q + r$

Answer:

Multiplication of the given expression gives :

By distributive law,

$(4p)(q + r) = 4pq + 4pr$

Question:1(ii) Carry out the multiplication of the expressions in each of the following pairs.

$ab, a - b$

Answer:

We have ab, (a-b).

Using distributive law we get,

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

Question:1(iii) Carry out the multiplication of the expressions in each of the following pairs.

$a + b, 7a^2b^2$

Answer:

Using distributive law we can obtain multiplication of given expression:

$(a+b)(7a^2b^2) = 7a^3b^2 + 7a^2b^3$

Question:1(iv) Carry out the multiplication of the expressions in each of the following pairs.

$a^2 - 9, 4a$

Answer:

We will obtain multiplication of given expression by using distributive law :

$(a^2 - 9)(4a) = 4a^3 - 36a$

Question:1(v) Carry out the multiplication of the expressions in each of the following pairs.

$pq + qr + rp, 0$

Answer:

Using distributive law :

$(pq + qr + rp)(0) = pq(0) + qr(0) + rp(0) = 0$

Question:2 Complete the table

	First expression	**Second expression**	**Product**
(i)	a	$b + c + d$	...

(ii)	$x+y-5$	$5xy$	...
(iii)	p	$6p^2-7p+5$	...
(iv)	$4p^2q^2$	p^2-q^2	...
(v)	$a+b+c$	abc	...

Answer:

We will use distributive law to find product in each case.

	First expression	Second expression	Product
(i)	a	$b+c+d$	$ab+ac+ad$
(ii)	$x+y-5$	$5xy$	$5x^2y+5xy^2-25xy$
(iii)	p	$6p^2-7p+5$	$6p^3-7p^2+5p$
(iv)	$4p^2q^2$	p^2-q^2	$4p^4q^2-4p^2q^4$
(v)	$a+b+c$	abc	$a^2bc+ab^2c+abc^2$

Question:3(i) Find the product.

$(a^2) \times (2a^{22}) \times (4a^{26})$

Answer:

Opening brackets :

$(a^2) \times (2a^{22}) \times (4a^{26}) = (a^2 \times 2a^{22}) \times (4a^{26}) = 2a^{24} \times 4a^{26}$

or $= 8a^{50}$

Question:3(ii) Find the product.

$(\frac{2}{3}xy) \times (\frac{-9}{10}x^2y^2)$

Answer:

We have,

$(\frac{2}{3}xy) \times (\frac{-9}{10}x^2y^2) = \frac{-3}{5}x^3y^3$

Question:3(iii) Find the product.

$(\frac{-10}{3}pq^3) \times (\frac{6}{5}p^3q)$

Answer:

We have

$(\frac{-10}{3}pq^3) \times (\frac{6}{5}p^3q) = -4p^4q^4$

Question:3(iv) Find the product.

$x \times x^2 \times x^3 \times x^4$

Answer:

We have $x \times x^2 \times x^3 \times x^4$

$x \times x^2 \times x^3 \times x^4 = (x \times x^2) \times x^3 \times x^4$

or $(x^3) \times x^3 \times x^4$

$= x^{10}$

Question:4(a) Simplify $3x(4x - 5) + 3$ and find its values for

(i) $x = 3$

Answer:

(a) We have

$3x(4x - 5) + 3 = 12x^2 - 15x + 3$

Put x = 3,

We get : $12(3)^2 - 15(3) + 3 = 12(9) - 45 + 3 = 108 - 42 = 66$

Question:4(a) Simplify $3x(4x - 5) + 3$ and find its values for

(ii) $x = \frac{1}{2}$

Answer:

We have

$3x(4x-5)+3=12x^2-15x+3$

Put

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

. So We get,

$12x^2-15x+3=12(\frac{1}{2})^2-15(\frac{1}{2})+3=6-\frac{15}{2}=\frac{-3}{2}$

Question:4(b) Simplify $a(a^2+a+1)+5$ and find its value for

(i) $a=0$

Answer:

We have : $a(a^2+a+1)+5=a^3+a^2+a+5$

Put a = 0 : $=0^3+0^2+0+5=5$

Question:4(b) Simplify $a(a^2+a+1)+5$ and find its value for

(ii) $a=1$

Answer:

We have $a(a^2+a+1)+5=a^3+a^2+a+5$

Put a = 1 ,

we get : $1^3 + 1^2 + 1 + 5 = 1 + 1 + 1 + 5 = 8$

Question:4(b) Simplify $a(a^2 + a + 1) + 5$ and find its value for

(iii) $a = -1$

Answer:

We have $a(a^2 + a + 1) + 5$.

or $a(a^2 + a + 1) + 5 = a^3 + a^2 + a + 5$

Put a = (-1)

$= (-1)^3 + (-1)^2 + (-1) + 5 = -1 + 1 - 1 + 5 = 4$

Question:5(a) Add: $p(p - q), q(q - r)$ and $r(r - p)$

Answer:

(a)First we will solve each brackets individually.

$p(p - q) = p^2 - pq$; $q(q - r) = q^2 - qr$; $r(r - p) = r^2 - rp$

Addind all we get : $p^2 - pq + q^2 - qr + r^2 - rp$

$= p^2 + q^2 + r^2 - pq - qr - rp$

Question:5(b) Add: $2x(z - x - y)$ and $2y(z - y - x)$

Answer:

Firstly, open the brackets:

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

and $2y(z - y - x) = 2yz - 2y^2 - 2xy$

Adding both, we get :

$2xz - 2x^2 - 2xy + 2yz - 2y^2 - 2xy$

or $= -2x^2 - 2y^2 - 4xy + 2xz + 2yz$

Question:5(c) Subtract: $3l(l - 4m + 5n)$ from $4l(10n - 3m + 2l)$

Answer:

At first we will solve each bracket individually,

$3l(l - 4m + 5n) = 3l^2 - 12lm + 15ln$

and $4l(10n - 3m + 2l) = 40ln - 12ml + 8l^2$

Subtracting:

$40ln - 12ml + 8l^2 - (3l^2 - 12lm + 15ln)$

or $= 40ln - 12ml + 8l^2 - 3l^2 + 12lm - 15ln$

or $= 25ln + 5l^2$

Question:5(d) Subtract: $3a(a + b + c) - 2b(a - b + c)$ from $4c(-a + b + c)$

Answer:

Solving brackets :

$3a(a+b+c)-2b(a-b+c)=3a^2+3ab+3ac-2ab+2b^2-2bc$

$=3a^2+ab+3ac+2b^2-2bc$

and $4c(-a+b+c)=-4ac+4bc+4c^2$

Subtracting : $-4ac+4bc+4c^2-(3a^2+ab+3ac+2b^2-2bc)$

$=-4ac+4bc+4c^2-3a^2-ab-3ac-2b^2+2bc$

$=-3a^2-2b^2+4c^2-ab+6bc-7ac$

NCERT solutions for class 8 maths chapter 9 algebraic expressions and identities-Exercise: 9.4

Question:1(i) Multiply the binomials.

$(2x+5)$ and $(4x-3)$

Answer:

We have (2x + 5) and (4x - 3)

(2x + 5) X (4x - 3) = (2x)(4x) + (2x)(-3) + (5)(4x) + (5)(-3)

= 8 x^2 - 6x + 20x - 15

= 8 x^2 + 14x -15

Question:1(ii) Multiply the binomials.

$(y-8)$ and $(3y-4)$

Answer:

We need to multiply (y - 8) and (3y - 4)

(y - 8) X (3y - 4) = (y)(3y) + (y)(-4) + (-8)(3y) + (-8)(-4)

= 3 y^2 - 4y - 24y + 32

= 3 y^2 - 28y + 32

Question:1(iii) Multiply the binomials

$(2.5l - 0.5m)$ and $(2.5l + 0.5m)$

Answer:

We need to multiply (2.5l - 0.5m) and (2.5l + 0..5m)

(2.5l - 0.5m) X (2.5l + 0..5m) = $(2.5l)^2 - (0.5m)^2$ using $(a - b)(a + b) = (a)^2 - (b)^2$

= 6.25 l^2 - 0.25 m^2

Question:1(iv) Multiply the binomials.

$(a + 3b)$ and $(x + 5)$

Answer:

(a + 3b) X (x + 5) = (a)(x) + (a)(5) + (3b)(x) + (3b)(5)

= ax + 5a + 3bx + 15b

Question:1(v) Multiply the binomials.

$(2pq + 3q^2)$ and $(3pq - 2q^2)$

Answer:

$(2pq + 3q^2) \times (3pq - 2q^2) = (2pq)(3pq) + (2pq)(-2q^2) + (3q^2)(3pq) + (3q^2)(-2q^2)$

$= 6p^2q^2 - 4pq^3 + 9pq^3 - 6q^4$

$= 6p^2q^2 + 5pq^3 - 6q^4$

Question:1(vi) Multiply the binomials.

$(\frac{3}{4}a^2 + 3b^2)$ and $4(a^2 - \frac{2}{3}b^2)$

Answer:

Multiplication can be done as follows

$(\frac{3}{4}a^2 + 3b^2) \times (4a^2 - \frac{8}{3}b^2) =$

$= 3a^4 - 2a^2b^2 + 12a^2b^2 - 8b^4$

$= 3a^4 + 10a^2b^2 - 8b^4$

Question:2(i) Find the product.

$(5 - 2x)(3 + x)$

Answer:

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

$= 15 + 5x - 6x - 2x^2$

$= 15 - x - 2x^2$

Question:2(ii) Find the product.

$(x + 7y)(7x - y)$

Answer:

(x + 7y) X (7x - y) = (x)(7x) + (x)(-y) + (7y)(7x) + (7y)(-y)

= 7 x^2 - xy + 49xy - 7 y^2

= 7 x^2 + 48xy - 7 y^2

Question:2(iii) Find the product.

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

Answer:

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

= $a^3 + a^2b^2 + ab + b^3$

Question:2(iv) Find the product.

$(p^2 - q^2)(2p + q)$

Answer:

following is the solution

($p^2 - q^2$) X (2p + q) = $(p^2)(2p) + (p^2)(q) + (-q^2)(2p) + (-q^2)(q)$

$2p^3 + p^2q - 2q^2p - q^3$

Question:3(i) Simplify.

$(x^2 - 5)(x + 5) + 25$

Answer:

this can be simplified as follows

(x^2 -5) X (x + 5) + 25 = (x^2)(x) + (x^2)(5) + (-5)(x) + (-5)(5) + 25

= $x^3 + 5x^2 - 5x - 25 + 25$

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

Question:3(ii) Simplify .

$(a^2 + 5)(b^3 + 3) + 5$

Answer:

This can be simplified as

(a^2 + 5) X (b^3 + 3) + 5 = (a^2)(b^3) + (a^2)(3) + (5)(b^3) + (5)(3) + 5

= $a^2b^3 + 3a^2 + 5b^3 + 15 + 5$

= $a^2b^3 + 3a^2 + 5b^3 + 20$

Question:3(iii) Simplify.

$(t + s^2)(t^2 - s)$

Answer:

simplifications can be

(t + s^2)(t^2 - s) = (t)(t^2) + (t)(-s) + (s^2)(t^2) + (s^2)(-s)

= $t^3 - ts + s^2t^2 - s^3$

Question:3(iv) Simplify.

$(a+b)(c-d)+(a-b)(c+d)+2(ac+bd)$

Answer:

(a + b) X (c -d) + (a - b) X (c + d) + 2(ac + bd)

= (a)(c) + (a)(-d) + (b)(c) + (b)(-d) + (a)(c) + (a)(d) + (-b)(c) + (-b)(d) + 2(ac + bd)

= ac - ad + bc - bd + ac +ad -bc - bd + 2(ac + bd)

= 2(ac - bd) + 2(ac +bd)

= 2ac - 2bd + 2ac + 2bd

= 4ac

Question:3(v) Simplify.

$(x+y)(2x+y)+(x+2y)(x-y)$

Answer:

(x + y) X (2x + y) + (x + 2y) X (x - y)

=(x)(2x) + (x)(y) + (y)(2x) + (y)(y) + (x)(x) + (x)(-y) + (2y)(x) + (2y)(-y)

= 2 x^2 + xy + 2xy + y^2 + x^2 - xy + 2xy - 2 y^2

=3 x^2 + 4xy - y^2

Question:3(vi) Simplify.

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

Answer:

simplification is done as follows

(x + y) X ($x^2 - xy + y^2$) = x X ($x^2 - xy + y^2$) + y ($x^2 - xy + y^2$)

= $x^3 - x^2y + xy^2 + yx^2 - xy^2 + y^3$

= $x^3 + y^3$

Question:3(vii) Simplify.

$$(1.5x - 4y)(1.5x + 4y + 3) - 4.5x + 12y$$

Answer:

(1.5x - 4y) X (1.5x + 4y + 3) - 4.5x + 12y = (1.5x) X (1.5x + 4y + 3) -4y X (1.5x + 4y + 3) - 4.5x + 12y

= 2.25 x^2 + 6xy + 4.5x - 6xy - 16 y^2 - 12y -4.5x + 12 y

= 2.25 x^2 - 16 y^2

Question:3(viii) Simplify.

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

Answer:

(a + b + c) X (a + b - c) = a X (a + b - c) + b X (a + b - c) + c X (a + b - c)

= a^2 + ab - ac + ab + b^2 -bc + ac + bc - c^2

= a^2 + b^2 - c^2 + 2ab

NCERT solutions for class 8 maths chapter 9 algebraic expressions and identities topic 9.11 standerd identities

Question:1(i) Put -b in place of b in identity 1. Do you get identity 2?

Answer:

Identity 1 $\Rightarrow (a+b)^2 = a^2 + 2ab + b^2$

If we replace b with -b in identity 1

We get,

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

which is equal to

$(a-b)^2$ which is identity 2

So, we get identity 2 by replacing b with -b in identity 1

NCERT free solutions for class 8 maths chapter 9 algebraic expressions and identities topic 9.11 standard identities

Question:1 Verify Identity (IV), for $a = 2, b = 3, x = 5$.

Answer:

Identity IV

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

So, it is given that a = 2, b = 3 and x = 5

Lets put these value in identity IV

(2 + 5)(3 + 5) = 5^2 + (2 + 3)5 +2 X 3

7 X 8 = 25 + 5 X 5 + 6

56 = 25 + 25 + 6

= 56

L.H.S. = R.H.S.

So, by this we can say that identity IV satisfy with given value of a,b and x

Question:2 Consider, the special case of Identity (IV) with a = b, what do you get? Is it related to Identity

Answer:

Identity IV is $\Rightarrow (a+x)(b+x) = x^2 + (a+b)x + ab$

If a =b than

(a + x)(a + x) = $x^2 + (a+a)x + a \times a$

$(a+x)^2 = x^2 + 2ax + a^2$

Which is identity I

Question:3 Consider, the special case of Identity (IV) with $a = -c$ and $b = -c$ What do you get? Is it related to Identity ?

Answer:

Identity IV is $\Rightarrow (a+x)(b+x) = x^2 + (a+b)x + ab$

If a = b = -c than,

(x - c)(x - c) = $x^2 + (-c + (-c))x + (-c) \times (-c)$

$(x-c)^2 = x^2 + -2cx + c^2$

Which is identity II

Question:4 Consider the special case of Identity (IV) with $b = -a$. What do you get? Is it related to Identity?

Answer:

Identity IV is $\Rightarrow (a+x)(b+x) = x^2 + (a+b)x + ab$

If b = -a than,

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

= $x^2 - a^2$

Which is identity III

NCERT solutions for class 8 maths chapter 9 algebraic expressions and identities-Exercise: 9.5

Question:1(i) Use a suitable identity to get each of the following products.

$(x + 3)(x + 3)$

Answer:

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

So, we use identity I for this which is

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

In this a=x and b = x

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

= $x^2 + 6x + 9$

Question:1(ii) Use a suitable identity to get each of the following products in bracket.

$(2y + 5)(2y + 5)$

Answer:

(2y + 5) X (2y + 5) = $(2y + 5)^2$

We use identity I for this which is

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

IN this a = 2y and b = 5

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

= $(2y+5)^2 = 4y^2 + 20y + 25$

Question:1(iii) Use a suitable identity to get each of the following products in bracket.

$(2a-7)(2a-7)$

Answer:

(2a -7) X (2a - 7) = $(2a-7)^2$

We use identity II for this which is

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

in this a = 2a and b = 7

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

= $4a^2 - 28a + 49$

Question:1(iv) Use a suitable identity to get each of the following products in bracket.

$(3a-\frac{1}{2})(3a-\frac{1}{2})$

Answer:

$(3a-\frac{1}{2}) \times (3a-\frac{1}{2}) = ((3a-\frac{1}{2}))^2$

We use identity II for this which is

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

in this a = 3a and b = -1/2

$(3a-\frac{1}{2})^2 = (3a)^2 - 2(3a)(\frac{1}{2}) + (\frac{1}{2})^2$

= $9a^2 - 3a + \frac{1}{4}$

Question:1(v) Use a suitable identity to get each of the following products in bracket.

$(1.1m - 4)(1.1m + 4)$

Answer:

$(1.1m - 4)(1.1m + 4)$

We use identity III for this which is

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

In this a = 1.1m and b = 4

$(1.1m - 4)(1.1m + 4)$ = $(1.1m)^2 - (4)^2$

= 1.21 m^2 - 16

Question:1(vi) Use a suitable identity to get each of the following products in bracket.

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

Answer:

take the (-)ve sign common so our question becomes

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

We use identity III for this which is

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

In this a = a^2 and b = b^2

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

Question:1(vii) Use a suitable identity to get each of the following.

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

Answer:

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

We use identity III for this which is

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

In this a = 6x and b = 7

(6x -7) X (6x - 7) = $(6x)^2-(7)^2=36x^2-49$

Question:1(viii) Use a suitable identity to get each of the following product.

$(-a+c)(-a+c)$

Answer:

take (-)ve sign common from both the brackets So, our question become

(a -c) X (a -c) = $(a-c)^2$

We use identity II for this which is

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

In this a = a and b = c

$(a-c)^2=a^2-2ac+c^2$

Question:1(ix) Use a suitable identity to get each of the following product.

$(\frac{x}{2}+\frac{3y}{4})(\frac{x}{2}+\frac{3y}{4})$

Answer:

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

We use identity I for this which is

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

In this a = $\frac{x}{2}$ and b = $\frac{3y}{4}$

= $\frac{x^2}{4} + \frac{3xy}{4} + \frac{9y^2}{16}$

Question:1(x) Use a suitable identity to get each of the following products.

$(7a - 9b)(7a - 9b)$

Answer:

$(7a - 9b) \times (7a - 9b) = (7a - 9b)^2$

We use identity II for this which is

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

In this a = 7a and b = 9b

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

= $49a^2 - 126ab + 81b^2$

Question:2(i) Use the identity $(x + a)(x + b) = x^2 + (a + b)x + ab$ to find the following products.

$(x + 3)(x + 7)$

Answer:

We use identity $(x+a)(x+b) = x^2 + (a+b)x + ab$

in this a = 3 and b = 7

$(x+3)(x+7) = x^2 + (3+7)x + 3 \times 7$

$= x^2 + 10x + 21$

Question:2(ii) Use the identity $(x+a)(x+b) = x^2 + (a+b)x + ab$ to find the following products.

$(4x+5)(4x+1)$

Answer:

We use identity $(x+a)(x+b) = x^2 + (a+b)x + ab$

In this a= 5 , b = 1 and x = 4x

$(4x+5)(4x+1) = (4x)^2 + (5+1)4x + (5)(1)$

$= 16x^2 + 24x + 5$

Question:2(iii) Use the identity $(x+a)(x+b) = x^2 + (a+b)x + ab$ to find the following products.

$(4x-5)(4x-1)$

Answer:

We use identity $(x+a)(x+b) = x^2 + (a+b)x + ab$

in this x = 4x , a = -5 and b = -1

$(4x-5)(4x-1) = (4x)^2 + (-5-1)4x + (-5)(-1)$

$= 16x^2 - 24x + 5$

Question:1(iv) Use the identity $(x+a)(x+b) = x^2 + (a+b)x + ab$ to find the following products.

$(4x+5)(4x-1)$

Answer:

We use identity $(x+a)(x+b) = x^2 + (a+b)x + ab$

In this a = 5 , b = -1 and x = 4x

$(4x+5)(4x-1) = (4x)^2 + (5+(-1))4x + (5)(-1)$

$= 16x^2 + 16x - 5$

Question:2(v) Use the identity $(x+a)(x+b) = x^2 + (a+b)x + ab$ to find the following products.

$(2x+5y)(2x+3y)$

Answer:

We use identity $(x+a)(x+b) = x^2 + (a+b)x + ab$

In this a = 5y , b = 3y and x = 2x

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

$= 4x^2 + 16xy + 15y^2$

Question:2(vi) Use the identity $(x+a)(x+b) = x^2 + (a+b)x + ab$ to find the following products.

$(2a^2+9)(2a^2+5)$

Answer:

We use identity $(x+a)(x+b) = x^2 + (a+b)x + ab$

In this a = 9 , b = 5 and x = $2a^2$

$(2a^2+9)(2a^2+5)$ = $(2a^2)^2 + (9+5)2a^2 + (9)(5)$

= $4a^4 + 28a^2 + 45$

Question:2(vii) Use the identity $(x+a)(x+b) = x^2 + (a+b)x + ab$ to find the following products.

$(xyz-4)(xyz-2)$

Answer:

We use identity $(x+a)(x+b) = x^2 + (a+b)x + ab$

In this a = -4 , b = -2 and x = xyz

$(xyz-4)(xyz-2)$ = $(xyz)^2 + ((-4)+(-2))xyz + (-4)(-2)$

= $x^2y^2z^2 - 6xyz + 8$

Question:3(i) Find the following squares by using the identities.

$(b-7)^2$

Answer:

We use identity

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

In this a =b and b = 7

$(b-7)^2 = b^2 - 2(b)(7) + 7^2$

= $b^2 - 14b + 49$

Question:3(ii) Find the following squares by using the identities.

$(xy + 3z)^2$

Answer:

We use

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

In this a = xy and b = 3z

$(xy + 3z)^2 = (xy)^2 + 2(xy)(3z) + (3z)^2$

= $x^2y^2 + 6xyz + 9z^2$

Question:3(iii) Find the following squares by using the identities.

$(6x^2 - 5y)^2$

Answer:

We use

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

In this a = $6x^2$ and b = $5y^2$

$(6x - 5y)^2 = (6x)^2 - 2(6x)(5y) + (5y)^2$

= $36x^2 - 60xy + 25y^2$

Question:3(iv) Find the following squares by using the identities.

$(\frac{2}{3}m + \frac{3}{2}n)^2$

Answer:

we use the identity

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

In this a = $\frac{2m}{3}$ and b = $\frac{3n}{2}$

= $\frac{4m^2}{9} + 2mn + \frac{9n^2}{4}$

Question:3(v) Find the following squares by using the identities.

$(0.4p - 0.5q)^2$

Answer:

we use

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

In this a = 0.4p and b =0.5q

$(0.4p - 0.5q)^2 = (0.4p)^2 - 2(0.4p)(0.5q) + (0.5q)^2$

= $0.16p^2 - 0.4pq + 0.25q^2$

Question:3(vi) Find the following squares by using the identities.

$(2xy + 5y)^2$

Answer:

we use the identity

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

In this a = 2xy and b =5y

$(2xy + 5y)^2 = (2xy)^2 + 2(2xy)(5y) + (5y)^2$

= $4x^2y^2 + 20xy^2 + 25y^2$

Question:4(i) Simplify:

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

Answer:

we use

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

In this a = a^2 and b = b^2

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

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

Question:4(ii) Simplify.

$(2x + 5)^2 - (2x - 5)^2$

Answer:

we use

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

In this a = (2x + 5) and b = (2x - 5)

$(2x + 5)^2 - (2x - 5)^2 = ((2x + 5) - (2x - 5))((2x + 5) + (2x - 5))$

= $(2x + 5 - 2x + 5)(2x + 5 + 2x - 5)$

= (4x)(10)

=40x

or

remember that

$(a + b)^2 - (a - b)^2 = 4ab$

here a= 2x, b= 5

$4ab = 4 \times 2x \times 5 = 40x$

Question:4(iii) Simplify.

$(7m - 8n)^2 + (7m + 8n)^2$

Answer:

we use

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

In this a = 7m and b = 8n

$(7m - 8n)^2 = (7m)^2 - 2(7m)(8n) + (8n)^2$

= $49m^2 - 112mn + 64n^2$

and

$(7m + 8n)^2 = (7m)^2 + 2(7m)(8n) + (8n)^2$

= $49m^2 + 112mn + 64n^2$

So, $(7m - 8n)^2 + (7m + 8n)^2$ = $49m^2 - 112mn + 64n^2$ + $49m^2 + 112mn + 64n^2$

= $2(49m^2 + 64n^2)$

or

remember that

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

Question: 4(iv) Simplify.

$(4m + 5n)^2 + (5m + 4n)^2$

Answer:

we use

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

1) In this a = 4m and b = 5n

$(4m+5n)^2 = (4m)^2 + 2(4m)(5n) + (5n)^2$

= $16m^2 + 40mn + 25n^2$

2) in this a = 5m and b = 4n

$(5m+4n)^2 = (5m)^2 + 2(5m)(4n) + (4n)^2$

= $25m^2 + 40mn + 16n^2$

So, $(4m+5n)^2 + (5m+4n)^2$ = $16m^2 + 40mn + 25n^2 + 25m^2 + 40mn + 16n^2$

= $41m^2 + 80mn + 41n^2$

Question: 4(v) Simplify.

$(2.5p - 1.5q)^2 - (1.5p - 2.5q)^2$

Answer:

we use

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

1) In this a = (2.5p- 1.5q) and b = (1.5p - 2.5q)

$(2.5p - 1.5q)^2 - (1.5p - 2.5q)^2 = ((2.5p - 1.5q) - (1.5p - 2.5q))((2.5p - 1.5q) + (1.5p - 2.5q))$

= $(2.5p - 1.5q - 1.5p + 2.5q)(2.5p - 1.5q + 1.5p - 2.5q)$

= 4(p + q) (p - q)

= 4 $(p^2 - q^2)$

Question:4(vi) Simplify.

$(ab + bc)^2 - 2ab^2c$

Answer:

We use identity

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

In this a = ab and b = bc

$(ab + bc)^2 = (ab)^2 + 2(ab)(bc) + (bc)^2$

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

Now, $a^2b^2 + 2ab^2c + b^2c^2$ - $2ab^2c$

= $a^2b^2 + b^2c^2$

Question:4(vii) Simplify.

$(m^2 - n^2m)^2 + 2m^3n^2$

Answer:

We use identity

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

In this a = m^2 and b = n^2m

$(m^2 - n^2m)^2 = (m^2)^2 - 2(m^2)(n^2m) + (n^2m)^2$

= $m^4 - 2m^3n^2 + n^4m^2$

Now, $m^4 - 2m^3n^2 + n^4m^2$ + $2m^3n^2$

= $m^4 + n^4m^2$

Question:5(i) Show that

$(3x + 7)^2 - 84x = (3x - 7)^2$

Answer:

L.H.S. = $(3x+7)^2 - 84x = 9x^2 + 42x + 49 - 84x$

$= 9x^2 - 42x + 49$

$= (3x-7)^2$

= R.H.S.

Hence it is prooved

Question:5(ii) Show that

$(9p-5q)^2 + 180pq = (9p+5q)^2$

Answer:

L.H.S.

= $(9p-5q)^2 + 180pq = 81p^2 - 90pq + 25q^2 + 180pq$ (Using $(a-b)^2 = a^2 - 2ab + b^2$)

$= 81p^2 + 90pq + 25q^2$

$= (9p+5q)^2 \left((a+b)^2 = a^2 + 2ab + b^2\right)$

= R.H.S.

Question:5(iii) Show that.

$(\frac{4}{3}m - \frac{3}{4}n)^2 + 2mn = \frac{16}{9}m^2 + \frac{9}{16}n^2$

Answer:

First we will solve the LHS :

$$= (\frac{4}{3}m - \frac{3}{4}n)^2 + 2mn = \frac{16}{9}m^2 - 2mn + \frac{9}{16}n^2 + 2mn$$

or $= \frac{16}{9}m^2 + \frac{9}{16}n^2$

= RHS

Question:5(iv) Show that.

$$(4pq + 3q)^2 - (4pq - 3q)^2 = 48pq^2$$

Answer:

Opening both brackets we get,

$$(4pq + 3q)^2 - (4pq - 3q)^2 = 16p^2q^2 + 24pq^2 + 9q^2 - (16p^2q^2 - 24pq^2 + 9q^2)$$

$$= 16p^2q^2 + 24pq^2 + 9q^2 - 16p^2q^2 + 24pq^2 - 9q^2)$$

$$= 48pq^2$$

= R.H.S.

Question:5(v) Show that

$$(a - b)(a + b) + (b - c)(b + c) + (c - a)(c + a) = 0$$

Answer:

Opening all brackets from the LHS, we get :

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

$$= a^2+ab-ab-b^2+b^2+bc-bc-c^2+c^2+ca-ac-a^2$$

$= 0$ = RHS

Question:6(i) Using identities, evaluate.

71^2

Answer:

We will use the identity:

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

So, $71^2 = (70+1)^2 = 70^2+2(70)(1)+1^2$

$$= 4900+140+1$$

$$= 5041$$

Question:6(ii) Using identities, evaluate.

99^2

Answer:

Here we will use the identity :

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

So : $99^2 = (100-1)^2 = 100^2-2(100)(1)+1^2$

or $= 10000 - 200 + 1$

$= 9801$

Question:6(iii) Using identities, evaluate.

102^2

Answer:

Here we will use the identity :

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

So :

$102^2 = (100+2)^2 = 100^2 + 2(100)(2) + 2^2$

or $= 10000 + 400 + 4$

$= 10404$

Question:6(iv) Using identities, evaluate.

998^2

Answer:

Here we will the identity :

$998^2 = (1000-2)^2 = 1000^2 - 2(1000)(2) + 2^2$

or $= 1000000 - 4000 + 4$

or $= 996004$

Question:6(v) Using identities, evaluate.

5.2^2

Answer:

Here we will use :

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

Thus

$(5.2)^2 = (5.0 + 0.2)^2 = 5^2 + 2(5)(0.2) + (0.2)^2$

or $= 25 + 2 + 0.04$

$= 27.04$

Question:6(vi) Using identities, evaluate.

297×303

Answer:

This can be written as :

$297 \times 303 = (300 - 3) \times (300 + 3)$

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

or $= 90000 - 9$

$= 89991$

Question:6(vii) Using identities, evaluate.

78×82

Answer:

This can be written in form of :

$78 \times 82 = (80 - 2) \times (80 + 2)$

or $= 80^2 - 2^2 \because (a - b)(a + b) = a^2 - b^2$

or $= 6400 - 4 = 6396$

Question:6(viii) Using identities, evaluate.

8.9^2

Answer:

Here we will use the identity :

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

Thus :

$8.9^2 = (9 - 0.1)^2 = 9^2 - 2(9)(0.1) + 0.1^2$

or $= 81 - 1.8 + 0.01$

or $= 79.21$

Question:6(ix) Using identities, evaluate.

10.5×9.5

Answer:

This can be written as :

$10.5 \times 9.5 = (10 + 0.5) \times (10 - 0.5)$

or $= 10^2 - 0.5^2 \because (a + b)(a - b) = a^2 - b^2$

or $= 100 - 0.25$

or $= 99.75$

Question:7(i) Using $a^2 - b^2 = (a + b)(a - b)$, find

$51^2 - 49^2$

Answer:

We know,

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

Using this formula,

$51^2 - 49^2$ = (51 + 49)(51 - 49)

= (100)(2)

= **200**

Question:7(ii) Using $a^2 - b^2 = (a + b)(a - b)$, find

$(1.02)^2 - (0.98)^2$

Answer:

We know,

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

Using this formula,

$(1.02)^2 - (0.98)^2$ = (1.02 + 0.98)(1.02 - 0.98)

= (2.00)(0.04)

= **0.08**

Question:7(iii) Using $a^2 - b^2 = (a + b)(a - b)$, find.

$153^2 - 147^2$

Answer:

We know,

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

Using this formula,

$153^2 - 147^2$ = (153 - 147)(153 +147)

=(6) (300)

= **1800**

Question:7(iv) Using $a^2 - b^2 = (a + b)(a - b)$, find

$12.1^2 - 7.9^2$

Answer:

We know,

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

Using this formula,

$(1.02)^2 - (0.98)^2$ = (1.02 + 0.98)(1.02 - 0.98)

= (2.00)(0.04)

= **0.08**

Question:8(i) Using $(x + a)(x + b) = x^2 + (a + b)x + ab$ 103×104

Answer:

We know,

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

Using this formula,

103×104 = (100 + 3)(100 + 4)

Here x =100, a = 3, b = 4

$\therefore 103 \times 104 = 100^2 + (3 + 4)100 + (3 \times 4)$

$= 10000 + 1200 + 12$

= 11212

Question:8(ii) Using $(x + a)(x + b) = x^2 + (a + b)x + ab$, find

5.1×5.2

Answer:

We know,

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

Using this formula,

5.1×5.2 = (5 + 0.1)(5 + 0.2)

Here x =5, a = 0.1, b = 0.2

$\therefore 5.1 \times 5.2 = 5^2 + (0.1 + 0.2)5 + (0.1 \times 0.2)$

$= 25 + 1.5 + 0.02$

= 26.52

Question:8(iii) Using $(x + a)(x + b) = x^2 + (a + b)x + ab$, find

103×98

Answer:

We know,

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

Using this formula,

103×98 = (100 + 3)(100 - 2) = (100 + 3){100 + (-2)}

Here x =100, a = 3, b = -2

$\therefore 103 \times 98 = 100^2 + (3 + (-2))100 + (3 \times (-2))$

$= 10000 + 100 - 6$

= 10094

Question: 8(iv) Using $(x + a)(x + b) = x^2 + (a + b)x + ab$, find

9.7×9.8

Answer:

We know,

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

Using this formula,

9.7×9.8 = (10 - 0.3)(10 - 0.2) = {10 + (-0.3)}{10 + (-0.2)}

Here x =10, a = -0.3, b = -0.2

$\therefore 9.7 \times 9.8 = 10^2 + ((-0.3) + (-0.2))10 + ((-0.3) \times (-0.2))$

$= 100 - 5 + 0.06$

= 95.