

NCERT solutions for class-8 maths algebraic expressions and identities Ex-9.5

Q1. Use a suitable identity to get each of the following products:

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

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

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

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

(v)
$$(1.1m-0.4)(1.1m+0.4)$$

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

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

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

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

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

Ans: (i)
$$(x+3)(x+3) = (x+3)^2$$

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

[Using identity
$$(a+b)^2 = a^2 + 2ab + b^2$$
]

$$= x^2 + 6x + 9$$

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

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

[Using identity $(a+b)^2 = a^2 + 2ab + b^2$]

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

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

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

[Using identity $(a-b)^2 = a^2 - 2ab + b^2$]

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

(iv)
$$\left(3a - \frac{1}{2}\right) \left(3a - \frac{1}{2}\right) = \left(3a - \frac{1}{2}\right)^2$$

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

[Using identity $(a-b)^2 = a^2 - 2ab + b^2$]

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

(v)
$$(1.1m-0.4)(1.1m+0.4) = (1.1m)^2 - (0.4)^2$$

[Using identity
$$(a-b)(a+b) = a^2 - b^2$$
]

$$= 1.21m^2 - 0.16$$

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

$$= \left(b^2\right)^2 - \left(a^2\right)^2$$

[Using identity $(a-b)(a+b) = a^2 - b^2$]

$$= b^4 - a^4$$

(vii)
$$(6x-7)(6x+7) = (6x)^2 - (7)^2$$

[Using identity $(a-b)(a+b) = a^2 - b^2$]

$$=36x^2-49$$

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

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

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

[Using identity $(a-b)^2 = a^2 - 2ab + b^2$]

$$=c^2-2ca+a^2$$

(ix)
$$\left(\frac{x}{2} + \frac{3y}{4}\right) \left(\frac{x}{2} + \frac{3y}{4}\right) = \left(\frac{x}{2} + \frac{3y}{4}\right)^2$$

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

[Using identity $(a+b)^2 = a^2 + 2ab + b^2$]

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

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

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

[Using identity
$$(a-b)^2 = a^2 - 2ab + b^2$$
]
= $49a^2 - 126ab + 81b^2$

Q2. Use the identity

$$(x+a)(x+b) = x^2 + (a+b)x + ab$$
 to find the following products:

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

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

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

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

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

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

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

Ans: (i)
$$(x+3)(x+7)$$

$$=(x)^2+(3+7)x+3\times7$$

[Using identity $(x+a)(x+b) = x^2 + (a+b)x + ab$]

$$= x^2 + 10x + 21$$

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

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

[Using identity $(x+a)(x+b) = x^2 + (a+b)x + ab$]

$$= 16x^2 + 6 \times 4x + 5 = 16x^2 + 24x + 5$$

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

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

[Using identity $(x+a)(x+b) = x^2 + (a+b)x + ab$]

$$= 16x^2 + (-6) \times 4x + 5 = 16x^2 - 24x + 5$$

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

$$=(4x)^2+\{5\times(-1)\}\times4x+5\times(-1)$$

[Using identity $(x+a)(x+b) = x^2 + (a+b)x + ab$]

$$= 16x^2 + (5-1) \times 4x - 5$$

$$= 16x^2 + 4 \times 4x - 5$$

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

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

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

[Using identity $(x+a)(x+b) = x^2 + (a+b)x + ab$]

$$=4x^2+8y\times2x+15y^2$$

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

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

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

[Using identity $(x+a)(x+b) = x^2 + (a+b)x + ab$]

$$=4a^4+14\times 2a^2+45$$

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

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

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

[Using identity $(x+a)(x+b) = x^2 + (a+b)x + ab$] = $x^2y^2z^2 - 6xvz + 8$

Q3. Find the following squares by using identities:

(i)
$$(b-7)^2$$

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

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

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

(v)
$$(0.4p-0.5q)^2$$

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

Ans: (i)
$$(b-7)^2 = (b)^2 - 2 \times b \times 7 + (7)^2$$

[Using identity
$$(a-b)^2 = a^2 - 2ab + b^2$$
]

$$=b^2-14b+49$$

(ii)
$$(xy + 3z)^2 = (xy)^2 + 2 \times xy \times 3z + (3z)^2$$

[Using identity
$$(a+b)^2 = a^2 + 2ab + b^2$$
]

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

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

$$=(6x^2)^2-2\times6x^2\times5y+(5y)^2$$

[Using identity
$$(a-b)^2 = a^2 - 2ab + b^2$$
]

$$=36x^4-60x^2y+25y^2$$

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

$$=\left(\frac{2}{3}m\right)^{2}+2\times\frac{2}{3}m\times\frac{3}{2}n+\left(\frac{3}{2}n\right)^{2}$$

[Using identity $(a+b)^2 = a^2 + 2ab + b^2$]

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

(v)
$$(0.4p-0.5q)^2$$

$$=(0.4p)^2-2\times0.4p\times0.5q+(0.5q)^2$$

[Using identity $(a-b)^2 = a^2 - 2ab + b^2$]

$$= 0.16 p^2 - 0.40 pq + 0.25 q^2$$

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

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

[Using identity
$$(a+b)^2 = a^2 + 2ab + b^2$$
]

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

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