NCERT solutions for class-8 maths algebraic expressions and identities Ex-9.4

Q1. Multiply the binomials:

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

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

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

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

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

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

Ans:

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

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

$= 2x\times4x-2x\times3+5\times4x-5\times3$

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

$= 8x^2+14x-15$

(ii) $(y-8)\times(3y-4) = y(3y-4)-8(3y-4)$

$= y\times3y-y\times4-8\times3y-8\times-4$

$= 3y^2-4y-24y+12$

$= 3y^2-28y+12$

(iii) $(2.5l-0.5m)\times(2.5l+0.5m)$

$=2.5l\times(2.5l+0.5m)-0.5m\times(2.5l+0.5m)$

$=2.5l\times2.5l+0.5l\times0.5m-0.5m\times2.5l-0.5m\times0.5m$

$=6.25l^2+1.25lm-1.25lm-0.25m^2$

$=6.25l^2-0.25m^2$

(iv) $(a+3b)\times(x+5)=a(x+5)+3b(x+5)$

$=a\times x+a\times5+3b\times x+3b\times5$

$=ax+5a+3bx+15b$

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

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

$=2pq\times3pq-2pq\times2q^2+3q^2\times3pq-3q^2\times2q^2$

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

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

(vi) $\left(\frac{3}{4}a^2+3b^2\right)\times4\left(a^2-\frac{2}{3}b^2\right)$

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

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

$=\frac{3}{4}a^2\times4a^2-\frac{3}{4}a^2\times\frac{8}{3}b^2+3b^2\times4a^2-3b^2\times\frac{8}{3}b^2$

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

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

Q2. Find the product:

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

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

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

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

Ans: (i) $(5-2x)(3+x)$

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

$=5\times3+5\times x-2x\times3-2x\times x$

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

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

$=x(7x-y)+7y\times(7x-y)$

$=x\times7x-x\times y+7y\times7x-7y\times y$

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

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

(iii) $\left(a^2+b\right)\left(a+b^2\right)$

$=a^2\times\left(a+b^2\right)+b\times\left(a+b^2\right)$

$=a^2\times a+a^2\times b^2+b\times a+b\times b^2$

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

(iv) $\left(p^2-q^2\right)(2p+q)$

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

$=p^2\times2p+p^2\times q-q^2\times2p-q^2\times q$

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

Q3. Simplify:

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

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

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

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

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

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

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

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

Ans: (i) $(x^2-5)(x+5)+25$

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

$= x^2\times x+x^2\times 5-5\times x-5\times 5+25$

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

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

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

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

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

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

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

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

$= t\times t^2-t\times s+s^2\times t^2-s^2\times s$

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

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

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

$= ac-ad+bc-bd+ac+ad-bc-bd+2ac+2bd$

$= ac+ac-ad+ad+bc-bc-bd-bd+2ac+2bd$

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

$= 4ac$

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

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

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

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

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

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

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

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

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

$= x^3 + y^3$

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

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

$= 2.25x^2 + 6.0xy + 4.5x - 6.0xy - 16y^2 - 12y - 4.5x + 12y$

$= 2.25x^2 + 6.0xy - 6.0xy + 4.5x - 4.5x - 16y^2 - 12y + 12y$

$= 2.25x^2 - 16y^2$

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

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

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

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

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

********** END **********