

EXERCISE 6.7

1. Find the following products:

(i) $(x + 4)(x + 7)$

(ii) $(x - 11)(x + 4)$

(iii) $(x + 7)(x - 5)$

(iv) $(x - 3)(x - 2)$

(v) $(y^2 - 4)(y^2 - 3)$

(vi) $(x + 4/3)(x + 3/4)$

(vii) $(3x + 5)(3x + 11)$

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

(ix) $(z^2 + 2)(z^2 - 3)$

(x) $(3x - 4y)(2x - 4y)$

(xi) $(3x^2 - 4xy)(3x^2 - 3xy)$

(xii) $(x + 1/5)(x + 5)$

(xiii) $(z + 3/4)(z + 4/3)$

(xiv) $(x^2 + 4)(x^2 + 9)$

(xv) $(y^2 + 12)(y^2 + 6)$

(xvi) $(y^2 + 5/7)(y^2 - 14/5)$

(xvii) $(p^2 + 16)(p^2 - 1/4)$

Solution:

(i) $(x + 4)(x + 7)$

Let us simplify the given expression

$$x(x + 7) + 4(x + 7)$$

$$x^2 + 7x + 4x + 28$$

$$x^2 + 11x + 28$$

(ii) $(x - 11)(x + 4)$

Let us simplify the given expression

$$x(x + 4) - 11(x + 4)$$

$$x^2 + 4x - 11x - 44$$

$$x^2 - 7x - 44$$

(iii) $(x + 7)(x - 5)$

Let us simplify the given expression

$$x(x - 5) + 7(x - 5)$$

$$x^2 - 5x + 7x - 35$$

$$x^2 + 2x - 35$$

(iv) $(x - 3)(x - 2)$

Let us simplify the given expression

$$x(x - 2) - 3(x - 2)$$

$$x^2 - 2x - 3x + 6$$

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

(v) $(y^2 - 4)(y^2 - 3)$

Let us simplify the given expression

$$y^2(y^2 - 3) - 4(y^2 - 3)$$

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

$$y^4 - 7y^2 + 12$$

(vi) $(x + 4/3)(x + 3/4)$

Let us simplify the given expression

$$x(x + 3/4) + 4/3(x + 3/4)$$

$$x^2 + 3x/4 + 4x/3 + 12/12$$

$$x^2 + 3x/4 + 4x/3 + 1$$

$$x^2 + 25x/12 + 1$$

(vii) $(3x + 5)(3x + 11)$

Let us simplify the given expression

$$3x(3x + 11) + 5(3x + 11)$$

$$9x^2 + 33x + 15x + 55$$

$$9x^2 + 48x + 55$$

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

Let us simplify the given expression

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

$$4x^4 + 10x^2 - 6x^2 - 15$$

$$4x^4 + 4x^2 - 15$$

(ix) $(z^2 + 2)(z^2 - 3)$

Let us simplify the given expression

$$z^2(z^2 - 3) + 2(z^2 - 3)$$

$$z^4 - 3z^2 + 2z^2 - 6$$

$$z^4 - z^2 - 6$$

(x) $(3x - 4y)(2x - 4y)$

Let us simplify the given expression

$$3x(2x - 4y) - 4y(2x - 4y)$$
$$6x^2 - 12xy - 8xy + 16y^2$$
$$6x^2 - 20xy + 16y^2$$

(xi) $(3x^2 - 4xy)(3x^2 - 3xy)$

Let us simplify the given expression

$$3x^2(3x^2 - 3xy) - 4xy(3x^2 - 3xy)$$
$$9x^4 - 9x^3y - 12x^3y + 12x^2y^2$$
$$9x^4 - 21x^3y + 12x^2y^2$$

(xii) $(x + 1/5)(x + 5)$

Let us simplify the given expression

$$x(x + 1/5) + 5(x + 1/5)$$
$$x^2 + x/5 + 5x + 1$$
$$x^2 + 26/5x + 1$$

(xiii) $(z + 3/4)(z + 4/3)$

Let us simplify the given expression

$$z(z + 4/3) + 3/4(z + 4/3)$$
$$z^2 + 4/3z + 3/4z + 12/12$$
$$z^2 + 4/3z + 3/4z + 1$$
$$z^2 + 25/12z + 1$$

(xiv) $(x^2 + 4)(x^2 + 9)$

Let us simplify the given expression

$$x^2(x^2 + 9) + 4(x^2 + 9)$$
$$x^4 + 9x^2 + 4x^2 + 36$$
$$x^4 + 13x^2 + 36$$

(xv) $(y^2 + 12)(y^2 + 6)$

Let us simplify the given expression

$$y^2(y^2 + 6) + 12(y^2 + 6)$$
$$y^4 + 6y^2 + 12y^2 + 72$$
$$y^4 + 18y^2 + 72$$

(xvi) $(y^2 + 5/7)(y^2 - 14/5)$

Let us simplify the given expression

$$y^2(y^2 - 14/5) + 5/7(y^2 - 14/5)$$
$$y^4 - 14/5y^2 + 5/7y^2 - 2$$

$$y^4 - 73/35y^2 - 2$$

(xvii) $(p^2 + 16)(p^2 - 1/4)$

Let us simplify the given expression

$$p^2(p^2 - 1/4) + 16(p^2 - 1/4)$$

$$p^4 - 1/4p^2 + 16p^2 - 4$$

$$p^4 + 63/4p^2 - 4$$

2. Evaluate the following:

(i) 102×106

(ii) 109×107

(iii) 35×37

(iv) 53×55

(v) 103×96

(vi) 34×36

(vii) 994×1006

Solution:

(i) 102×106

We can express 102 as $100 + 2$ and 106 as $100 + 6$

Now let us simplify

$$\begin{aligned} 102 \times 106 &= (100 + 2)(100 + 6) \\ &= 100(100 + 6) + 2(100 + 6) \\ &= 10000 + 600 + 200 + 12 \\ &= 10812 \end{aligned}$$

(ii) 109×107

We can express 109 as $100 + 9$ and 107 as $100 + 7$

Now let us simplify

$$\begin{aligned} 109 \times 107 &= (100 + 9)(100 + 7) \\ &= 100(100 + 7) + 9(100 + 7) \\ &= 10000 + 700 + 900 + 63 \\ &= 11663 \end{aligned}$$

(iii) 35×37

We can express 35 as $30 + 5$ and 37 as $30 + 7$

Now let us simplify

$$\begin{aligned} 35 \times 37 &= (30 + 5)(30 + 7) \\ &= 30(30 + 7) + 5(30 + 7) \\ &= 900 + 210 + 150 + 35 \end{aligned}$$

$$= 1295$$

(iv) 53×55

We can express 53 as $50 + 3$ and 55 as $50 + 5$

Now let us simplify

$$\begin{aligned} 53 \times 55 &= (50 + 3)(50 + 5) \\ &= 50(50 + 5) + 3(50 + 5) \\ &= 2500 + 250 + 150 + 15 \\ &= 2915 \end{aligned}$$

(v) 103×96

We can express 103 as $100 + 3$ and 96 as $100 - 4$

Now let us simplify

$$\begin{aligned} 103 \times 96 &= (100 + 3)(100 - 4) \\ &= 100(100 - 4) + 3(100 - 4) \\ &= 10000 - 400 + 300 - 12 \\ &= 10000 - 112 \\ &= 9888 \end{aligned}$$

(vi) 34×36

We can express 34 as $30 + 4$ and 36 as $30 + 6$

Now let us simplify

$$\begin{aligned} 34 \times 36 &= (30 + 4)(30 + 6) \\ &= 30(30 + 6) + 4(30 + 6) \\ &= 900 + 180 + 120 + 24 \\ &= 1224 \end{aligned}$$

(vii) 994×1006

We can express 994 as $1000 - 6$ and 1006 as $1000 + 6$

Now let us simplify

$$\begin{aligned} 994 \times 1006 &= (1000 - 6)(1000 + 6) \\ &= 1000(1000 + 6) - 6(1000 + 6) \\ &= 1000000 + 6000 - 6000 - 36 \\ &= 999964 \end{aligned}$$