EXERCISE 19(C)

Question 1.

Fill in the blanks :

(*i*) $6 \times 3 =$ ..... and $6x \times 3x =$ .....

(*ii*) $6 \times 3 =$ ..... and $6x^2 \times 3x^3 =$ .....

(*iii*) $5 \times 4 =$ ..... and $5x \times 4y =$ .....

(*iv*) $4 \times 7 =$ ..... and $4ax \times 7x =$ .....

(*v*) $6 \times 2 =$ ..... and $6xy \times 2xy =$ .....

(*vi*) 12×4 ..... and $12ax^2 \times 4ax =$ .....

(*vii*) $1 \times 8 =$ ..... and $a^2xy^2 \times 8a^3x^2y =$ .....

(*viii*) $15 \times 3 =$ ..... and $15x \times 3x^5y^2 =$ .....

Solution:

(i) 6 x 3 = 18 and 6x x 3x = 6 x 3x x x x = $18x^2$

(*ii*) $6 \times 3 = \mathbf{18}$ and $6x^2 \times 3x^3$

$= 6 \times 3 \times x^2 \times x^3 = \mathbf{18x^5}$

(*iii*) $5 \times 4 = \mathbf{20}$ and $5x \times 4y$

$= 5 \times 4 \times x \times y = \mathbf{20xy}$

(*iv*) $4 \times 7 = \mathbf{28}$ and $4ax \times 7x$

$= 4 \times 7 \times a \times x \times x = \mathbf{28ax^2}$

(*v*) $6 \times 2 = \mathbf{12}$ and $6xy \times 2xy$

$= 6 \times 2 \times x \times x \times y \times y = \mathbf{12x^2y^2}$

(*vi*) $12 \times 4 = \mathbf{48}$ and $12ax^2 \times 4ax$

$= 12 \times 4 \times a \times a \times x^2 \times x$

$= \mathbf{48a^2x^3}$

(*vii*) $1 \times 8 = \mathbf{8}$ and $a^2xy^2 \times 8a^3x^2y$

$= 1 \times 8 \times a^2 \times a^3 \times x \times x^2 \times y^2 \times y$

$= \mathbf{8a^5x^3y^3}$

(*viii*) $15 \times 3 = \mathbf{45}$ and $15x \times 3x^5y^2$

$= 15 \times 3 \times x \times x^5 \times y^2$

$= \mathbf{45x^6y^2}$

Question 2.

(*i*) $4x \times 6x \times 2 =$ .....

(*ii*) $3ab \times 6ax =$ .....

(*iiii*) $x \times 2x^2 \times 3x^3 =$ .....

(*iv*) $5 \times 5a^3 =$ .....

(*v*) $6 \times 6x^2 \times 6x^2y^2 =$ .....

(*vi*) $-8x \times -3x = -$ .....

(*vii*) $-5 \times -3x \times 5x^2 =$ .....

(*viii*) $8 \times -4xy^2 \times 3x^3y^2 =$ .....

(*ix*) $-4x \times 5xy \times 3z =$ .....

(*x*) $5x \times 2x^2y \times (-7y^3) \times 2x^3y^2 =$ .....

(*i*) $4x \times 6x \times 2 = 4 \times 6 \times 2 \times x \times x$

$= \mathbf{48x^2}$

(*ii*) $3ab \times 6ax = 3 \times 6 \times a \times a \times b \times x$

$= \mathbf{18a^2bx}$

(*iii*) $x \times 2x^2 \times 3x = 1 \times 2 \times 3 \times x^{1+2+3}$

$= \mathbf{6x^6}$

(*iv*) $5 \times 5a^3 = \mathbf{25a^3}$

(*v*) $6 \times 6x^2 \times 6x^2y^2 = 6 \times 6 \times 6 \times x^{2+2}\, y^2$

$= \mathbf{216x^4y^2}$

(*vi*) $-8x \times -3x = -8 \times -3 \times x^{1+1}$

$= \mathbf{24x^2}$

(*vii*) $-5 \times -3x \times 5x^2 = -5 \times -3 \times 5 \times x^{1+2}$

$= \mathbf{75x^3}$

(*viii*) $8 \times -4xy^2 \times 3x^3y^2$

$= 8 \times -4 \times 3 \times x^{1+3}y^{2+2}$

$= \mathbf{-96x^4y^4}$

(*ix*) $-4x \times 5xy \times 3z$

$= -4 \times 5 \times 3 \times x^{1+1} \times y \times z$

$= \mathbf{-60x^2yz}$

(*x*) $5x \times 2x^2y \times -7y^3 \times 2x^3y^2$

$= 5 \times 2 \times -7 \times 2 \times x^{1+2+3} \times y^{1+3+2}$

$= \mathbf{-140x^6y^6}$

Question 3.

(*i*) $3x^3 \times 5x^4$

(*ii*) $5a^2 \times 7a^7$

(*iii*) $3abc \times 6ac^3$

(*iv*) $a^2b^2 \times 5a^3b^4$

(*v*) $2x^2y^3 \times 5x^3y^4$

(*vi*) $abc \times bcd$

Solution:

(*i*) $3x^3 \times 5x^4 = 3 \times 5x^{3+4} = \mathbf{15x^7}$

(*ii*) $5a^2 \times 7a^7 = 5 \times 7 \times a^{2+7} = \mathbf{35a^9}$

(*iii*) $3abc \times 6ac^3 = 3 \times 6 \times a^{1+1} \times b \times c^{1+3}$

$= \mathbf{18a^2bc^4}$

(*iv*) $a^2b^2 \times 5a^3b^4 = 1 \times 5 \times a^{2+3}\, b^{2+4}$

$= \mathbf{5a^5b^6}$

(*v*) $2x^2y^3 \times 5x^3y^4 = 2 \times 5 \times x^{2+3} \times y^{3+4}$

$= \mathbf{10x^5y^7}$

(*vi*) $abc \times bcd = a \times b^{1+1} \times c^{1+1} \times d$

$= \mathbf{ab^2c^2d}$

Question 4.

Multiply :

(*i*) $a + b$ by ab

(*ii*) $3ab - 4b$ by $3ab$

(*iii*) $2xy - 5by$ by $4bx$

(*iv*) $4x + 2y$ by $3xy$

(*v*) $x^2 - x$ by $2x$

(*vi*) $1 + 4x$ by x

(*vii*) $9xy^2 + 3x^2y$ by $5xy$

(*viii*) $6x - 5y$ by $3axy$

Solution:

(*i*) $(a + b) \times ab = a \cdot ab + b \cdot ab$

$= \mathbf{a^2b + ab^2}$

(*ii*) $(3ab - 4b) \times 3ab = 3ab \times 3ab - 4b \times 3ab$

$= 3 \times 3a^{1+1}b^{1+1} - 4 \times 3 \times a \times b^{1+1}$

$= \mathbf{9a^2b^2 - 12ab^2}$

(*iii*) $(2xy - 5by) \times 4bx = 2xy \cdot 4bx - 5by \cdot 4bx$

$= \mathbf{8bx^2y - 20b^2xy}$

(*iv*) $(4x + 2y) \times 3xy = 4x.3xy + 2y \cdot 3xy$

$= 12x^2y + 6xy^2$

(*v*) $(x^2 - x) \times 2x = x^2.2x - x \cdot 2x$

$= \mathbf{2x^3 - 2x^2}$

(*vi*) $(1 + 4x) \times x = 1 \cdot x + 4x \cdot x$

$= \mathbf{x + 4x^2}$

(*vii*) $(9xy^2 + 3x^2y) \times 5xy$

$= 9xy^2 \cdot 5xy + 3x^2y \cdot 5xy$

$= \mathbf{45x^2y^3 + 15x^3y^2}$

(*viii*) $(6x - 5y) \times 3axy$

$= 6x \cdot 3axy - 5y \cdot 3axy$

$= \mathbf{18ax^2y - 15axy^2}$

Question 5.

Multiply :

(*i*) $-x + y - z$ and $-2x$

(*ii*) $xy - yz$ and x^2yz^2

(*iii*) $2xyz + 3xy$ and $-2y^2z$

(*iv*) $-3xy^2 + 4x^2y$ and $-xy$

(*v*) $4xy$ and $-x^2y - 3x^2y^2$

Solution:

(i) $(-x + y - z) \times -2x$

$= -x \cdot -2x + y \cdot -2x - z \cdot -2x$

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

(ii) $xy - yz \times x^2yz^2$

$= xy \cdot x^2yz^2 - yz \cdot x^2yz^2$

$= x^{2+1} \times y^{1+1} \times z^2 - x^2 \times y^{1+1} \times z^{2+1}$

$= \mathbf{x^3y^2z^2 - x^2y^2z^3}$

(iii) $2xyz + 3xy \times -2y^2z$

$= 2xyz \cdot -2y^2z + 3xy \cdot -2y^2z$

$= -4x \times y^{2+1} \times z^{1+1} - 6 \times x \times y^{2+1} \times z$

$= \mathbf{-4xy^3z^2 - 6xy^3z}$

(iv) $-3xy^2 + 4x^2y \times -xy$

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

$= \mathbf{3x^2y^3 - 4x^3y^2}$

(v) $-x^2y - 3x^2y^2 \times 4xy$

$= -x^2y \cdot 4xy - 3x^2y^2 \cdot 4xy$

$= \mathbf{-4x^3y^2 - 12x^3y^3}$

Question 6.

Multiply :

(i) $3a + 4b - 5c$ and $3a$

(ii) $-5xy$ and $-xy^2 - 6x^2y$

Solution:

(i) $(3a + 4b - 5c) \times 3a$

$= (3a \times 3a) + (4b \times 3a) - (5c \times 3a)$

$= 9a^2 + 12ab - 15ac$

(ii) $(-xy^2 - 6x^2y) \times -5xy$

$= -xy^2 \times -5xy - 6x^2y \times -5xy$

$= 5x^2y^3 + 30x^3y^2$

Question 7.

Multiply :

(i) x + 2 and x + 10

(ii) x + 5 and x – 3

(iii) x – 5 and x + 3

(iv) x – 5 and x – 3

(v) 2x+ y and x+ 3y
(vi) (3x – 5y) and (x + 6y)
(vii) (x + 9y) and (x – 5y)
(viii) (2x + 5y) and (2x + 5y)

Solution:

(*i*) $(x + 2)\cdot(x + 10)$

$= x\cdot(x + 2) + 10\cdot(x + 2)$

$= x^2 + 2x + 10x + 20$

$= \mathbf{x^2 + 12x + 20}$

(*ii*) $(x + 5)\cdot(x - 3)$

$= x\cdot(x + 5) - 3\cdot(x + 5)$

$= x^2 + 5x - 3x - 15$

$= \mathbf{x^2 + 2x - 15}$

(*iii*) $(x - 5)\cdot(x + 3) = x\cdot(x - 5) + 3\cdot(x - 5)$

$= x^2 - 5x + 3x - 15$

$= \mathbf{x^2 - 2x - 15}$

(*iv*) $(x - 5)\cdot(x - 3) = x\cdot(x - 5) - 3\cdot(x - 5)$

$= x^2 - 5x - 3x + 15$

$= \mathbf{x^2 - 8x + 15}$

(*v*) $(2x + y)\cdot(x + 3y)$

$= x\cdot(2x + y) + 3y\,(2x + y)$

$= 2x^2 + xy + 6xy + 3y^2$

$= \mathbf{2x^2 + 7xy + 3y^2}$

(*vi*) $(3x - 5y)\cdot(x + 6y)$

$= x\cdot(3x - 5y) + 6y\,(3x - 5y)$

$= 3x^2 - 5xy + 18xy - 30y^2$

$= 3x^2 + 13xy - 30y^2$

(*vii*) $(x + 9y)\cdot(x - 5y)$

$= x\cdot(x + 9y) - 5y\,(x + 9y)$

$= x^2 + 9xy - 5xy - 45y^2$

$= \mathbf{x^2 + 4xy - 45y^2}$

(*viii*) $(2x + 5y)\cdot(2x + 5y)$

$= 2x\cdot(2x + 5y) + 5y\cdot(2x + 5y)$

$= 4x^2 + 10xy + 10xy + 25y^2$

$= \mathbf{4x^2 + 20xy + 25y^2}$

Question 8.

Multiply :

(*i*) $3abc$ and $-5a^2b^2c$

(*ii*) $x - y + z$ and $-2x$

(*iii*) $2x - 3y - 5z$ and $-2y$

(*iv*) $-8xyz + 10x^2yz^3$ and xyz

(*v*) xyz and $-13xy^2z + 15x^2yz - 6xyz^2$

(*vi*) $4abc - 5a^2bc - 6ab^2c$ and $-2abc^2$

Solution:

(*i*) $3abc \times -5a^2b^2c$

$= 3 \cdot -5 \cdot a^{1+2} \cdot b^{1+2} \cdot c^{1+1}$

$= \mathbf{-15a^3b^3c^2}$

(*ii*) $(x - y + z) \cdot -2x$

$= \mathbf{-2x^2 + 2xy - 2xz}$

(*iii*) $2x - 3y - 5z \cdot -2y$

$= \mathbf{-4xy + 6y^2 + 10yz}$

(*iv*) $-8xyz + 10x^2yz^3 \cdot xyz$

$= \mathbf{-8x^2y^2z^2 + 10x^3y^2z^4}$

(*v*) $-13xy^2z + 15x^2yz - 6xyz^2 \cdot xyz$

$= \mathbf{-13x^2y^3z^2 + 15x^3y^2z^2 - 6x^2y^2z^3}$

(*vi*) $4abc - 5a^2bc - 6ab^2c \cdot -2abc^2$

$= \mathbf{-8a^2b^2c^3 + 10a^3b^2c^3 + 12a^2b^3c^3}$

Question 9.

Find the product of :

(*i*) $xy - ab$ and $xy + ab$

(*ii*) $2abc - 3xy$ and $2abc + 3xy$

(*iii*) $a + b - c$ and $2a - 3b$

(*iv*) $5x - 6y - 7z$ and $2x + 3y$

(*v*) $5x - 6y - 7z$ and $2x + 3y + z$

(*vi*) $2a + 3b - 4c$ and $a - b - c$

Solution:

(*i*) $(xy - ab)\cdot(xy + ab)$

$= xy\cdot(xy - ab) + ab\,(xy - ab)$

$= x^2y^2 - abxy + abxy - a^2b^2$

$\mathbf{= x^2y^2 - a^2b^2}$

(*ii*) $(2abc - 3xy)\cdot(2abc + 3xy)$

$= 2abc\cdot(2abc - 3xy) + 3xy\cdot(2abc - 3xy)$

$= 4a^2b^2c^2 - 6abcxy + 6abcxy - 9x^2y^2$

$\mathbf{= 4a^2b^2c^2 - 9x^2y^2}$

(*iii*) $(a + b - c)\cdot(2a - 3b)$

$= 2a\cdot(a + b - c) - 3b\,(a + b - c)$

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

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

$\mathbf{= 2a^2 - ab - 2ac + 3bc - 3b^2}$

(*iv*) $(5x - 6y - 7z)\cdot(2x + 3y)$

$= 2x\cdot(5x - 6y - 7z) + 3y\cdot(5x - 6y - 7z)$

$= 10x^2 - 12xy - 14xz + 15xy - 18y^2 - 21yz$

$\mathbf{= 10x^2 + 3xy - 14xz - 18y^2 - 21yz}$

(*v*) $(5x - 6y - 7z)\cdot(2x + 3y + z)$

$= 2x\cdot(5x - 6y - 7z) + 3y\cdot(5x - 6y - 7z)$

$+ z\,(5x - 6y - 7z)$

$= 10x^2 - 12xy - 14xz + 15xy - 18y^2$

$- 21yz + 5xz - 6yz - 7z^2$

$= 10x^2 - 12xy + 15xy - 14xz + 5xz$

$- 18y^2 - 21yz - 6yz - 7z^2$

$\mathbf{= 10x^2 + 3xy - 9xz - 18y^2 - 27yz - 7z^2}$

(*vi*) $(2a + 3b - 4c)\cdot(a - b - c)$

$= a\cdot(2a + 3b - 4c) - b\cdot(2a + 3b - 4c)$

$- c\cdot(2a + 3b - 4c)$

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

$- 2ac - 3bc + 4c^2$

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

$+ 4bc - 3bc + 4c^2$

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