Expansions

Examples

1) $3(2x+5) = 6x+15$

2) $5(3x-7) = 15x-35$

3) $4(2p-3q) = 8p-12q$

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

5) $-3(2x-5) = -6x+15$

6) $4(2x-3)+3(x-4)$

$= 8x-12+3x-12$

$= 11x-24$

Exercise A

Expand the brackets

1) $2(m+4)$
2) $3(h+2)$
3) $4(p+q)$
4) $5(x+2)$
5) $3(2y+1)$
6) $2(p+4q)$
7) $4(h+2k)$
8) $6(2x+3)$
9) $3(x+2y+3)$
10) $2(p+q+r)$

Exercise B

Expand the brackets

1) $4(x-1)$
2) $2(2x-3)$
3) $3(x-3)$
4) $5(2p-q)$
5) $2(p-q+r)$
6) $-2(x+4)$
7) $-3(y-2)$
8) $-5(x-1)$
9) $-4(2x+y)$
10) $-2(3p-2q)$

Solutions

Exercise A

1) $2(m+4) = 2m+8$
2) $3(h+2) = 3h+6$
3) $4(p+q) = 4p+4q$
4) $5(x+2) = 5x+10$
5) $3(2y+1) = 6y+3$
6) $2(p+4q) = 2p+8q$
7) $4(h+2k) = 4h+8k$
8) $6(2x+3) = 12x+18$
9) $3(x+2y+3) = 3x+6y+9$
10) $2(p+q+r) = 2p+2q+2r$

Exercise B

1) $4(x-1) = 4x-4$
2) $2(2x-3) = 4x-6$
3) $3(x-3) = 3x-9$
4) $5(2p-q) = 10p-5q$
5) $2(p-q+r) = 2p-2q+2r$
6) $-2(x+4) = -2x-8$
7) $-3(y-2) = -3y+6$
8) $-5(x-1) = -5x+5$
9) $-4(2x+y) = -8x-4y$
10) $-2(3p-2q) = -6p+4q$

Exercise C

Expand and simplify

1) $3(x+2)+5(x+3)$

2) $4(p+2q)+3(p+q)$

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

4) $2(h+k)-3(h-k)$

5) $5(x+6)-2(x+4)$

Exercise C

1) $3(x+2)+5(x+3)$

$= 3x+6+5x+15$

$= 8x+21$

2) $4(p+2q)+3(p+q)$

$= 4p+8q+3p+3q$

$= 7p+11q$

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

$= 3x+6y+4x-2y$

$= 7x+4y$

4) $2(h+k)-3(h-k)$

$= 2h+2k-3h+3k$

$= -h+5k$

5) $5(x+6)-2(x+4)$

$= 5x+30-2x-8$

$= 3x+22$

Multiplying Two Brackets

Consider $(a+b)(c+d)$

$= ac + bc + ad + bd$

Examples

1) $(x+2)(x+3)$

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

$= x^2 + 5x + 6$

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

$= x^2 - 4x + 3x - 12$

$= x^2 - x - 12$

3) $(x+4)(y-5)$

$= xy + 4y - 5x - 20$

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

$= 6x^2 - 9x + 8x - 12$

$= 6x^2 - x - 12$

5) $(3x-1)(3x-2)$

$= 9x^2 - 3x - 6x + 2$

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

Exercise Expand and Simplify

1) $(x+3)(x+5) = x^2 + 3x + 5x + 15$

$= x^2 + 8x + 15$

2) $(x-1)(x+3) = x^2 - x + 3x - 3$

$= x^2 + 2x - 3$

3) $(x-2)(x-4) = x^2 - 2x - 4x + 8$

$= x^2 - 6x + 8$

4) $(2x+5)(x+4) = 2x^2 + 5x + 8x + 20$

$= 2x^2 + 13x + 20$

5) $(3y-2)(2y-3) = 6y^2 - 4y - 9y + 6$

$= 6y^2 - 13y + 6$

Trinomials

Ex 1

$$(x+1)(x+2)(x+3)$$

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

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

$$= x^3 + 3x^2 + 2x$$
$$\quad + 3x^2 + 9x + 6$$

$$= x^3 + 6x^2 + 11x + 6$$

Ex 2

$$(2x-3)(x+1)(3x-5)$$

$$= [2x^2 - 3x + 2x - 3](3x-5)$$

$$= [2x^2 - x - 3](3x-5)$$

$$= 6x^3 - 3x^2 - 9x$$
$$\quad - 10x^2 + 5x + 15$$

$$= 6x^3 - 13x^2 - 4x + 15$$

Exercise

1) $(x+2)(x+3)(x+4)$

$= [x^2 + 2x + 3x + 6](x+4)$

$= [x^2 + 5x + 6](x+4)$

$$\begin{aligned} = \quad & x^3 + 5x^2 + 6x \\ & \quad + 4x^2 + 20x + 24 \\ \hline = \quad & x^3 + 9x^2 + 26x + 24 \end{aligned}$$

2) $(x-1)(x-1)(x-2)$

$= [x^2 - x - x + 1](x-2)$

$= [x^2 - 2x + 1](x-2)$

$$\begin{aligned} = \quad & x^3 - 2x^2 + x \\ & \quad - 2x^2 + 4x - 2 \\ \hline = \quad & x^3 - 4x^2 + 5x - 2 \end{aligned}$$