

# Expanding brackets + Use of Pascal's triangle to find coefficients

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## Worked example

Expand:

$$2(4x + 3)(5x - 6)$$

$$3(7x + 2)(8x - 5)$$

## Your turn

Expand:

$$4(5x + 6)(3x - 2)$$

$$60x^2 + 32x - 48$$

## Worked example

Expand:

$$2x(4x + 3)(5x - 6)$$

$$3x^2(7x + 2)(8x - 5)$$

## Your turn

Expand:

$$4x^2(5x + 6)(3x - 2)$$

$$60x^4 + 32x^3 - 48x^2$$

## Worked example

Expand:

$$(x + 5)(x + 6)(x + 7)$$

## Your turn

Expand:

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

$$x^3 + 9x^2 + 26x + 24$$

## Worked example

Expand:

$$(2x + 5)(3x + 6)(4x + 7)$$

## Your turn

Expand:

$$(3x + 2)(4x + 6)(5x + 7)$$
$$60x^3 + 214x^2 + 242x + 84$$

## Worked example

Expand:

$$(x + 5)(x - 6)(x - 7)$$

## Your turn

Expand:

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

$$x^3 - 5x^2 - 2x + 24$$

## Worked example

Expand:

$$(x - 5)(x - 6)(x - 7)$$

## Your turn

Expand:

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

$$x^3 - 9x^2 + 26x - 24$$

## Worked example

Expand:

$$(x + 5)(x + 6)^2$$

## Your turn

Expand:

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

$$x^3 + 8x^2 + 21x + 18$$

## Worked example

Expand:

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

## Your turn

Expand:

$$(x - 2)(x - 3)^2$$
$$x^3 - 8x^2 + 21x - 18$$

## Worked example

Expand:

$$(x + 5)^3$$

$$(x + 6)^3$$

## Your turn

Expand:

$$(x + 4)^3$$

$$x^3 + 12x^2 + 48x + 64$$

## Worked example

Expand:

$$(x - 5)^3$$

$$(x - 6)^3$$

## Your turn

Expand:

$$(x - 4)^3$$

$$x^3 - 12x^2 + 48x - 64$$

## Worked example

Expand:

$$(5 - 2x)(3x - 4)^2$$

## Your turn

Expand:

$$(7 - 3x)(4x - 5)^2$$
$$-48x^3 + 232x^2 - 355x + 175$$

## Worked example

Use Pascal's triangle to find the expansion of

$$(1 + x)^6$$

## Your turn

Use Pascal's triangle to find the expansion of

$$(1 + x)^7$$

$$1 + 7x + 21x^2 + 35x^3 + 35x^4 + 21x^5 + 7x^6 + x^7$$

## Worked example

Use Pascal's triangle to find the expansion of

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

## Your turn

Use Pascal's triangle to find the expansion of

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

$$1 + 12x + 54x^2 + 108x^3 + 81x^4$$

## Worked example

Use Pascal's triangle to find the expansion of

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

## Your turn

Use Pascal's triangle to find the expansion of

$$(1 - 3x)^4$$

$$1 - 12x + 54x^2 - 108x^3 + 81x^4$$

## Worked example

Use Pascal's triangle to find the expansion of

$$(5x - 2)^4$$

## Your turn

Use Pascal's triangle to find the expansion of

$$(2x - 5)^4$$

$$16x^4 - 160x^3 + 600x^2 - 1000x + 625$$

## Worked example

Find the expansion of  $(3 + 2x)^4$

## Your turn

Find the expansion of  $(2 + 3x)^4$

$$16 + 96x + 216x^2 + 216x^3 + 81x^4$$

## Worked example

Find the expansion of  
 $(2x - 3y^2)^5$

## Your turn

Find the expansion of  
 $(3x^2 - 2y)^4$

$$81x^8 - 216x^6y + 216x^4y^2 - 96x^2y^3 + 16y^4$$

## Worked example

Find the coefficient of  $x^3$  in the expansion of  $(3 + 2x)^5$

## Your turn

Find the coefficient of  $x^3$  in the expansion of  $(2 + 3x)^4$

216

## Worked example

Find the coefficient of  $x^3$  in the expansion of  $(2 - 3x)^4$

## Your turn

Find the coefficient of  $x^4$  in the expansion of  $(3 - 2x)^5$

240

### Worked example

The coefficient of  $x^3$  in the expansion of  $(3 - cx)^5$  is 720. Find the possible value(s) of the constant  $c$ .

### Your turn

The coefficient of  $x^3$  in the expansion of  $(2 - cx)^5$  is  $-1080$ . Find the possible value(s) of the constant  $c$ .

$$c = 3$$

## Worked example

Find the coefficient of  $x^{20}$  in  $(1 - 3x^5)^7$

## Your turn

Find the coefficient of  $x^{20}$  in  $(1 - 2x^4)^7$

**$-672$**

## Worked example

Find the third term in the expansion of

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

## Your turn

Find the fourth term in the expansion of

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

$$-125x^9$$

## Worked example

The coefficient of the  $x^5$  term in the expansion of  $(3x - a)^7$  is 45927. Work out the possible values of  $a$

## Your turn

The coefficient of the  $x^4$  term in the expansion of  $(2x + a)^6$  is 60. Work out the possible values of  $a$

$$a = \pm \frac{1}{2}$$