Expanding triple brackets

ANSWERS

1

Expand and simplify

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

the first two brackets

×	x	+3
x	x^2	+3x
+1	+x	+3

= $x^2 + 4x + 3$

then multiply by the third

×	x^2	+4x	+3
x	x^3	+4x^2	+3x
+4	+4x^2	+16x	+12

Answer $x^3 + 8x^2 + 19x + 12$

2

Expand and simplify

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

the first two brackets

×	x	+1
x	x^2	+x
+3	+3x	+3

= $x^2 + 4x + 3$

then multiply by the third

×	x^2	+4x	+3
x	x^3	+4x^2	+3x
+5	+5x^2	+20x	+15

Answer $x^3 + 9x^2 + 23x + 15$

3

Expand and simplify

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

the first two brackets

×	x	−2
x	x^2	−2x
+5	+5x	−10

= $x^2 + 3x - 10$

then multiply by the third

×	x^2	+3x	−10
x	x^3	+3x^2	−10x
+1	+x^2	+3x	−10

Answer $x^3 + 4x^2 - 7x - 10$

4

Expand and simplify

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

×	x	+2
x	x^2	+2x
−3	−3x	−6

= $x^2 - x - 6$

×	x^2	−x	−6
x	x^3	−x^2	−6x
+4	+4x^2	−4x	−24

Answer $x^3 + 3x^2 - 10x - 24$

5

Expand and simplify

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

×	x	+3
x	x^2	+3x
+3	+3x	+9

= $x^2 + 6x + 9$

×	x^2	+6x	+9
x	x^3	+6x^2	+9x
+2	+2x^2	+12x	+18

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

6

Expand and simplify

$(x-2)^3$

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

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

Answer $x^3 - 6x^2 + 12x - 8$

7

Ola writes $(x+4)^3 = x^3 + 64$. Put $x = 1$ into both sides to show she is wrong.

Then expand $(x+4)^3$ correctly.

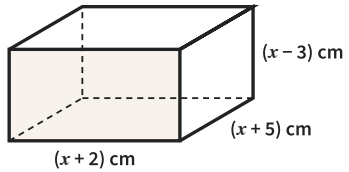
$5^3 = 125$, but $1^3 + 64 = 65$

$(x^2 + 8x + 16)(x+4)$

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

8

A cuboid measures $(x+2)$ cm by $(x+5)$ cm by $(x-3)$ cm. Show that its volume is $x^3 + ax^2 + bx + c$ cm^3, and find a, b and c.



$(x^2 + 7x + 10)(x-3)$

$= x^3 + 4x^2 - 11x - 30$

Answer $a = 4, b = -11, c = -30$

Expanding triple brackets *further practice*

ANSWERS

9

Expand and simplify

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

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

Answer $x^3 + x^2 - 17x + 15$

10

Expand and simplify $(x - 4)^2(x + 1)$

$(x^2 - 8x + 16)(x + 1)$

Answer $x^3 - 7x^2 + 8x + 16$

11

Sam expands $(x + 2)(x - 3)(x + 1)$ and gets $x^3 - 7x + 6$. Put $x = 2$ into both to check. Is Sam right? If not, find the right answer.

$(4)(-1)(3) = -12$, but $8 - 14 + 6 = 0$

$(x^2 - x - 6)(x + 1)$

Answer No: $x^3 - 7x - 6$

12

Given that $(x + 1)(x + 6)(x + k) = x^3 + 11x^2 + 34x + 24$, find the value of k.

$(x^2 + 7x + 6)(x + k)$

the number: $6k = 24$

Answer $k = 4$

13

A cuboid has a square base with sides of $(x + 2)$ cm. Its height is $(x - 3)$ cm. Find an expression for its volume. Expand and simplify.

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

Answer $x^3 + x^2 - 8x - 12$ cm^3

14

Show that

$(x + 1)(x - 1)(x + 4) = x^3 + 4x^2 - x - 4$

$(x^2 - 1)(x + 4)$

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

Answer shown

15

Expand and simplify

$(x + 2)(x + 4)(x + 5)$. Then put $x = 10$ into your answer to work out $12 \times 14 \times 15$ without a calculator.

$(x^2 + 6x + 8)(x + 5)$

$1000 + 1100 + 380 + 40$

Answer $x^3 + 11x^2 + 38x + 40$, 2520

16

Kai expands $(x - 1)(x + 2)(x + 5)$ and writes $x^3 + 6x^2 + 5x - 10$. Explain his mistake. Then write the right answer.

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

he dropped $-2x$: $5x - 2x = 3x$

Answer $x^3 + 6x^2 + 3x - 10$