Brackets and Factorising Practice from Lessons
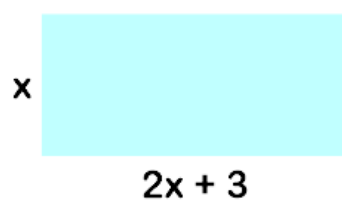
Expanding single and multiple brackets

Expand the brackets and simplify!

1. 9(1 - g)

2. -x(7y - 11x)

3. 6(z + 2) - 2z

4. 12 - 2(x - 5)

5. 50 - 13(3x - 2)

6. 3(m + 2) + 4(m + 1)

7. 2(8t - 2) + 5(2t - 4)

8. 5(x + 2) - 2(x + 3)

9. x(8x - 2) - 2(3x - 8)

10. 4w - 2(1 - 5w)

Write an expression to represent the area of the rectangle.

x

2x + 3

Write an expression to represent the total area of the rectangle and the square.

3x

Expand the brackets and simplify!

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

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

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

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

- $(x + 3)(x - 3)$

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

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

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

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

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

Squaring Brackets

1. $(x + 5)^2$

2. $(x + 12)^2$

3. $(x - 5)^2$

4. $(x - 11)^2$

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

6. $(3x + 2)^2$

7. $(4x - 2)^2$

8. $(3x + 2y)^2$

9. $(p + 1)^2$

Expanding Brackets with Trinomials

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

3. $(2x - 1)(3x^2 - x + 4)$ 4. $(2 - x^2)(3x^2 - 2x + 5)$

5. $(x + 1)(x + 2)(x + 5)$ 6. $(2x + 3)(x - 1)(x + 2)$

Mixed Expanding Brackets

Expand the brackets and simplify!

1. $-2(x - 3)$ 7. $3(x - 2) - 7(2 - 4x)$
2. $5(2x + 3) - 4$ 8. $(x + 3)(x - 1)$
3. $13 - 2(x + 1)$ 9. $(5 - 2x)(8 - 5x)$
4. $-2(x - 10) + 21$ 10. $(x + 3)(x^2 + 4x + 5)$
5. $5x - 3(2x + 12)$ 11. $(4 - x)(2 - x + 3x^2)$
6. $6(3x - 1) + 2(2x + 3)$ 12. $(x + 2)(x + 3)(x - 5)$

Factorise these expressions, i.e. put them into a bracket.

1). $2x + 6$ 2). $4x + 12$ 3). $3t + 9$ 4). $5a - 20$ 5). $6y + 9$
6). $4f - 10$ 7). $9g + 15$ 8). $8x + 12$ 9). $14r - 21$ 10). $12e - 15$
11). $xy + 3x$ 12). $2ab + ad$ 13). $5t + rt$ 14). $5ry - rf$ 15). $3gh - 2g$

Factorise these expressions, they are slightly harder.

1). $2x^3 - 4x^2$ 2). $x^2y^2 - 6xy$ 3). $xy - 4x^2$ 4). $2x^2y^2 + 6x^2y$
5). $15p^2q - 3pq^3$ 6). $16v^2 + 40uv$ 7). $27y^2 - 18xy$ 8). $30t^4 - 6t^3$
9). $30m^3 - 12\,m^4$ 10). $16p^3q - 15p^2q$ 11). $15t^3 - 20t^2$ 12). $28y^2 - 35y^3$

Factorising by difference of two squares

Factorise, using the difference of two squares :-

(a) $x^2 - 4$

(b) $a^2 - 16$

(c) $b^2 - 25$

(d) $x^2 - 1$

(e) $1 - k^2$

(f) $81 - w^2$

(g) $64 - h^2$

(h) $100 - x^2$

(i) $x^2 - b^2$

(j) $w^2 - v^2$

(k) $4a^2 - 1$

(l) $x^2 - 25y^2$

(m) $36 - 49p^2$

(n) $81a^2 - 4b^2$

(o) $121v^2 - 100w^2$

(p) $64p^2 - 81q^2$

(q) $1 - 16a^2$

(r) $25 - 81x^2$

(s) $49 - 4k^2$

(t) $1 - 144y^2$.

1. $2b^2 - 32$ 2. $27 - 3b^2$ 3. $5y^2 - 125$ 4. $363 - 75b^2$

Shown is a square with side 5 centimetres cut out from a square of side k centimetres.

(a) Prove that the **pink** area can be expressed as :- $(k - 5)(k + 5)$ cm^2.

(b) Find the area when $k = 8\cdot5$.

k cm

5 cm
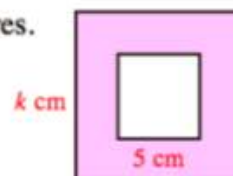
Factorising Trinomials

Practice:

$a^2 + 12a + 11$

Now complete these in your jotter:

$d^2 - 10d + 24$ $e^2 + 24e + 63$

$f^2 - 11f + 18$ $10 - 20g + g^2$

$34 + 19h + h^2$ $k^2 + 4k + 4$

$b^2 - 9b + 20$

Now try these by considering a HCF first:

$2m^2 + 4m + 2$ $3n^2 - 18n + 24$

$4p^2 + 20p + 24$ $5q^2 - 10q + 40$

$c^2 - 11c + 28$

$a^2 + a - 12$

$b^2 - 3b - 18$

$c^2 - 2c - 63$

$d^2 - 5d - 36$

$e^2 - e - 6$

$f^2 + 2f - 3$

$10 + 3g - g^2$

$20 - 8h - h^2$

$2i^2 + 4i - 30$

$4j^2 - 32j + 60$

Task 1: Factorise the following

1. $2x^2 + 5x + 3$

3. $12m^2 - 8m + 1$

5. $8u^2 + 10u - 3$

Task 2: Check your answers to the questions above by multiplying back out the brackets.

Mixed Factorising

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

(b) $m^2 - 36$

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

(d) $x^2 + 7x + 10$

(e) $y^2 + 6y$

(f) $t^2 + 9t + 8$

(g) $a^2 + 5a$

(h) $x^2 - 4$

(i) $2x + 3xy$

(j) $v^2 - 10v + 16$

(k) $7ab + 21b$

(l) $1 - a^2$

(m) $a^2 - 6a - 7$

(n) $4x^2 - 9$

(o) $6st + 3s$

(p) $x^2 - 2x - 24$

(q) $9b^2 - 16$

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

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

(t) $c^2 - 13c + 12$

(u) $64y^2 - 25$

Completing the Square

For each of the following, write in the form $(x + p)^2 + q$

$x^2 + 4x$

$x^2 - 8x$

$x^2 - 6x$

$x^2 + 14x$

$x^2 + 2x + 7$

$x^2 + 10x + 27$

$x^2 + 6x + 2$

$x^2 + 8x + 9$

$x^2 + 4x - 8$

$x^2 + 16x - 3$

$x^2 - 14x - 15$

$x^2 - 8x + 8$

$x^2 - 20x - 6$

$x^2 - 2x + 5$

$x^2 - 6x + 11$

$x^2 - 12x + 21$