FACTORISING NON-MONIC TRINOMIALS

Factorise: $(ax+m)(bx+n) = abx^2 + x(mb+na) + mn$

1 $2x^2+3x+1$ 2 $3x^2+11x-4$ 3 $2x^2+7x+6$ 4 $4a^2+13a+3$

① $mn = 1$ Factors of 1 : 1 $m = n = 1$

$ab = 2$ Factors of 2 : 1 2 / 2 1 $a = 2$ $b = 1$

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

② $mn = -4$ Factors of -4 : 1 -1 2 -2 / -4 4 -2 2 $m = 4$ $n = -1$

$ab = 3$ Factors of 3 : 1 3 / 3 1

$mb+na = 11$ $b = 3$ $a = 1$

So $3x^2+11x-4 = (x+4)(3x-1)$

③ $mn = 6$ Factors of 6 : 2 3 -2 -3 1 6 -1 -6 / 3 2 -3 -2 6 1 -6 -1

$ab = 2$ Factors of 2 : 1 2 -1 -2 / 2 1 -2 -1 $m = 3$ $n = 2$ $a = 2$ $b = 1$

$mb+na = 7$

So $2x^2+7x+6 = (2x+3)(x+2)$

④ $mn = 3$ Factors of 3 : 3 1 -3 -1 / 1 3 -1 -3

$ab = 4$ Factors of 4 : 1 4 -1 -4 2 -2 / 4 1 -4 -1 2 -2

$mb+na = 13$ $m = 3$ $b = 4$ $n = 1$ $a = 1$

So $4a^2+13a+3 = (x+3)(4x+1)$

FACTORISING NON-MONIC TRINOMIALS

9 $3x^2 - 17x + 10$ **10** $6a^2 - 13a - 63$ **11** $3x^2 - 11x - 4$ **12** $10x^2 - 11x - 8$

(9) $mn = 10$ Factors of 10 : $1\ \ 10\ \ -1\ \ -10\ \ 2\ \ 5\ \ -2\ \ -5$
$10\ \ 1\ \ -10\ \ -1\ \ 5\ \ 2\ \ -5\ \ -2$

$ab = 3$ Factors of 3 $1\ \ 3\ \ -1\ \ -3$
$3\ \ 1\ \ -3\ \ -1$

$mb + na = -17$ $m = -2$ $n = -5$ $b = 1$ $a = 3$

So $3x^2 - 17x + 10 = (3x - 2)(x - 5)$

(10) $mn = -63$ Factors of -63 $3\ \ -21\ \ 7\ \ -7\ \ 9\ \ -9\ \ \ldots$
$-21\ \ 3\ \ -9\ \ 9\ \ -7\ \ 7\ \ \ldots$

$ab = 6$ Factors of 6 $1\ \ 6\ \ -1\ \ -6\ \ 2\ \ -2\ \ 3\ \ -3$
$6\ \ 1\ \ -6\ \ -1\ \ 3\ \ -3\ \ 2\ \ -2$

$mb + na = -13$ $m = +7$ $n = -9$ $a = 3$ $b = 2$

So $6a^2 - 13a - 63 = (3a + 7)(2a - 9)$

(11) $mn = -4$ Factors of -4 $1\ \ 4\ \ -1\ \ -4\ \ 2\ \ -2$
$-4\ \ -1\ \ +4\ \ +1\ \ -2\ \ 2$

$ab = 3$ Factors of 3 $1\ \ 3\ \ -1\ \ -3$
$3\ \ 1\ \ -3\ \ -1$

$mb + na = -11$ $m = 1$ $n = -4$ $b = 1$ $a = 3$

So $3x^2 - 11x - 4 = (3x + 1)(x - 4)$

(12) $mn = -8$ Factors of -8 $1\ \ -8\ \ 8\ \ -1\ \ 2\ \ -2\ \ 4\ \ -4$
$-8\ \ 1\ \ 1\ \ -8\ \ -4\ \ 4\ \ -2\ \ 2$

$ab = 10$ Factors of 10 $1\ \ 10\ \ -1\ \ -10\ \ 2\ \ -2\ \ 5\ \ -5$
$10\ \ 1\ \ -10\ \ -1\ \ 5\ \ -5\ \ +2\ \ -2$

$mb + na = -11$ $m = -8$ $b = 2$ $n = 1$ $a = 5$

So $10x^2 - 11x - 8 = (5x - 8)(2x + 1)$

FACTORISING NON-MONIC TRINOMIALS

21 $6x^2 - 29x + 28$ **22** $6x^2 - 19x + 14$ **23** $6x^2 - 20x + 14$ **24** $8x^2 + 2x - 3$

(21) $mn = 28$ Factors of 28: $1\ 2\ 4\ 7\ 14\ 28\ -1\ -2\ -4\ -7\ -14$
$28\ 14\ 7\ 4\ 2\ 1\ -28\ -14\ -7\ -4\ -2$

$ab = 6$ Factors of 6: $1\ 6\ -1\ -6\ 2\ 3\ -2\ -3$
$6\ 1\ -6\ -1\ 3\ 2\ -3\ -2$

$mb + na = -29$ $m = -7$ $n = -4$ $a = 2$ $b = 3$

So $6x^2 - 29x + 28 = (2x - 7)(3x - 4)$

(22) $mn = 14$ Factors of 14: $1\ -1\ 14\ -14\ 2\ -2\ 7\ -7$
$14\ -14\ 1\ -1\ 7\ -7\ 2\ -2$

$ab = 6$ Factors of: $1\ -1\ 2\ -2\ 6\ -6\ 3\ -3$
$6\ -6\ 3\ -3\ 1\ -1\ 2\ -2$

$mb + na = -19$ $m = -7$ $n = -2$ $b = 1$ $a = 6$

So $6x^2 - 19x + 14 = (6x - 7)(x - 2)$

(23) $mn = 14$ Factors of 14: $1\ -1\ 14\ -14\ 2\ -2\ 7\ -7$
$14\ -14\ 1\ -1\ 7\ -7\ 2\ -2$

$ab = 6$ Factors of 6: $1\ 6\ -1\ -6\ 2\ 3\ -2\ -3$
$6\ 1\ -6\ -1\ 3\ 2\ -3\ -2$

$mb + na = -20$ $m = -1$ $n = -14$ $b = 6$ $a = 1$

So $6x^2 - 20x + 14 = (x - 1)(6x - 14)$

(24) $mn = -3$ Factors of -3: $1\ -1\ 3\ -3$
$-3\ 3\ -1\ 1$

$ab = 8$ Factors of 8: $1\ 8\ -1\ -8\ 2\ 4\ -2\ -4$
$8\ 1\ -8\ -1\ 4\ 2\ -4\ -2$

$mb + na = 2$ $m = 3$ $n = -1$ $b = 2$ $a = 4$

So $8x^2 + 2x - 3 = (4x + 3)(2x - 1)$

FACTORISING NON-MONIC TRINOMIALS

29 $15x^2 - 19x + 6$ **30** $3x^2 - 2x - 1$ **31** $9x^2 + 9x - 10$ **32** $2x^2 - 9x + 4$

(29) $mn = 6$ Factors of 6

1	6	-1	-6	2	-2	3	2
6	1	-6	-1	3	-3	2	3

$ab = 15$ Factors of 15

1	15	-1	-15	3	5	-3	-5
15	1	-15	-1	5	3	-5	-3

$mb + na = -19$ $m = 2$ $n = 3$ $b = -5$ $a = -3$

So $15x^2 - 19x + 6 = (-3x + 2)(-5x + 3)$

(30) $mn = -1$ Factors of -1

1	-1
-1	1

$ab = 3$ Factors of 3

1	3	-1	-3
3	1	-3	-1

$mb + na = -2$ $m = 1$ $n = -1$ $b = 1$ $a = 3$

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

(31) $mn = -10$ Factors of -10

1	-1	-10	10	2	-2	5	-5
-10	10	1	-1	-5	5	-2	2

$ab = 9$ Factors of 9

1	-1	9	-9	3	-3
9	-9	1	1	+3	-3

$mb + na = 9$ $m = -2$ $n = 5$ $b = 3$ $a = 3$

So $9x^2 + 9x - 10 = (3x - 2)(3x + 5)$

(32) $mn = 4$ Factors of 4

1	4	-4	-1	2
4	1	-1	-4	2

$ab = 2$ Factors of 2

1	2	-1	-2
2	1	-2	-1

$mb + na = -9$ $m = -1$ $n = -4$ $b = 1$ $a = 2$

So $2x^2 - 9x + 4 = (2x - 1)(x - 4)$