

Ex.) Factor $x^2 - 10x - 24$

$$x^2 - 10x - 24$$

★ ◆

Step 1: Find the factors (the numbers you can divide by) of ◆


◆ の約数を書きだす

24: 1 2 3 4 6 ...

Notice that halfway point is between 4 and 6 because $4 \times 6 = 24$

4 と 6 の間が中間地点。 $4 \times 6 = 24$ だから

24: 1 2 3 4 6 8 12 24



The two numbers connected with a line are pairs

線で結ばれた二つの数字がペアで

Step 2: Find the pair of numbers that become ★ when added
You can assign + or - symbol to the numbers

足すと ★ になるペアを見つける。+や-の記号を自由に付けてみる

$$4 + 6 = 10$$

Nope

$$4 + (-6) = -2$$

Nope

$$(-4) + (-6) = -10$$

Good try! It doesn't become ◆ when -4 and -6 are multiplied

おいしい! -4 と -6 をかけ算しても ◆ になりません

$$(-3) + (-8) = -11$$

Nope

$$(-2) + (-12) = -14$$

Nope

$$2 + (-12) = -10$$

Yes!... It becomes ◆ when 2 and -12 are multiplied!
当たり! 2 と -12 をかけ算すると ◆ になる!

Factoring exercises (ver.241108)

Step 3: Fill in the pair of numbers you found in Step 2 to $(x \quad)(x \quad)$ form

Step 2 で見つけた数字のペアを $(x \quad)(x \quad)$ のフォーマットに入れる

$$(x + 2)(x - 12)$$

Answer $(x + 2)(x - 12)$

[Practice]

Ex.) Factor $x^2 + 8x - 20$

$$\begin{array}{ccc} x^2 & + & 8x & - & 20 \\ & \underbrace{\quad} & & \underbrace{\quad} & \\ & \star & & \diamond & \end{array}$$

Step 1: Find the factors (the numbers you can divide by) of \diamond

20:

Step 2: Find the pair of numbers that become \star when added
You can assign + or - symbol to the numbers

Step 3: Fill in the pair of numbers you found in Step 2 to $(x \quad)(x \quad)$ form

$$(x \quad)(x \quad)$$

Answer

Factoring exercises (ver.241108)

[Level 1]

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

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

3) $x^2 + 7x + 12 =$

[Level 2]

4) $x^2 + 10x + 25 =$

5) $x^2 + 14x + 49 =$

6) $x^2 + 20x + 100 =$

[Level 3]

7) $x^2 - 3x + 2 =$

8) $x^2 - 7x + 12 =$

9) $x^2 - 10x + 24 =$

[Level 4]

10) $x^2 + x - 2 =$

11) $x^2 + 2x - 8 =$

12) $x^2 + 5x - 24 =$

[Level 5]

13) $x^2 - x - 2 =$

14) $x^2 - 3x - 18 =$

15) $x^2 - 15x - 54 =$

[Level 6]

16) $x^2 + 17 - 60 =$

17) $x^2 - 22x - 72 =$

18) $x^2 - 15x - 126 =$

Ex.) Factor $x^2 - 16$

Consider this as $x^2 + 0x - 16$

$$x^2 + \underbrace{0x}_{\star} - \underbrace{16}_{\diamond}$$

Step 1: Find the number that becomes \diamond when squared

二乗した時に \diamond になるものを見つける

$$4^2 = 16 \quad \text{This means that the pair is 4 and 4}$$

Step 2: Fill in the pair of numbers you found in Step 1 to $(x + \quad)(x - \quad)$ form

Step 1 で見つけた数字のペアを $(x + \quad)(x - \quad)$ のフォーマットに入れる

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

Answer $(x + 4)(x - 4)$

*Note that $4 + (-4) = 0$ and matches with \star

$4 + (-4) = 0$ となり、 \star と同じになる

Factoring exercises (ver.241108)

[Level 1]

1) $x^2 - 4 =$

2) $x^2 - 36 =$

3) $x^2 - 100 =$

[Level 2]

4) $x^2 - 121 =$

5) $x^2 - 169 =$

6) $x^2 - 289 =$