

النشر والتبسيط

$a(b+c)$ $(a+b)(c+d)$ حذف الأقواس المتطابقات الخيرة

$$a(b+c) = a \times b + a \times c$$

$$(a+b)(c+d) = a(c+d) + b(c+d)$$

$$= ac + ad + bc + bd$$

إذا كان ما يسبق الأقواس $+$

نحذف الأقواس دون تغيير ما بداخلها

إذا كان ما يسبق الأقواس $-$

نحذف الأقواس مع تغيير إشارة ما بداخلها

إذا كان ما يسبقها

$+$ أو $-$

المتطابقات الخيرة

$$(a+b)^2 = a^2 + b^2 + 2ab$$

$$(a-b)^2 = a^2 + b^2 - 2ab$$

$$(a+b)(a-b) = a^2 - b^2$$

$$\begin{aligned}
 2(3x - 5) &= 2 \times 3x + [2(-5)] \\
 &= 6x + (-10) \\
 &= 6x - 10
 \end{aligned}$$

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

$$\begin{aligned}
 -2x(4x - 3) &= -2x(4x) - (-2x)(3) \\
 &= -8x^2 + 6x
 \end{aligned}$$

$$\begin{aligned}
 (3x - 2)(-5x + 3) &= 3x(-5x) + 3x(3) + (-2)(-5x) \\
 &\quad + (-2)(3) \\
 &= -15x^2 + 9x + 10x - 6 \\
 &= -15x^2 + 19x - 6
 \end{aligned}$$

$$\begin{aligned}
 2x(5x - 1)(2x + 4) &= [2x(5x) + 2x(-1)](2x + 4) \\
 &= (10x^2 - 2x)(2x + 4) \\
 &= 10x^2(2x) + 10x^2(4) + (-2x)(2x) \\
 &\quad + (-2x)(4) \\
 &= 20x^3 + 40x^2 - 4x^2 - 8x \\
 &= 20x^3 + 36x^2 - 8x
 \end{aligned}$$

$$5x - (3x - 1) = 5x - 3x + 1 \\ = 2x + 1.$$

بسط القوس
نحذف الأعداد
ونغير الإشارة

$$(2x - 1) - (3x + 2) = 2x - 1 - 3x - 2 \\ = -1x - 3 \\ = -x - 3$$

$$(5x - 1)(2x + 2) - 2x(2x - 3) - (x + 16) + 16$$

(1) (2) (3) (4)

$$= [5x(2x) + 5x(2) - 1(2x) - 1(2)] - 2x(2x) - 2x(-3) - x - 16 + 16$$

(1) (2) (3) (4)

$$= 10x^2 + 10x - 2x - 2 - 2x^2 + 6x - x - 16 + 16$$

(1) (2) (3) (4)

$$= 10x^2 - 2x^2 + 10x - 2x + 6x - x - 2 - 16 + 16$$

$$= 8x^2 + 13x - 2$$

النسبة التوسيع (المطابقات الخيرة)

$$\begin{aligned}(x+3)^2 &= x^2 + 3^2 + 2(x)(3) \\ &= x^2 + 9 + 6x = x^2 + 6x + 9\end{aligned}$$

$$\begin{aligned}(5x+4)^2 &= (5x)^2 + 4^2 + 2(5x)(4) \\ &= 25x^2 + 16 + 40x = 25x^2 + 40x + 16\end{aligned}$$

$$\begin{aligned}(x-2)^2 &= x^2 + 2^2 - 2(x)(2) \\ &= x^2 + 4 - 4x = x^2 - 4x + 4\end{aligned}$$

$$\begin{aligned}(3x-6)^2 &= (3x)^2 + 6^2 - 2(3x)(6) \\ &= 9x^2 + 36 - 36x = 9x^2 - 36x + 36\end{aligned}$$

$$\begin{aligned}\left(\frac{2}{3}x - \frac{1}{2}\right)^2 &= \left(\frac{2}{3}x\right)^2 + \left(\frac{1}{2}\right)^2 - 2\left(\frac{2}{3}x\right)\left(\frac{1}{2}\right) \\ &= \frac{4}{9}x^2 + \frac{1}{4} - \frac{4}{3}x \\ &= \frac{4}{9}x^2 - \frac{2}{3}x + \frac{1}{4}\end{aligned}$$

$$(x-1)(x+1) = x^2 - 1^2 = x^2 - 1.$$

$$(5x+3)(5x-3) = (5x)^2 - (3)^2 \\ = 25x^2 - 9.$$

$$(-2x+3)(3+2x) = (3-2x)(3+2x) \\ = 3^2 - (2x)^2 \\ = 9 - 4x^2 \\ = -4x^2 + 9.$$

$$\begin{aligned} & \underline{(7x-1)^2} - \underline{(2x-5)(2x+5)} + \underline{2x(x-3)} \\ &= \overset{(1)}{(7x)^2} + \overset{(2)}{1^2} - 2(7x)(1) - [(2x)^2 - 5^2] + \overset{(3)}{2x(x)} - 2x(3) \\ &= 49x^2 + 1 - 14x - 4x^2 + 25 + 2x^2 - 6x \\ &= 49x^2 - 4x^2 + 2x^2 - 14x - 6x + 1 + 25 \\ &= 47x^2 - 20x + 26 \end{aligned}$$

التحليل إلى عوامل عاملية "العامل المشترك"

التحليل : هو الانتقال من عبارة مجموع إلى عبارة
حدا

$$6x + 3 = \underline{3} \times \underline{2x} + \underline{3} \times \underline{1}$$

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

$$5x^2 + x = \underline{x} \times 5x + \underline{x} \times 1$$

$$= x(5x + 1)$$

$$\underline{(2x + 1)}(2x - 3) + \underline{(2x + 1)}(5x - 2)$$

$$= (2x + 1) [(2x - 3) + (5x - 2)]$$

$$= (2x + 1) (2x - 3 + 5x - 2)$$

$$= (2x + 1) (7x - 5)$$

$$x \underline{(3x - 1)} - (3x - 1)(2x - 1) = (3x - 1) [x - (2x - 1)]$$

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

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

$$= (3x - 1) (1 - x)$$

$$(5x-3)^2 - 2(5x-3) = \underline{(5x-3)}(5x-3) - 2\underline{(5x-3)}$$

$$= (5x-3) [(5x-3) - 2]$$

$$= (5x-3)(5x-3-2)$$

$$= (5x-3)(5x-5)$$

$$\underline{1x(x+2)} + x\underline{(x+2)} = (x+2) [1 + x]$$

$$= (x+2)(x+1).$$

التحليل • (المتممات البقية) ^{النسبة}

$$(a+b)^2 = a^2 + b^2 + 2ab$$

$$(a-b)^2 = a^2 + b^2 - 2ab$$

$$(a+b)(a-b) = a^2 - b^2$$

التحليل

$$A = \underbrace{4x^2}_{a^2} + \underbrace{4x}_{2ab} + \underbrace{1}_{b^2}$$

$$a^2 = 4x^2 \rightarrow a = \sqrt{4x^2}$$

$$a = 2x$$

$$A = (2x)^2 + 2(2x)(1) + (1)^2, b^2 = 1$$

$$\rightarrow b = \sqrt{1}$$

$$b = 1$$

$$A = (2x + 1)^2$$

$$2ab = 4x \rightarrow 2(2x)(1)$$

$$B = \underbrace{9x^2}_{a^2} - \underbrace{24x}_{2ab} + \underbrace{16}_{b^2}$$

$$a^2 = 9x^2 \rightarrow a = \sqrt{9x^2} = 3x$$

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

$$b^2 = 16 \rightarrow b = \sqrt{16}$$

$$b = 4$$

$$B = (3x - 4)^2$$

$$2ab = 24 \rightarrow 2(3x)(4)$$

$$C = \underbrace{x^2}_{a^2} + \underbrace{6x}_{2ab} + \underbrace{9}_{b^2}$$

$$a^2 = x^2 \rightarrow a = \sqrt{x^2} = x$$

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

$$b^2 = 9 \rightarrow b = \sqrt{9} = 3$$

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

$$2ab = 6x \rightarrow 2(x)(3)$$

D

$$D = \underbrace{4x^2}_{a^2} - \underbrace{9}_{b^2}$$

$$a^2 = 4x^2 \rightarrow a = \sqrt{4x^2} = 2x$$

$$D = (2x)^2 - (3)^2$$

$$b^2 = 9 \rightarrow b = \sqrt{9} = 3$$

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

$$E = \underbrace{x^2}_{a^2} - \underbrace{1}_{b^2}$$

$$a^2 = x^2 \rightarrow a = \sqrt{x^2} = x$$

$$E = (x + 1)(x - 1)$$

$$b^2 = 1 \rightarrow b = \sqrt{1} = 1$$

F

مثلاً بقية المعبره ⑨

$$F = (3x + 1)(x - 1) + \underbrace{9x^2}_{a^2} - \underbrace{1}_{b^2} \quad a^2 = 9x^2 \rightarrow a = \sqrt{9x^2} = 3x$$

$$F = (3x + 1)(x - 1) + (3x + 1)(3x - 1) \quad b^2 = 1 \rightarrow b = \sqrt{1} = 1$$

طابق مشترك

$$F = (3x + 1) [(x - 1) + (3x - 1)]$$

$$F = (3x + 1) (x - 1 + 3x - 1)$$

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