0.5 Operations with Algebraic Expressions 2

Tuesday, November 14, 2023 8:24 AM

Exp Simplify

① $(-2xy^2)(5yx^3)(3x^2y^2)$

$= (-2 \cdot 5 \cdot 3) \cdot (x^1 \cdot x^3 \cdot x^2)(y^2 \cdot y^1 \cdot y^2)$

like terms

$= (-30)(x^6)(y^5) = -30x^6y^5$

② $(18m^3n) \div (3mn^4)$

$\frac{\cancel{18}^{6} m^3 n^1}{\cancel{3}_{1} m^1 n^4} = 6 m^{3-1} n^{1-4} = 6m^2n^{-3}$

$= \frac{6m^2}{n^3}$

③ $5x^2 - [3x - (7x^2 - 4x)]$

$5x^2 - [3x - 7x^2 + 4x]$

$5x^2 - 3x + 7x^2 - 4x$

like terms

$-3x, -4x$

$5x^2, 7x^2$

$12x^2 - 7x$

$12x^2 - 7x$

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

$3x \quad -2 \quad -5x \quad -6x \quad -3 \quad -1$

$-8x - 6$

Exp (Distributive Law) قانون التوزيع

Simplify

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

$= -12x^2 + 3x^5$

(2) $bx^3(3x^2 + ax - ab)$

$(bx^3)(3x^2) + (bx^3)(ax) + (bx^3)(-ab)$

$3bx^5 + abx^4 - ab^2x^3$

$x \cdot x = x^2$

$x + x = 2x$

$x + x = x[1+1] = 2x$

$1 \quad 1 \quad 1+1 \quad 2$

$x^1 \cdot x^1 = x^{1+1} = x^2$

$x^2 \cdot x^8 = x^{10}$

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(3) $-3(7 - x^5) = (-3)(7) + (-3)(-x^5)$

$= -21 + 3x^5$

(4) $(2x^1 - 1)\cdot(5 - 3x^1) = (2x)(5) + (2x)(-3x)$

كبير مقدود كبير مقدود

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

$= 10x - 6x^2 - 5 + 3x$

$= \boxed{13x - 6x^2 - 5}$

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

$\boxed{-3x}$

$5 - 4x$ → موجب 5، $-4x$

$-5 + 4x$

Ex. (Add of two Poly's)

Exp (Product of two Poly's)

Simplify

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

$+ (-1)(7) + (-1)(-x)$

$= 14x^2 - 2x^3 - 7 + x$

② $(x^4 - 3x)(5 - 2x^3 + 4x^4)$

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

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

$= 5x^4 - 2x^7 + 4x^8 - 15x + 6x^4 - 12x^5$

$= 11x^4 - 2x^7 + 4x^8 - 15x - 12x^5$

Binomial squared $(a+b)^2 = a^2 + 2ab + b^2$ ✓

a ← الأول, b ← الثاني

$(\text{الأول})^2 + 2(\text{الأول})(\text{الثاني}) + (\text{الثاني})^2$

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

Exp ① $(x+3)^2 = (x)^2 + 2(x)(3) + (3)^2$
$$= x^2 + 6x + 9$$

② $(2x - 4)^2 = (2x)^2 + 2(2x)(-4) + (-4)^2$
(2x: الأول، -4: الثاني)
$$= 4x^2 - 16x + 16$$

③ $(-3x + 4y)^2 = (-3x)^2 + 2(-3x)(4y) + (4y)^2$
(-3x: الأول، 4y: الثاني)
$$= 9x^2 - 24xy + 16y^2$$

④ $\left(4x^2 - \frac{1}{2}\right)^2 = (4x^2)^2 + 2(4x^2)\left(-\frac{1}{2}\right) + \left(-\frac{1}{2}\right)^2$
$\left(-\frac{1}{2}\right)\left(-\frac{1}{2}\right)$
(4x²: الأول)
$$= 16x^4 - 4x^2 + \frac{1}{4}$$

فرق بين مربعين $x^2 - a^2 = (x-a)(x+a)$

فرق بين مربعين

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

Exp ① $x^2 - 16 = (x - 4)(x + 4)$

$16 = 4^2$

$(x)(4)$

كيف؟ →

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

$x^2 + 4x - 4x - 16$

$x^2 - 16$

② $y^2 - 6 = (y - \sqrt{6})(y + \sqrt{6})$

$6 = (\sqrt{6})^2$

③ $1 - z^2 = (1 - z)(1 + z)$

$1 = 1^2$, $z^2 = z^2$

④ $x^2 - 3 = (x - \sqrt{3})(x - \sqrt{3})$

$\sqrt{3}\,\sqrt{3}$

$\sqrt{3 \cdot 3} = \sqrt{9} = 3$