**Definition:** A **term**, or **monomial**, is a constant or the product of a constant and one or more variables raised to whole-number exponents.

**Definition:** A **polynomial**, is any finite sum of terms. Because subtraction can be written in terms of addition, finite differences are also included in this definition.

**Definition:** A **degree** of a polynomial with one variable is the highest power to which the variable is raised in any one term.

**Definition:** Two or more terms that differ only in their numerical coefficients are called **similar**, or **like**, terms. Because similar/like terms differ only in their coefficients, they have identical variable parts.

Additional examples:

14) $12a^2+8ab-15ab-10b^2$

$12a^2+8ab-15ab-10b^2=12a^2-7ab-10b^2$

16) $(-4x^2+5x-3)-(2x^2+x-7)$

$(-4x^2+5x-3)-(2x^2+x-7)=-4x^2+5x-3-2x^2-x+7=-6x^2+4x+4$

18) $(-6a^2+a-4)-(-2a^2-3a-4)$

$(-6a^2+a-4)-(-2a^2-3a-4)=-6a^2+a-4+2a^2+3a+4=-4a^2+4a+0=-4a^2+4a$

20) $(11x^2-8x)-(4x^2-2x-7)$

$(11x^2-8x)-(4x^2-2x-7)=11x^2-8x-4x^2+2x+7=7x^2-6x+7$

22) $\left(\frac{2}{3}x^2-\frac{1}{2}x\right)-\left(\frac{1}{4}x^2+\frac{1}{6}x+\frac{1}{12}\right)-\left(\frac{1}{2}x^2+\frac{1}{4}\right)$

$$LCD=12$$

$$\left(\frac{2}{3}x^2-\frac{1}{2}x\right)-\left(\frac{1}{4}x^2+\frac{1}{6}x+\frac{1}{12}\right)-\left(\frac{1}{2}x^2+\frac{1}{4}\right)=\left(\frac{4}{4}\cdot\frac{2}{3}x^2-\frac{6}{6}\cdot\frac{1}{2}x\right)-\left(\frac{3}{3}\cdot\frac{1}{4}x^2+\frac{2}{2}\cdot\frac{1}{6}x+\frac{1}{12}\right)-\left(\frac{6}{6}\cdot\frac{1}{2}x^2+\frac{3}{3}\cdot\frac{1}{4}\right)$$

$$=\left(\frac{8}{12}x^2-\frac{6}{12}x\right)-\left(\frac{3}{12}x^2+\frac{2}{12}x+\frac{1}{12}\right)-\left(\frac{6}{12}x^2+\frac{3}{12}\right)$$

$$=\frac{8}{12}x^2-\frac{6}{12}x-\frac{3}{12}x^2-\frac{2}{12}x-\frac{1}{12}-\frac{6}{12}x^2-\frac{3}{12}$$

$$=-\frac{1}{12}x^2-\frac{8}{12}x-\frac{4}{12}=-\frac{1}{12}x^2-\frac{2}{3}x-\frac{1}{3}$$

24) Subtract $-3x+6$ from $-3x+9$

$(-3x+9)-(-3x+6)=-3x+9+3x-6=0x+3=3$

26) Subtract $-5x^2+x-4$ from $-2x^2-3x+1$

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

28) $-6[(2x-5)-3(8x-2)]$

$-6[(2x-5)-3(8x-2)]=-6[2x-5-24x+16]=-6[-22x+11]=132x-66$

30) $x-7[3x-(2-x)]$

$x-7[3x-(2-x)]=x-7[3x-2+x]=x-7[4x-2]=x-28x+14=-27x+14$

32) $-5x-3[-2(2x-1)-3(4x+2)]$

$-5x-3[-2(2x-1)-3(4x+2)]=-5x-3[-4x+2-12x-6]=-5x-3[-16x-4]$

$=-5x+48x+12=43x+12$

34) $-5[-4(x+2)-3]-3[2(-3x+1)-2(x-3)]$

$-5[-4(x+2)-3]-3[2(-3x+1)-2(x-3)]=-5[-4x-8-3]-3[-6x+2-2x+6]$

$=-5[-4x-11]-3[-8x+8]=20x+55+24x-24=44x-31$

36) Find the value of $4x^2+3x-2$ when $x$ is $-1$.

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

38) Find the value of $\frac{2}{5}x^2-\frac{1}{10}x+2$ when $x$ is $10$.

$\frac{2}{5}(10)^2-\frac{1}{10}(10)+2=\frac{2}{5}\cdot\frac{(10)(10)}{1}-\frac{1}{10}\cdot\frac{(10)}{1}+2=\frac{2}{1}\cdot\frac{(2)(10)}{1}-\frac{1}{1}\cdot\frac{(1)}{1}+2=40-1+2=41$

40) Find the value of $x^3+x^2+x+1$ when $x$ is $-2$.

$(-2)^3+(-2)^2+(-2)+1=-8+4-2+1=5$

42) $-3x(5x^2-6x-4)$

$-3x(5x^2-6x-4)=-15x^3+18x^2+12x$

44) $5a^2b^2(8a^2-2ab+b^2)$

$5a^2b^2(8a^2-2ab+b^2)=40a^4b^2-10a^3b^3+5a^2b^4$

46) $(2a-3)(3a^2-5a+1)$

$(2a-3)(3a^2-5a+1)=6a^3-10a^2+2a-9a^2+15a-3=6a^3-10a^2+17a-3$

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

$(a+b)(a^2+ab+b^2)=a^3+a^2b+ab^2+a^2b+ab^2+b^3=a^3+2a^2b+2ab^2+b^3$

50) $(x+3y)(x^2+3xy+9y^2)$

$(x+3y)(x^2+3xy+9y^2)=x^3+3x^2y+9xy^2+3x^2y+9xy^2+27y^3=x^3+6x^2y+18xy^2+27y^3$

52) $(x^2 - x + 1)(x^2 + x - 1)$

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

54) $(5a - 4)(2a + 1)$

$(5a - 4)(2a + 1) = 10a^2 + 5a - 8a - 4 = 10a^2 - 3a - 4$

56) $(7 - t)(6 - 3t)$

$(7 - t)(6 - 3t) = 42 - 21t - 6t + 3t^2 = 42 - 27t + 3t^2$

58) $(x^3 + 4)(x^3 - 7)$

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

60) $\left(5t - \frac{1}{5}\right)\left(10t + \frac{3}{5}\right)$

$\left(5t - \frac{1}{5}\right)\left(10t + \frac{3}{5}\right) = (5t)(10t) + (5t)\left(\frac{3}{5}\right) - \left(\frac{1}{5}\right)(10t) - \left(\frac{1}{5}\right)\left(\frac{3}{5}\right) = 50t^2 + 3t - 2t - \frac{3}{25} = 50t^2 + t - \frac{3}{25}$

62) $(b + 5a^2)(b - 2a^2)$

$(b + 5a^2)(b - 2a^2) = b^2 - 2a^2b + 5a^2b - 10a^4 = b^2 + 3a^2b - 10a^4$

64) $(3a + 2)^2$

$(3a + 2)^2 = (3a + 2)(3a + 2) = 9a^2 + 6a + 6a + 4 = 9a^2 + 12a + 4$

66) $(3x - 4y)^2$

$(3x - 4y)^2 = (3x - 4y)(3x - 4y) = 9x^2 - 12xy - 12xy + 16y^2 = 9x^2 - 24xy + 16y^2$

68) $(7 - 2t)^2$

$(7 - 2t)^2 = (7 - 2t)(7 - 2t) = 49 - 14t - 14t + 4t^2 = 49 - 28t + 4t^2$

70) $(6a - 1)(6a + 1)$

$(6a - 1)(6a + 1) = 36a^2 + 6a - 6a - 1 = 36a^2 - 1$

72) $(5r^2 - 2s)(5r^2 + 2s)$

$(5r^2 - 2s)(5r^2 + 2s) = 25r^4 + 10r^2s - 10r^2s - 4s^2 = 25r^4 - 4s^2$

74) $\left(\frac{3}{4}x - \frac{1}{7}\right)\left(\frac{3}{4}x + \frac{1}{7}\right)$

$$\left(\frac{3}{4}x - \frac{1}{7}\right)\left(\frac{3}{4}x + \frac{1}{7}\right) = \left(\frac{3}{4}x\right)\left(\frac{3}{4}x\right) + \left(\frac{3}{4}x\right)\left(\frac{1}{7}\right) - \left(\frac{1}{7}\right)\left(\frac{3}{4}x\right) - \left(\frac{1}{7}\right)\left(\frac{1}{7}\right)$$

$$= \frac{9}{16}x^2 + \frac{3}{28}x - \frac{3}{28}x - \frac{1}{49} = \frac{9}{16}x^2 - \frac{1}{49}$$

76) $(x+4)^3$

$$(x+4)^3 = (x+4)(x+4)(x+4) = (x+4)(x^2+4x+4x+16) = (x+4)(x^2+8x+16)$$
$$= x^3+8x^2+16x+4x^2+32x+64 = x^3+12x^2+48x+64$$

78) $(4x+1)^3$

$$(4x+1)^3 = (4x+1)(4x+1)(4x+1) = (4x+1)(16x^2+4x+4x+1) = (4x+1)(16x^2+8x+1)$$
$$= 64x^3+32x^2+4x+16x^2+8x+1 = 64x^3+48x^2+12x+1$$

80) $(b^2+1)(a^4-5)$

$$(b^2+1)(a^4-5) = a^4b^2-5b^2+a^4-5$$

82) $(x-4)(2y^3+1)$

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

84) $(x-1)^2+(x-2)^2+(x-3)^2$

$$(x-1)^2+(x-2)^2+(x-3)^2 = (x^2-x-x+1)+(x^2-2x-2x+4)+(x^2-3x-3x+9)$$
$$= (x^2-2x+1)+(x^2-4x+4)+(x^2-6x+9)$$
$$= x^2-2x+1+x^2-4x+4+x^2-6x+9 = 3x^2-12x+14$$

86) $(5x-4)^2-(5x+4)^2$

$$(5x-4)^2-(5x+4)^2 = (25x^2-20x-20x+16)-(25x^2+20x+20x+16)$$
$$= (25x^2-40x+16)-(25x^2+40x+16)$$
$$= 25x^2-40x+16-25x^2-40x-16 = -80x$$

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

$$(x-3)^3 = (x-3)(x-3)(x-3) = (x-3)(x^2-3x-3x+9) = (x-3)(x^2-6x+9)$$
$$= x^3-6x^2+9x-3x^2+18x-27 = x^3-9x^2+27x-27$$

$$(x+3)^3 = (x+3)(x+3)(x+3) = (x+3)(x^2+3x+3x+9) = (x+3)(x^2+6x+9)$$
$$= x^3+6x^2+9x+3x^2+18x+27 = x^3+9x^2+27x+27$$

$$(x-3)^3-(x+3)^3 = (x^3-9x^2+27x-27)-(x^3+9x^2+27x+27)$$
$$= x^3-9x^2+27x-27-x^3-9x^2-27x-27$$
$$= -18x^2-54$$