# *MATH 6: Homework 11.*

January 9, 2022

# *Algebra and formulas for fast multiplication and factorization*

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

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

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

And ***factorizing***: $$a(b+c) = ab + ac$$

1. Factorize by taking terms outside of parenthesis:
   a. $6a + 12 =$
   b. $mn + n =$
   c. $5xy - 15x =$
   d. $4ax - 8ax^2 + 12ax^2 =$

2. Factorize using formulas for fast multiplication:
   a. $9 - x^2 =$
   b. $x^6 - 4 =$
   c. $9 - 6x + x^2 =$
   d. $a^3 - 2a^2x + ax^2 =$

3. Show that the LHS = RHS:
   a. $(m-n)(a+b) + m - n = a(m-n) + (b+1)(m-n)$
   b. $x^2(x+1) - x - 1 = x(x+1)^2 - (x+1)^2$
   c. $2x(x+b) + a(x+b) = (2x+a)x + (2x+a)b$
   d. $(a+b)^2 + c(a+b) = (a+b)(a+c) + (a+b)b$

4. Solve the equations:
   a. $2x(x-1) = 2(x^2-5)$
   b. $\frac{1}{6}x - \frac{2}{9}(x+5) = -\frac{1}{18}(x-1)$
   c. $3x^2 - (3x+2)(x-1) - (x+2) = 0$

5. Solve the equations:
   a. $|7x+3| = 18$
   b. $|x+17| = -3$
   c. $-|x+2| + 3 = 0$

6. You are in a chemistry class and you are given a 5*l* solution which contains 8% sugar. How many *l* of 15% sugar solution do you have to add to obtain a:
   a. 10% solution
   b. 16% solution