**SchoolNova, Math 5b**
**Homework 6**
**Algebra: Opening Parenthesis, Word Problems**
**October 27, 2019**

Please provide sufficient details about how you solved the problem. More difficult problems are marked with a $*$. If unable to solve a problem, please present your thoughts and any partial solution.

1. Determine each of the following products, by opening parenthesis and collecting like terms:

   (a) $(x+y) \times (x+y)$

   (b) $(x+y) \times (x-y)$

   (c) $(2x+3y) \times (2x+3y)$

   (d) $(2x+3y) \times (2x-3y)$

2. Simplify each of the following algebraic expressions, by opening parenthesis and collecting like terms:

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

3. Simplify each of the following algebraic expressions, by opening the parenthesis and collecting like terms:

   (a) $a(a+b) + b(a+b)$

   (b) $(a+b)(a+b)$

   (c) $a(a+b) - b(a+b)$

   (d) $(a-b)(a+b)$

   (e) $(a+b)^2$

   (f) $(a+b)^3$

   (g) $(a+b+c)^2$

4. Simplify each of the following algebraic expressions, by opening the parenthesis and collecting **like terms**:

   (a) $-x^2 + [-(3x^2 + 2y^2) + (3x^2 + y^2)]$

   (b) $x - \frac{1}{3}(x^2 + 3x + 6)$

   (c) $xy - [yz - xz + (xy - 3yz)]$

   (d) $(xy^2)^2 + (xy)^2 + 3(x^2y^4 + x^2y^2)$

5. Solve the following equations for $x$:

   (a) $x + 2 = 6$

   (b) $x - 2 = 11$

   (c) $10 - x = 4$

   (d) $2x + 18 = 20$

   (e) $4x = 24$

   (f) $2x + 6 = x + 10$

6. $*$ It is given that $a + b = 10$, $b + c = 14$ and $a + c = 16$. Find $a + b + c$.

7. TGV is France's high speed rail service. TGV trains can comfortably go as fast as 300 km/hr, while the US train service Amtrak goes at a speed of 130 km/hr. How long will it take TGV and Amtrak to go from New York to Washington, D.C., if the distance between New York and Washington, D.C. is 400 km. How much time would we save, if the TGV operated between New York and Washington, D.C.?

8. Solve the following puzzle (different letters stand for different digits):

$$\begin{array}{cccc} T & H & I & S \\ & + & I & S \\ \hline E & A & S & Y \end{array}$$

9. For more practice, you can use the link *https* : *//www.mathsisfun.com/algebra/index.html*