Algebra and Geometry 1. Homework 14.

1. Example of Knights and Knaves problem.
   On the Island all knights tell the truth, and all knaves are always lying.
   On the island of knights and knaves, you meet two inhabitants: Zoey and Mel. Zoey tells you that Mel is a knave. Mel says, “Neither Zoey nor I are knaves." So, who is a knight and who is a knave?
   Z = “Zoey is a knight”
   M = “Mel is a knight”

	Z	M	Zoey tells: Mel is a knave	Mel tells: Neither Zoey nor Mel are knaves
1	T	T	F	T
2	T	F	T	F
3	F	T	F	F
4	F	F	T	F

   Line 1. Both Z. and M. supposed to be Knights. Then, the Zoey proposition that Mel is knave is not true, so, so Zoey lied, therefore Zoey can’t be a knight. Mel’s proposition that neither of them are knaves is also false, so Mel is also a knave. And this bring us to the line 4.
   Line 4. Both are knaves. Then, Zoey tells the truth, and Zoey can’t be a knave, but Mel lies, so Mel is a Knave.
   Line 2. Zoey is a knight and Mel is a knave. Everything is fine! Zoey tells the truth, Mel doesn’t.
   Line 3. Zoey is a knave; Mel is a knight. Zoey lies, But Mel lies as well, so Mel can’t be a knight.
   We can see, that Zoey is a knight and Mel is a knave.
2. On the island of knights and knaves, you meet two inhabitants: Sue and Zippy. Sue says that Zippy is a knave. Zippy says, “I and Sue are knights." So, who is a knight and who is a knave?

3. You meet two inhabitants: Sue and Marge. Sue says that Marge is a knave. Marge claims, ‘Sue and I are not the same.’
   Can you determine who is a knight and who is a knave?

4. On the island of knights and knaves you can meet 3 kinds of people:
   knights, who always tell the truth
   knaves, who always lie
   tourists, who sometimes lie and sometimes tell the truth
   On that island, you meet 3 people, A, B, and C, one of whom is a knight, one a knave,
   and one tourist (but not necessarily in that order). They make the following statements:
   A: I am a tourist
   B: That is true
   C: I am not a tourist
   What are A, B, and C?

5. On the island of Knights and Knaves, a traveler meets two inhabitants: Carl and Bill. Bill says: “Carl is a Knave”. Carl says: “If Bill is a Knight, then I am a Knight, too.” Make a truth table and determine whether each of them is a Knight or a Knave?

6. Solve equations:

   a. $\frac{x+3}{4} = 3x - 5;$ *b*. $\frac{x-3}{5} + \frac{x+2}{4} = \frac{1}{2}$

   c. $\frac{2-x}{3} = x - 3;$ *d*. $\frac{x2-3}{4} + \frac{x+2}{2} = 6 + \frac{2x-3}{2}$

7. Write as polynomials:

   a. $(2x-3)(2x+3);$ *b*. $(2x-3)(2x-3)$

   c. $(2x^2 - x)(2x^2 + x)$ *d*. $(3y^2 - 5)(2y^2 + 7)$