Algebra and Geometry 1. Homework 14.

1. Create the TRUE table for the following proposition P:
   P = "For my homework I need to solve one math problem and one physics problem"
   This proposition connects two other propositions:
   A = " I solved one math problem "
   and
   B = " I solved one physics problem "

   Did I do my homework if I solved only math problem? Only physics problem?

A	B	$P=A\wedge B$

Formulate the negation of P, when my home work will not be done**.** Fill the table for $\neg P$ **.**

A	B	$\neg P = \neg(A\wedge B)$

Fill the table for $\neg P$ along with $\neg A$ and $\neg B$**.**

$\neg A$	$\neg B$	$\neg P = \neg(A\wedge B)$

There is another proposition:

$$Q = \text{"}\textit{For my homework I need to solve one math problem or one physics problem}\text{"}$$

This proposition connects two same propositions:
A = " I solved one math problem "
and
B = " I solved one physics problem "

Did I do my homework if I solved only math problem? Only physics problem? Both problems?

A	B	$Q=A \vee B$

Formulate the negation of Q, when my home work will not be done**.** Fill the table for $\neg Q$ **.**

A	B	$\neg Q = \neg(A \vee B)$

Fill the table for $\neg Q$ along with $\neg A$ and $\neg B$**.**

$\neg A$	$\neg B$	$\neg Q = \neg(A \vee B)$

What you can say about the negation of AND and OR logical connectives?

2. 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?

3. 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 knightand who is a knave?

4. Read the following propositions. Prove the true proposition, do the negation of the propositions:

   a. Any natural number is greater than 0.
   b. There is a natural number which square is greater than 30.
   c. The square of any natural number is greater than the number itself.

5. Simplify the following expressions (combine like terms).

   $a.\ 2xy + 0.5xy + (xy) : 6 + (xy) : 3 + xy;$
   $b.\ a + 2b + 2a + 4b + 3a + 6b$
   $c.\ 8\frac{3}{11}x + 0.66y + 5\frac{2}{11}x + 2.34y$
   $d.\ 17x - (3y + z) + (5z - x) - (2x - 8y);$
   $e.\ c - (c - d) - \left(c - \frac{d}{2}\right) - \left(c - \frac{d}{4}\right) - \left(c - \frac{d}{8}\right) - \left(c - \frac{d}{16}\right) + \frac{d}{16}$

6. A swimming pool can be filled through one pipe in a hours, through second pipe in b hours, and through the third pipe in c hours. In how many hours the pool can be filled with all three pipe opened?

7. A swimming pool can be filled through one pipe in a hours, through second pipe in b hours, and through all three pipe altogether in x hours. In how many hours the pool can be filled with only third pipe opened?
   Write the expressions for both problems.