Accelerated math. Homework 23.

Problems marked with * are more difficult.

1. Prove, that

   $0.0\overline{10} = 0.\overline{01}$;

   $0.5\overline{45} = 0.\overline{54}$;

   $0.\overline{77} = 0.\overline{7}$

   Example: $0.3\overline{53} = 0.\overline{35}$

   $0.3\overline{53} = x$

   $10x = 3.\overline{53}$

   $1000x = 353.\overline{53}$

   $1000x - 10x = 353.\overline{53} - 3.\overline{53} = 350$

   $990x = 350$

   $x = \frac{350}{990} = \frac{35}{99}$

   $y = 0.\overline{35}$

   $100x = 35.\overline{35}$

   $100y - y = 35$

   $y = \frac{35}{99}$

   $x = y$

2. Number a marked on the number line (see the picture below). Which of the expression below isn't true?

1) $\frac{1}{a} < -1$ 2) $-\frac{1}{a} > 1$ 3) $\frac{1}{a} < a$ 4) $-\frac{1}{a} < a$

3. Change the position of one digit such that the equality becomes true:

$$101 - 102 = 1$$

4. Solve the following equations:

а) $2a - (14 - 3a) = -10$;

б) $(9 - 2b) - (b + 5) = 16$;

в) $-(4c - 7) = 5c + (11 - 7c)$;

г) $-6x + 2(5 - 3x) = 8$;

д) $18 - 4y = 7(2 - y) + 6$;

е) $4(-2z + 5) = 14 - 2(4z - 3)$.

5. Simplify the following expressions:

$5 + (3a - 5b + 7c) - (7c - 5b + 3a)$;

$7 - (3x - 4y + 1) - (4y - 3x + 1)$;

$4x - (2x - 7y + 6) + (11 - 2x - 7y)$;

$3y + (x - y - 7) - (4y - 12 + x)$;

$(a - b) - (c - b) - (a - c)$;

$-(a - b) - (b - c) - (c - a)$;