

Math 5b, homework 5.



1. Write the numbers, written in the ternary (3-based) system in decimal system:

$$a. 12101_3; \quad b. 111_3, \quad c. 222_3$$

2. Write the numbers 231 and 101 in ternary system.

3. Write a 4-digit number, each digit 1 more than the previous digit (like 2345). Then write the 4-digit number with the same digits but in opposite order (like 5432). Subtract the smaller number from the greater one. Do it two more times using different digits. What did you notice? Can you explain it?

4. Use the distributive property and simplify fractions:

Example:

$$\frac{21 \cdot 24 + 21 \cdot 36}{35 \cdot 12} = \frac{21 \cdot (24 + 36)}{35 \cdot 12} = \frac{3 \cdot 7 \cdot 60}{5 \cdot 7 \cdot 12} = \frac{3 \cdot 7 \cdot 12 \cdot 5}{5 \cdot 7 \cdot 12} = 3$$

$$a. \frac{15 \cdot 9 - 15 \cdot 6}{9 \cdot 30}; \quad b. \frac{17 \cdot 4 + 17 \cdot 9}{34 \cdot 52}; \quad c. \frac{18 \cdot 7 + 18 \cdot 3}{1200}; \quad d. \frac{24 \cdot 11 - 24 \cdot 3}{300}$$

5. Two people simultaneously set out from A to B. The first one rode a bicycle, while the second one traveled by car at a speed five times greater than the first. Halfway to the destination, the car experienced an accident, and the motorist continued the remaining journey on foot at a speed half that of the bicyclist. Who arrived in B first? Can you say, not only who's the fastest, but also how much faster he is.

6. *Parliament elections were held on Fruit Island. Everyone who voted for the Mandarin party love tangerines. Of those who voted for other parties, 90% do not like tangerines. How many percent of the votes got the Mandarin party, if it is known that exactly 46% of the inhabitants love tangerines.

7. Evaluate (answer is 5):

$$(2.5 - 0.75) \cdot \frac{4}{7} + \left(\left(3\frac{3}{8} - 2\frac{11}{12} \right) \cdot 1\frac{7}{9} + 2\frac{11}{12} \cdot 1\frac{7}{9} \right) : \left(3.5 : 2\frac{1}{3} \right)$$

* — More difficult problem.

9.

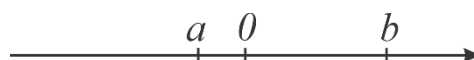
10. There is a bag of sugar, a scale and a weight of 1 g. Is it possible to measure 1 kg of sugar in 10 weights?

$$a. \quad a + b \dots 0;$$

$$b. \quad a - b \dots 0;$$

$$c. \quad ab \dots 0;$$

$$d. \quad \frac{b}{a} \dots 1$$



13. Can you find out which numbers are multiplied?

[illegible]

15. Without doing calculation prove that

$$a. \quad \frac{1}{3} + \frac{1}{4} > \frac{1}{2};$$

$$b. \quad \frac{1}{5} + \frac{1}{6} + \frac{1}{7} + \frac{1}{8} > \frac{1}{2}$$

a. $5 \cdot (-3)^3 + 7$

$$b. \quad -2 \cdot (-1.1)^2 + 15$$

c. $10 - 7 \cdot (-2)^7$

$$d. \quad -20 - 10 \cdot (-0.1)^2;$$

$$e. 7 \cdot (-1)^3 - 4 \cdot (-1)^2 - 8;$$

$$f. -10 \cdot (-0.3)^2 - 5 \cdot (-0.3) + 1;$$

