

MATH 7
ASSIGNMENT 1: REVIEW OF MATH 6
SEP 26, 2021

WELCOME TO THE NEW YEAR AT SCHOOLNOVA!!

And welcome to Math 7! It is a fun and practical course, full of techniques you are likely to find yourself using all the time in your future education. So know that all your effort this year is sure to bring fruits!

Here are some of the topics we plan to study this year:

- Algebra: manipulating algebraic expressions, factorization, solving equations and inequalities of first and second degree
- Trigonometry: similarity of triangles, trigonometric functions, equations and identities
- Other topics: vectors in 2 dimensions, principles of probability, combinatorics, Pascal's triangle

We will try to do much of the homework in class so that you do not need to spend too much time on it at home. As usual, all HW assignments and other information will be posted online at <http://www.schoolnova.org> as well as on Google Classroom.

Your homework is to be turned in through Google Classroom on the next Saturday by 9pm. You will also be able to see your grade/feedback there, one week later. Don't worry if you cannot do all of the problems, but always attempt all of them and write down your progress. Please write neatly and in a separate sheet of paper.

I ask that each student bring a notebook (preferably quad ruled), pencils and a folder or binder to keep old assignments — you will need them! And no sharing (because of covid)!

We also plan to participate in math competitions, and you should register soon. Check your SchoolNova email for the link to register.

If you have any questions, please contact me by email: cardoso@schoolnova.org.

PREVIOUS MATERIAL

A lot of the material covered in Math 6 (and before) will be useful for us, especially:

Mathematical logic.

Sets and functions.

The coordinate plane and graphs.

Arithmetic and geometric progressions.

Today we will review these topics; no new material is given.

HOMEWORK

1. Prove that

$$\text{NOT}(A \text{ AND } B) \text{ is the same as } (\text{NOT } A) \text{ OR } (\text{NOT } B)$$

2. Write the truth table for each of the following formulas. Are they equivalent (i.e., do they always give the same value)?
- (a) $(A \text{ OR } B) \text{ AND } (A \text{ OR } C)$
 - (b) $A \text{ OR } (B \text{ AND } C)$.
3. In a class of 25 students, 10 students know French, 5 students know Russian, and 12 know neither. How many students know both Russian and French?
4. Draw all points on the plane for which one has $x = y + 1$.
5. Point M has coordinates $(5, 7)$.
- (a) Find coordinates of the point M_1 obtained from M by reflection around the x -axis
 - (b) Find coordinates of the point M_2 obtained from M by reflection around the diagonal line.
6. Draw the graphs of the following functions:

- (a) $2x + 3y = 1$
- (b) $2x - 1 = y$
- (c) $y = |x| - 2$

- 7. What are the first 2 terms for the arithmetic sequence $a_1, a_2, -9, -2, 5, \dots$?
- 8. Find the sum of the first 100 terms of the arithmetic sequence if $a_1 = 10$ and $a_{100} = 150$.
- 9. A geometric sequence has 99 terms, and the first term is 12 and the last term is 48. What is the 50th term?
- 10. Compute

$$\frac{1}{2} + \frac{1}{2^2} + \frac{1}{2^3} + \cdots + \frac{1}{2^{10}}$$