Lesson plan: Properties of the right triangle

School:
Școala Gimnazială Nr.1 Oțelu Roșu

Teacher:
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Grade:
a VI-a B

Subject:
Mathematics-geometry

Unit:
Properties of triangles

Title:
Properties of the right triangle

Type of the lesson:
to learn specific notions about the right triangle through analysis and demonstration

Time:
50 minutes

General skills:
1. Identifying some data, quantities and mathematical relations, in the context in which they appear
2. Processing of mathematical data of quantitative, qualitative, structural type, contained in various information sources
3. Use of specific concepts and algorithms in various mathematical contexts
4. Expression in mathematics-specific language of information, conclusions and solutions for a given situation
5. Analyzing the mathematical characteristics of a given situation
6. Mathematical modeling of a given situation, by integrating acquisitions from different fields

Specific skills:
- Recognition of elements of plane geometry associated with the notion of triangle
- Calculation of segment lengths, measures of angles in the context of triangle geometry
- Use of congruence criteria and properties of particular triangles to determine the characteristics of a geometric configuration
- Expression in symbolic and figurative geometric language of the characteristics of triangles and important lines in a triangle

- Analysis of some geometric constructions in order to highlight some properties of the triangles
- Transposing, in specific language, a given situation related to the geometry of the triangle, solving the obtained problem and interpreting the result

Operational objectives

O1. Drawing right angles, using geometric tools (square, protractor);
O2. Identification and naming of right angles in given geometric configurations;
O3. Identification, naming and representation of right triangles, use of terminology: legs, hypotenuse, sharp angles, vertex opposite a side, side opposite a vertex;
O4. Identification, naming and representation of perpendicular lines in given geometric configurations;
O5. Drawing the right triangle presented by description, notation or image, using geometric tools;
O6. Establishing the congruence of some triangles based on the congruence criteria in solving problems;
O7. Determining the measures of the angles of a triangle under given conditions;
O8. Calculation of segment lengths;
O9. Notification by measuring the connection between the lengths of the sides of a right triangle with an angle measuring 30 °; application of the 30 ° angle theorem
O10. Identification of properties of the isosceles right triangle;
O11. Drawing representation of elements of a right triangle related to angles and important lines;
O12. Argumentation of the approach to solve a problem in which right triangles appear.

Affective objectives:

Oa1: to participate with pleasure and interest in all the proposed activities;
Oa2: to show curiosity and creativity in solving the proposed tasks;
Oa3: to keep attention awake, enough time to achieve the set goals.

Psychometric objectives:

Opm: to draw, to build, correctly, neatly,

Purpose of the lesson (general objective):

Discover the properties of the right triangle;
application of knowledge in various contexts; in order to develop the flexibility of thinking;

Teaching strategy:
  a) Methods and procedures: problematization, discovery learning, systematic observation, heuristic conversation, independent work, work with the textbook, explanation, demonstration, exercise, clusters, gallery tour, mosaic.
  b) Forms of organization: frontal, in groups.
  c) Resources:
      a. official: program, planning;
      b. material: chalk, blackboard, textbook, problem collection, notebooks, geometry kit;
      c. posters (duplexes), compass, marker, colors, adhesive tape, paper gluing substance, worksheets, drawings, geometric tools, relationship sheets and formulas;
      d. -time: 50 '
  d) -   human: the students of grade VI B

Evaluation:
  - By oral check
  - Verbal assessments
  - Systematic observation

- Analysis of the received answers
- Selfassessment
- -Solving exercises and problems

Type of assessment:
continuous, formative, written and oral;

Bibliography:
1. Textbook for the sixth grade, Dorin Linț, Maranda Linț, Maria Zaharia, Dan Zaharia, Didactic and Pedagogical Publishing House;
2. Mate 2000, Dan Zaharia, Editura Paralela 45;
3. Mathematics, Exercises and problems for the 6th grade, Delfin Publishing House;
4. Mathematics school curriculum, approved by order of the Minister 3393 / 28.02.2017.

Annexes:
Worksheets

LESSON CONDUCT

Lesson stages	Activity content		Didactic strategy resources:			Evaluation
	Teacher's activity	Students'activity	Procedural	Material	Classroom management	
1.Oragnizational moment (1 min)	The order is established, the climate necessary to start the activity. Check the atendance. Check that all students have all the necessary materials on the desk. Prepare the necessary materials.	They're getting ready for class. They have notebooks, textbooks and notebooks and a geometry kit on the desks. - meet administrative requirements; - answer the teacher's questions;	Conversation	School register Notebooks Textbooks Crayons Geometry kit	Frontal Individual	Verbal appreciations
2. Capturing attention (3 min)	-verifying the homework and updating the previously taught knowledge: What is a right angle? Draw right angles with the square and then with the protractor. Then draw right triangles. Name the elements of the triangle. The teacher appreciates and corrects the students' answers	Reading the homework. Answer the questions and draw right angles and right triangles. They pay attention to the teacher's explanations, discuss freely and ask for any clarifications during the discussion.	conversation Discussion Analyze Explanation Systematic observation brainstorming	pencils notebooks Geometry kit drawings	Frontal Individual	Verbal appreciations Systematic observation Analysis of the received answers Selfassessme nt Continuous formative oral
3. Preparing students for the reception of new knowledge (2 min)	The teacher divides the class into four groups, using colored cards. On each work table are placed cards with numbers, from 1 to 4, which will indicate the work groups.	Listen and comply with what the teacher says.	Conversation		Frontal activity	
4.Communicating	The teacher iforms the students about	The students write in their	Conversation	Pencils	Frontal	Verbal

the lesson topic and operational objectives (2 min)	the topic of the lesson. S/He writes the date and the title of the lesson " Properties of the right triangle " on the board Informs students about the main objectives of the lesson	notebooks the title of the lesson.	Explanation	Noteboks Board Chalk Drawing	Individual	appreciations
5. Content presentation and learning conduct (25 min)	A worksheet is distributed to each group; In each group, students will choose a number from one to four, stating that they will have to get up and sit at the table on which the number of their choice is placed. This will form 4 groups of experts. Students are explained that they will become experts in the group, and they will receive a worksheet that they will have to explain to their classmates after 15 minutes. The expert sheets are distributed, the students discuss them in groups, the teacher monitors the activity of each group. After 15 minutes, the initial groups are re-established, in which there will be experts in each task. Each expert explains to the other colleagues the work task learned, the colleagues noting on the notebooks. After 10 minutes, each student will have all the work tasks explained. The teacher intervenes whenever s/he feels the need.	Students pay attention to the teacher's explanations and presentation; they form expert groups, meet the teacher's requirements;	conversation Presentation Jigshaw Commenting and group discussion	Sheets, plasticine, chopsticks paper, scissors, compass marker, colors; tape glue	Activity in expert groups and working groups	Verbal appreciations Systematic observation Analysis of the received answers Selfassessment Solving exercises and problems continuous formative written

6. Fixation and systematization (8 min)	After 15 minutes, one student from each group presents the solutions obtained for the work task, then how to solve it; The "GALLERY TOUR" method is applied: - each group visits the gallery to examine and discuss each product; - take notes; can comment and give a grade on the papers on display; - after all the groups have visited the "gallery", appreciations will be made, they will correct any mistakes and the grade will be discussed; - the teacher makes assessments regarding the entire activity;	Students listen carefully to the report of the team leaders, visit the gallery, give grades, comment, present the strengths and weaknesses;	discussions and analysis of the debate in groups and reporting sessions	paper, marker	Group activity	Continuous formative Oral and written
7. Association, generalization and application (4 min)	Students are asked to complete the following statement: "If I were a triangle, I would like to be a .... triangle because …………"	Listen, solve work tasks;	Exercises; brainstorming	handouts; marker	Individual work	Continuous Formative Oral
8. Appreciation of students' activity (3 min)	The evaluation is done by grading the students who have stood out.	Students listen carefully, take notes and comment;	Heuristic conversation;		Frontal activity	Oral
9. Homework (2 min)	The teacher gives homework- Handouts are distributed; explanations are given for solving the tasks.	Write down the homework	Conversation	Notebooks	Frontal	Verbal appreciations

Worksheet

Fill in and solve:
In a right triangle, the sum of the acute angles is: ....
In a right triangle, the sharp angles, because they make together .... are ....
....
Let be the triangle ABC, rectangular in A, m (∢B) = 300. Determine m (∢C) = ...
In a right and isosceles triangle, the angles next to the base (hypotenuse) have the measure of ....
each;
Draw the right triangle ABC in A, AB = AC = 8 cm; m (∢B) = ... m (∢C) = ...;

Fill in and solve:
In a right triangle the length of the median corresponding to the hypotenuse is equal to
.... of the length of the hypotenuse;
The center of the circle circumscribed by a right triangle is in .... the hypotenuse;
Let the triangle ABC be rectangular in A with AB = 12 cm, AC = 16 cm;
Draw the triangle;
Measure BC = ...
If BC = 20 cm, calculate the length of the median [AO] (check the result by measurement);
Construct the circle around the triangle ABC; race = ...

Fill in and solve:
In a right triangle the leg that opposes the angle of 300 is .... from
hypotenuse;
Let the triangle ABC, be rectangular in A, BC = 18 cm, m (∢B) = 600.
AB = ... cm
Let the triangle ABC, be rectangular in A, AC = 18 cm, m (∢C) = 600.
CB = ... cm

Let be the triangle ABC, in which the median [AO] relative to the side [BC] is half the length of [BC].
Prove that the triangle is rectangular in A. Working steps:
Write the hypothesis and conclusion;
drawing;
The triangle AOB, because it has two sides, [AO] and [BO] congruent, is triangle ...., so m
(∢ABO) = m (∢ ....) = x0;
The triangle AOC is triangle .... because .... so m (∢OAC) = m (∢
...................) = y0 ;
m (∢A) + m (∢B) + m (∢C) = ... results in x0 + y0 = ... so m (∢A) =
.... results in the triangle ABC is ………………………… …. .

Expert sheet 1

A triangle ABC has m ($\angle$A) = 900; draw;

1. Specify his cathetus and hypotenuse: ....

2. What kind of angles are angles B and C? (sharp, straight or obtuse)?

3. How many degrees do: m ($\angle$B) + m ($\angle$C) = ...

4. If m ($\angle$B) = x0 then m ($\angle$C) = 900 - ....

5. If m ($\angle$B) = 37 0 then m ($\angle$C) = ...

Expert sheet 2

A triangle ABC has m ($\angle$A) = 900; AB = AC; draw;

1. Specify the cathetus and hypotenuse: ....

2. What kind of triangle is it? Why ?

3. What kind of angles are angles B and C? (sharp, straight or obtuse)?

4. Determine the measures of angles B and C.
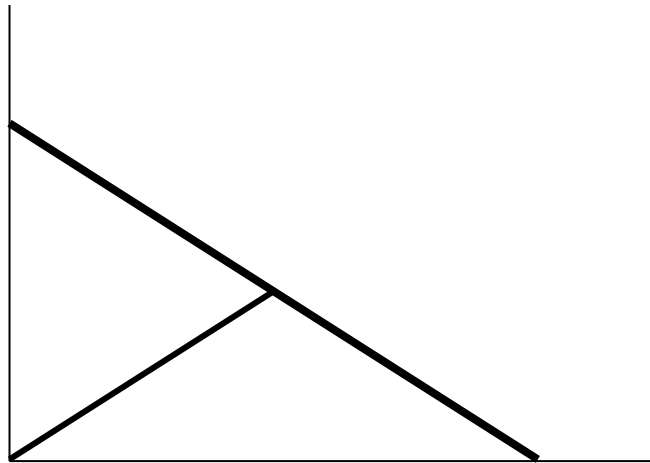
Expert sheet 3

Construct a right angle XOY.

1) Let A [OX, B [OY, M be the middle [AB]. Join O with M.

What is [OM] for the right triangle AOB?

Measure the AM, MB, and OM segments. What do you find?

2) Draw the circle with center in M and radius OM.

Which points noted on the figure belong to the circle ?

1). Using the results from 1) and 2) complete:

a) In a right triangle the length of the median relative

to the hypotenuse is...

....

b) In a right triangle the center of the circumscribed

circle is..

....

Expert sheet 4

Draw a triangle ABC, rectangular in A and m ($\angle$B) = 300.
Draw the symmetry of point C with in connection with the line AB.
Let this be D. Join B with D.
Complete :
[AB]   is   height   in   triangle   BCD   because
…………………………………………………… .. (a)
AB   is   a   mediator   in   the   triangle   BCD   because
…………………………………………………… … (b)
It follows from (a) and (b) that the triangle BCD is triangle
………………… …… and therefore [BA] is also …………… ….. results
$\angle$DBA = $\angle$ ………….. = …. 0
m ($\angle$DBC) = ……………………………………… …………………; m (<BDC) =
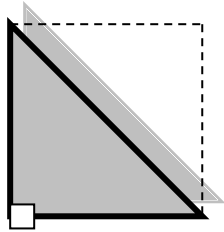……………………………….; m (<DCB) = ………….
The triangle ABC is the triangle ……………………………… ..
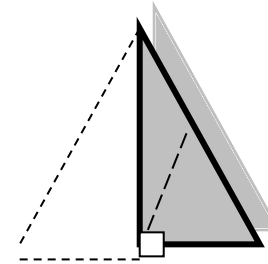AC is half of ………………….
In the right triangle ABC in A, the leg [AC] that opposes the angle of
300 is half of ………………………….. ………………….
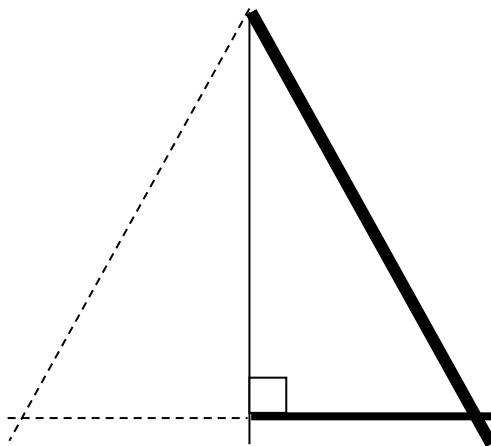
RIGHT TRIANGLE

The median [AO] is half of [BC]

If AB = AC
then:
m(∢B) = m(∢C) = 45⁰

The triangle ABC rectangular in A

m (∢ B) + m (∢ C) = 90⁰

If m(∢B) = 30⁰ then

$AC = \frac{1}{2} BC$