

EXERCISE 05

CONDITIONAL STATEMENT

Purpose of classes

Implementation of simple procedures and functions using conditional statement.

Materials to be prepared

Materials placed on the course website: Lecture03.

Tasks

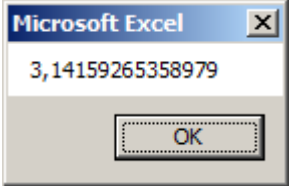
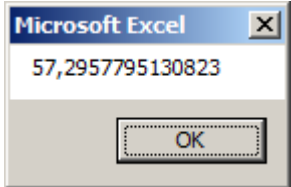
Write procedures and functions described below.

1.	Function condition_1 checks the triangle inequality. The parameters of the function are the lengths of the three sides of the triangle and the function returns TRUE value if it is possible to build a triangle with the given dimensions and FALSE if it is not possible. <i>Hint:</i> A triangle can be formed if all of the following conditions are met (a, b, c - sides of the triangle): $a < b + c, \quad b < a + c, \quad c < a + b.$
2.	Function condition_2 is a modified version of the function condition_1 in which the possibility of building a triangle is tested using the condition: $ b - c < a < b + c.$
3.	Function area calculates the area of a triangle. The parameters of the function are: • two sides of the triangle, • the angle between these sides • parameter specifying the unit in which the angle is expressed (the angle can be expressed in degrees or radians), the parameter specifying the unit is an optional parameter; if it is not provided by the user, it should be assumed that the angle is expressed in degrees (see Note 1). <i>Hint:</i> The area of the triangle should be calculated using the formula (a, b - sides of the triangle, γ - angle): $S = \frac{1}{2} ab \sin(\gamma).$
4.	Function triangle_1 is a modified version of the function area. This function has an additional optional parameter indicating the value calculated by the function. If this parameter is equal to 1 (default value), function calculates the area, and if it is equal to 2, function calculates the perimeter of the triangle. <i>Hint:</i> To calculate the perimeter of a triangle, you need to determine the length of its third side: $c = \sqrt{a^2 + b^2 - 2ab \cos(\gamma)}.$
5.	Function triangle_2 is a modified version of the function triangle_1. This function can calculate: • length of the third side of the triangle (last parameter equal to 3) • angle β between sides a and c (last parameter equal to 4), • angle α between sides b and c (last parameter equal to 5).



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	Angles α and β should be calculated in the same units as angle γ. <i>Hint:</i> Use the formulas: $\alpha = \arccos\left(\frac{b^2+c^2-a^2}{2bc}\right), \quad \beta = \arccos\left(\frac{a^2+c^2-b^2}{2ac}\right),$ Calculations of <i>arccos</i> - see Note2.
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Notes	
1	Converting degrees to radians <code>Radians(angle As Double) As Double</code> angle is an angle in degrees <i>example:</i> <code>MsgBox Application.WorksheetFunction.Radians(180)</code> 
1	Converting radians to degrees <code>Degrees(angle As Double) As Double</code> angle is an angle in radians <i>example:</i> <code>MsgBox Application.WorksheetFunction.Degrees(1)</code> 
2	Calculations of arccosine (inverse cosine) <code>ACos(value As Double) As Double</code> value is cosine of certain angle which is determined by the functions, returned angle is given in radians in the range 0 to pi. <i>example:</i> <code>MsgBox Application.WorksheetFunction.ACos(1)</code> 