

Exercise A.2.23 and 25

The lengths of the sides of a triangle are given. Determine which are right triangles. For those that are, identify the hypotenuse.

A.2.23 7, 24, 25

Solution

The converse of the Pythagorean Theorem, Theorem A.2.B, states that if the length of one side squared is the sum of the squares of the other two lengths then we have a right triangle. Now

$$7^2 = 49, \quad 24^2 = 576, \quad \text{and} \quad 25^2 = 625.$$

Since  $49 \neq 576 + 625$ ,  $576 \neq 49 + 625$ , and  $625 = 49 + 576$ . Because of the equality,

these are the lengths of the sides of a right triangle and the hypotenuse is  $\sqrt{625} = 25$ . □

A.2.25 6, 4, 3.

Solution

As above, we consider  $6^2 = 36$ ,  $4^2 = 16$ , and  $3^2 = 9$ . But  $36 \neq 16 + 9 = 25$ ,  $16 \neq 36 + 9 = 45$ , and  $9 \neq 36 + 16 = 52$ . So the square of one of the lengths is not the sum of the squares of the lengths of the other two sides. So, by the converse of the Pythagorean Theorem implies that these are not the lengths of the sides of a right triangle. □