Anne notice that the space below the stairs created a right triangle. She measured the base as 12ft and she knew that the area of space below the stairs was 30ft^2. Explain in paragraph form how to find the diagonal created by the stairs.

Anne knew that the area of space below the stairs was 30ft^2 and the base was 12ft.

As with any triangle, the area is equal to one half the base multiplied by the corresponding height. In a right triangle, if one leg is taken as the base then the other is height, so the area of a right triangle is one half the product of the two legs. As a formula the area T is $T = \frac{1}{2}ab$. Therefore $b = 2T/a$

The Pythagorean theorem states that:

In any right triangle, the area of the square whose side is the hypotenuse (the side opposite to the right angle) is equal to the sum of the areas of the squares whose sides are the two legs (the two sides that meet at a right angle).

This can be stated in equation form as

$$a^2 + b^2 = c^2$$

where c is the length of the hypotenuse, and a and b are the lengths of the remaining two sides.

Therefore:

$$c^2 = a^2 + \left(\frac{2T}{a}\right)^2$$

and finally:

$$c = \sqrt{a^2 + \left(\frac{2T}{a}\right)^2} = \sqrt{12^2 + \left(\frac{2 * 30}{12}\right)^2} = 13 \text{ ft}$$

Answer:13 ft