Question

From the top of a cliff 55m high, the angle of depression of a boat is 26degree. find the distance from the boat to the foot of the cliff.

Solution

First, we have to make a drawing. On this drawing we designate the cliff and the boat. And we can draw a right triangle.
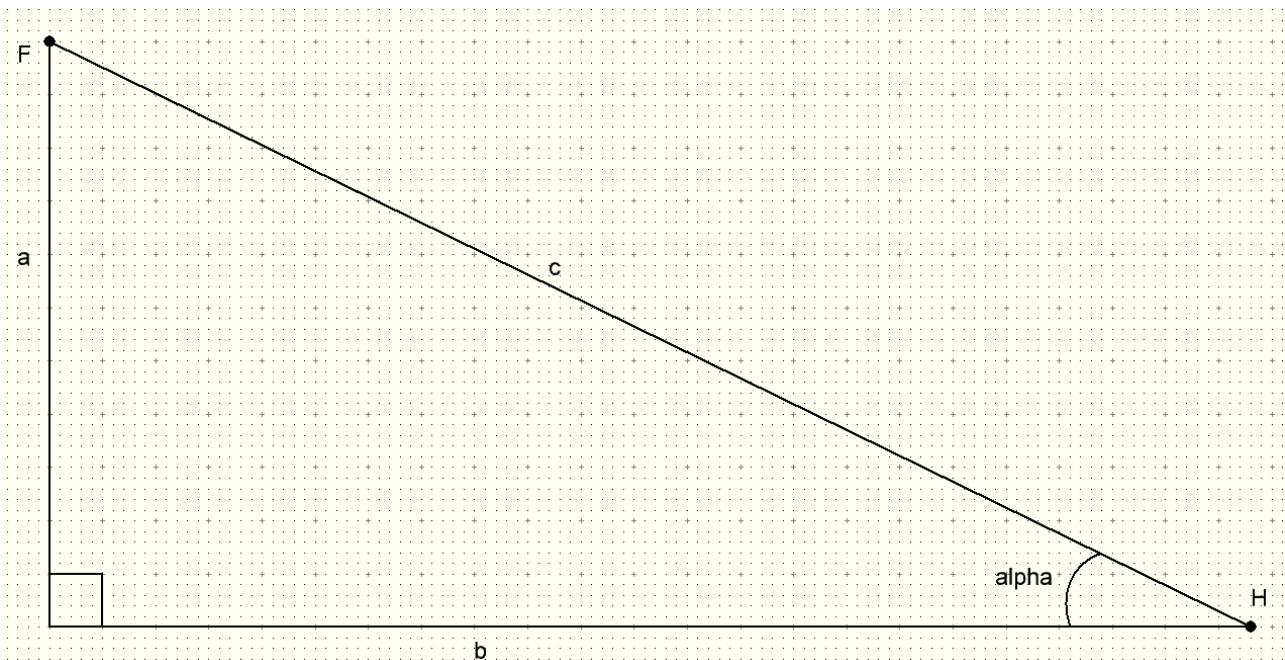
We have three sides of this triangle which are called "a", "b", "c" and one angle "alpha", two points "H" and "F".

The left side that called "a" is the side that shows the height of a cliff, $a = 55$(m).

The bottom side called "b" is the side that shows the distance from the boat to the foot of the cliff. We will be looking for the "b" side. The "c" gives the distance from the boat to the top of a cliff.

The angle "alpha" is the angle between the "c" and "b" sides, $\angle alpha = 26°$

The boat is located at point "H". Point "F" is the top of a cliff.

We will use the tangent formula:

$$tan(alpha) = \frac{a}{b} \Rightarrow b = \frac{a}{tan(alpha)} = \frac{55}{tan(26°)} = \frac{55}{0.4877} = 112.77(m)$$

Answer: The distance from the boat to the foot of the cliff is 122.77 meters.