

## Application of Pythagorean Theorem

1. The typical ratio of length to width that is used to produce televisions is 4: 3.

A TV with length 20 inches and width 15 inches, for example, has sides in a 4: 3 ratio; as does any TV with length  $4x$  inches and width  $3x$  inches for any number  $x$ .

a) The advertised size of a TV is the size of its diagonal. What is the advertised size of a TV with length 20 inches and width 15 inches?

b) A 42" TV was just given to your family. What are the length and width measurements of the TV?

c) The table that your TV currently rests on is 30" in length. Will the new TV fit on the table? Explain.

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a) The advertised size of a TV is the size of its diagonal. What is the advertised size of a TV with length 20 inches and width 15 inches?

*Let  $c$  in. be the length of the diagonal.*

$$\begin{aligned}20^2 + 15^2 &= c^2 \\400 + 225 &= c^2 \\625 &= c^2 \\\sqrt{625} &= \sqrt{c^2} \\25 &= c\end{aligned}$$

*Since the TV has a diagonal length of 25 inches, then it is a 25" TV.*

b) A 42" TV was just given to your family. What are the length and width measurements of the TV?

*Let  $x$  be the factor applied to the ratio 4: 3.*

$$\begin{aligned}(3x)^2 + (4x)^2 &= 42^2 \\9x^2 + 16x^2 &= 1764 \\(9 + 16)x^2 &= 1764 \\25x^2 &= 1764 \\\frac{25x^2}{25} &= \frac{1764}{25} \\x^2 &= 70.56 \\\sqrt{x^2} &= \sqrt{70.56} \\x &= \sqrt{70.56}\end{aligned}$$

*$x = 8.4$ , and the dimensions of the TV are  $(4 \times 8.4)$  inches, which is 33.6 inches, and  $(3 \times 8.4)$  inches, which is 25.2 inches.*

c) The table that your TV currently rests on is 30" in length. Will the new TV fit on the table? Explain.

The dimension for the length of the TV is 33.6 inches. It will not fit on a table that is 30 inches in length.

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