PSSA Open Ended Prep – Proportions

Please read the given situation carefully. Then, answer each question that follows. If you are asked to EXPLAIN something, please do so using COMPLETE SENTENCES!

Situation #1:

The sun has made shadows of a boy and a tree, creating two similar triangles. The boy is 5 feet tall, and his shadow is 12 feet long. The tree’s shadow is 60 feet long.

Part A) Use proportions to determine how tall the tree is through indirect measurement. Show all work. EXPLAIN what you did and why.

\[
\frac{x}{5} = \frac{60}{12}
\]

\[
12x = 300
\]

\[
\frac{12x}{12} = \frac{300}{12}
\]

\[
x = 25
\]

I set up a proportion using the similar triangles shown above. I solved the proportion by cross multiplying and solving for the variable. The tree is 25 feet tall.

Part B) Use the Pythagorean Theorem to determine the distance from the top of the tree to the end of its shadow. Show all work.

\[
a^2 + b^2 = c^2
\]

\[
25^2 + 60^2 = c^2
\]

\[
625 + 3600 = c^2
\]

\[
take \ square \ root \ of \ 4225 = c^2
\]

\[
65 = c
\]

65 feet
PSSA Open Ended Prep – Proportions

Situation #2:

A scale drawing of a house has a scale of 4 inch : 5 feet. On the scale drawing, the living room is 26 inches long and 19 inches wide.

Part A) Using proportions, determine the dimensions of the living room. **Show all work.** **EXPLAIN** what you did and why.

\[
\frac{4 \text{ in}}{5 \text{ ft}} = \frac{26 \text{ in}}{x} \quad \frac{4 \text{ in}}{5 \text{ ft}} = \frac{19 \text{ in}}{y}
\]

\[
\frac{4x}{4} = 130 \quad \frac{4y}{4} = 95
\]

\[
x = 32.5 \text{ ft} \quad y = 23.75 \text{ ft}
\]

I set up two proportions using the scale of 4 inch : 5 feet in each one. I solved each proportion by cross multiplying to find the actual dimensions of the living room.

Part B) How many square feet of carpet will be needed to cover the living room? **Show all work.**

\[
A = lw
\]

\[
A = (32.5)(23.75) \quad 771.875 \text{ ft}^2
\]

Part C) The hallway between the living room and the laundry room is supposed to be 12 feet long, but on the scale drawing it is just 7 inches long. What adjustment needs to be made to the drawing?

\[
\frac{4 \text{ in}}{5 \text{ ft}} = \frac{x}{12 \text{ ft}}
\]

\[
5x = 48 \quad x = 9.6
\]

The drawing should be showing a length of 9.60 inches. So, increase the drawing length from 7 inches to 9.6 inches.