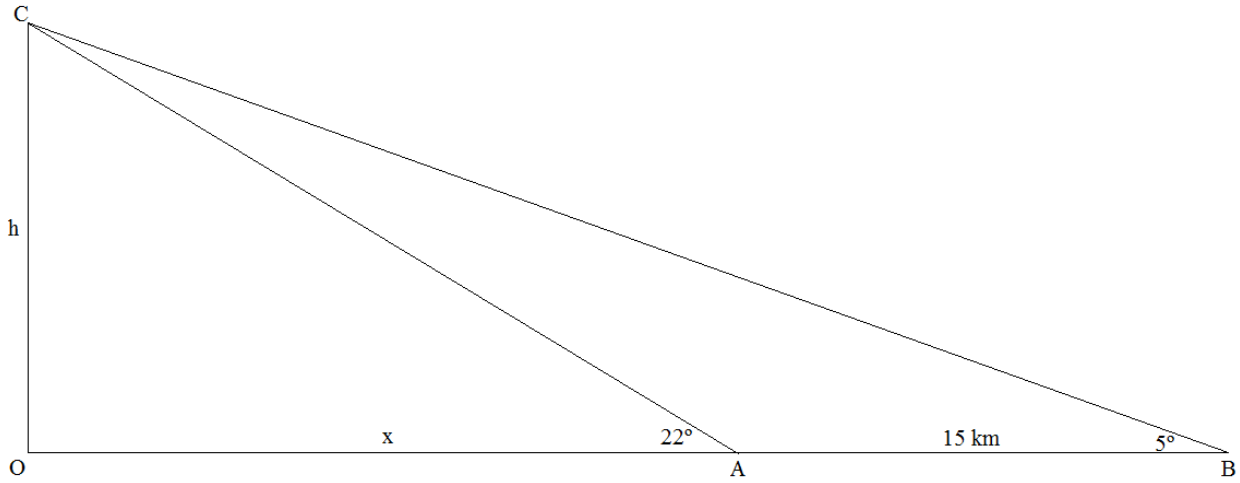
Answer on Question #83271 – Math – Trigonometry

Question

Mr. Elliott is heading on a ski trip to Revelstoke Mountain. While driving his car towards the mountain Mr. Elliott measures the angle of elevation to the top of the mountain to be 5°. He drives 15 km closer to the mountain and measures the new angle of elevation to be 22°. Assuming Mr. Elliott was driving on a level (flat) road, find the height of the mountain (in metres).

Solution



Right triangle ΔCBO

$$\tan 5° = \frac{OC}{OB} = \frac{h}{x+15}$$

Right triangle ΔCAO

$$\tan 22° = \frac{OC}{OA} = \frac{h}{x}$$

$$x = \frac{h}{\tan 22°}$$

$$h = \left(\frac{h}{\tan 22°} + 15\right)\tan 5°$$

$$h = \frac{\tan 5° \tan 22°}{\tan 22° - \tan 5°} \cdot 15 \approx 1.675\ (km)$$

$$h = 1675\ m$$

Answer: The height of the mountain is 1675 metres.