

AN ALTITUDE OF A TRIANGLE IS $\frac{5}{3}$ THE LENGTH OF ITS CORRESPONDING BASE. IF THE ALTITUDE IS INCREASED BY 4CM AND THE BASE DECREASED BY 2CM, THE AREA OF THE TRIANGLE REMAIN THE SAME . FIND THE BASE AND THE ALTITUDE OF THE TRIANGLE.

Solution:

Let an altitude will be h and it's corresponding base will be a . According to condition $h = \frac{5}{3}a$, and the area of triangle will be $S = \frac{1}{2} * \frac{5}{3}a * a$. If the altitude is increased by 4 cm and the base decreased by 2cm, the area will be $S = \frac{1}{2} * (\frac{5}{3}a + 4) * (a - 2)$

According to condition, the area of triangle remain the same, so let's make the equation

$$\frac{1}{2} * \frac{5}{3}a * a = \frac{1}{2} * (\frac{5}{3}a + 4) * (a - 2)$$

$$\frac{5}{3}a * a = (\frac{5}{3}a + 4) * (a - 2)$$

$$12a^2 = 34$$

$$a^2 = \frac{17}{6} \Rightarrow a = \sqrt{17/6} \Rightarrow h = \frac{5}{3}\sqrt{17/6}$$

Answer: $a = \sqrt{17/6}, h = \frac{5}{3}\sqrt{17/6}$