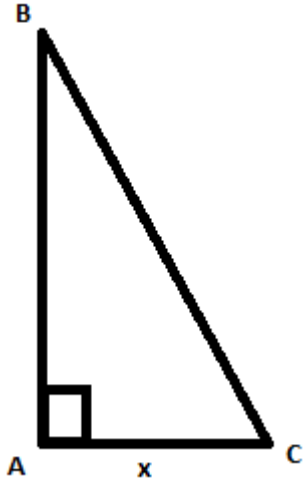


Answer on Question #83744 – Math – Other

Question

1. In Triangle ABC the angle A is 90° and $AC = x$. If $\sin B = x$ what is $\sin C = ?$

Solution



We know that $AC = x$, $\sin B = x$, $A = 90^\circ$. We can use the sine theorem:

$$\frac{AC}{\sin B} = \frac{BC}{\sin A} \leftrightarrow \frac{x}{x} = \frac{BC}{\sin 90^\circ} \leftrightarrow BC = 1$$

Now, we use the Pythagorean theorem:

$$AB^2 = BC^2 - AC^2 = 1 - x^2 \leftrightarrow AB = \sqrt{1 - x^2}$$

(One must note that the same result can be obtained using the cosine theorem:

$$BC^2 = AB^2 + AC^2 - 2 * AC * AB * \cos A \leftrightarrow 1 = AB^2 + x^2 - 2 * AB * AC * 0$$

$$AB^2 = 1 - x^2 \leftrightarrow AB = \sqrt{1 - x^2})$$

Using the definition of the sine function

$$\sin C = \frac{AB}{BC} = \frac{\sqrt{1 - x^2}}{1} = \sqrt{1 - x^2}$$

(One must note that $\sin C$ can be found using the sine theorem:

$$\frac{AB}{\sin C} = \frac{BC}{\sin A} \leftrightarrow \frac{\sqrt{1 - x^2}}{\sin C} = \frac{1}{\sin 90^\circ} \leftrightarrow \sin C = \sqrt{1 - x^2})$$

Answer: $\sin C = \sqrt{1 - x^2}$.

Question

2. $-3 < 5 - 2x < 7$ express it with modules.

Solution

$$-3 < 5 - 2x < 7$$

Subtract 5

$$-8 < -2x < 2$$

Divide by -1

$$8 > 2x > -2$$

Subtract 3

$$5 > 2x - 3 > -5$$

Rewrite the last formula as

$$-5 < 2x - 3 < 5$$

By the definition of the absolute value it is equivalent to

$$|2x - 3| < 5$$