Right Triangle Trigonometry
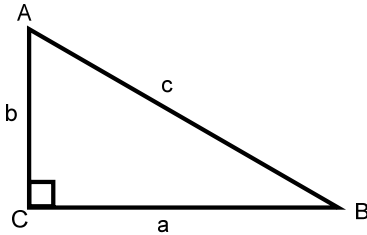
You know 3 trig functions but there are 6

SOH CAH TOA

Reciprocal Functions

$$\sin B = \frac{opposite}{hypotenuse} = \frac{b}{C}$$

$$\csc B = \frac{hypotenuse}{opposite} = \frac{C}{b}$$
cosecant (csc)

$$\cos B = \frac{adjacent}{hypotenuse} = \frac{a}{C}$$

$$\sec B = \frac{hypotenuse}{adjacent} = \frac{C}{a}$$
secant (sec)

$$\tan B = \frac{opposite}{adjacent} = \frac{b}{a}$$

$$\cot B = \frac{adjacent}{opposite} = \frac{a}{b}$$
cotangent (cot)

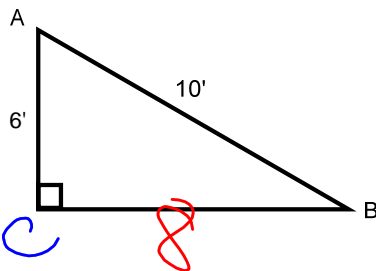**To find the 3rd side, use Pythagorean Theorem**

$$a^2 + b^2 = c^2$$
$$6^2 + b^2 = 10^2$$
$$36 + b^2 = 100$$
$$b^2 = 64$$
$$b = 8$$

1. Find all six trig ratios for angle B exactly

$$\sin B = \frac{6}{10} = \frac{3}{5}$$

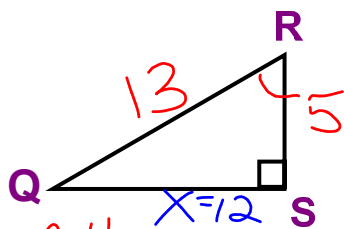$$\csc B = \frac{10}{6} = \frac{5}{3}$$

$$\cos B = \frac{8}{10} = \frac{4}{5}$$

$$\sec B = \frac{10}{8} = \frac{5}{4}$$

$$\tan B = \frac{6}{8} = \frac{3}{4}$$

$$\cot B = \frac{8}{6} = \frac{4}{3}$$

2.

R

13   5

Q

CAH

$X=12$ **S**

GIVEN: $\cos R = \dfrac{5}{13} = \dfrac{A}{H}$

Find missing side:

$a^2 + b^2 = c^2$

$5^2 + x^2 = 13^2$

$25 + x^2 = 169$

$-25 \qquad -25$

$\sqrt{x^2} = \sqrt{144}$

$x = 12$

FIND each value as a fraction:

1. $\cot R$

$\tan R = \dfrac{12}{5}$

so $\cot R = \dfrac{5}{12}$

2. $\sec Q$

$\cos Q = \dfrac{12}{13}$

$\sec Q = \dfrac{13}{12}$

3. $\sin R$

SOH

$\sin R = \dfrac{12}{13}$