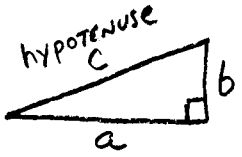
Chapter 9 In a Nutshell ~ Algebra ~ Per. 4 ~

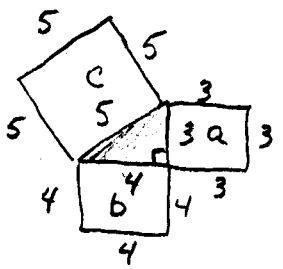
Pythagorean Theorem



"The square of the hypotenuse equals the sum of the squares of the other two sides."

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

Ex)



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

$5^2 = 3^2 + 4^2$

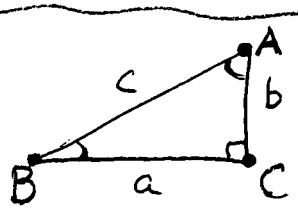
$25 = 9 + 16$ ✓

c^2 = Area of square with hypotenuse as one side

a^2 = area of square with leg "a" as one side

b^2 = area of square with leg "b" as one side

Trigonometric Ratios



Sides ⇒ lower case

Vertices opposite each side ⇒ upper case

As long as there is only 1 angle at each vertex, also can use A, B, C for angle names

Sine of ∠A = $\frac{\text{opposite}}{\text{hypotenuse}} = \frac{o}{h} = \frac{a}{c}$

Note: Latin for sinuous, i.e., "curvy" or snakelike

ANY △ THIS △

Cosine of ∠A = $\frac{\text{adjacent}}{\text{hypotenuse}} = \frac{a}{h} = \frac{b}{c}$

ANY

Note: This is the same as the sine of ∠B = $\frac{\text{side } b}{\text{side } c}$

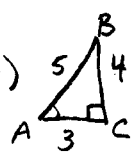
That is, the cosine of ∠A is the same as the sine of its complementary ∠.

Tangent of ∠A = $\frac{\text{opposite}}{\text{adjacent}} = \frac{o}{a} = \frac{a}{b}$

ANY

Famous Mnemonic: SOHCAHTOA

Ex)



$\sin A = \frac{o}{h} = \frac{4}{5}$

$\cos A = \frac{a}{h} = \frac{3}{5}$

$\tan A = \frac{o}{a} = \frac{4}{3}$

Note: To go backwards, given ratio, find ∠ ⇒ arcsin x or $\sin^{-1} x$

Ex) arcsin(.8) = 53 degrees

Put calculator in degree mode

Simplifying Radicals

$\sqrt{\text{No perfect sq's}}$, $\sqrt{\text{No fractions}}$, $\frac{1}{\sqrt{\text{None Here}}}$ LOOK

Note: $3\sqrt{2} + 4\sqrt{2} = 7\sqrt{2}$ ↑ Treat like "x"

$3\sqrt{3} + 4\sqrt{2}$ ↘ No!

$(a^{\frac{1}{2}})(a^{\frac{1}{2}}) = a^1$

$\therefore \sqrt{2} = 2^{\frac{1}{2}}$ etc. WHY?