Homework Questions from 10.8

SOH CAH [TOA]

2. The slope of a ski hill is 0.84. Find the angle that the hill makes with the horizontal.

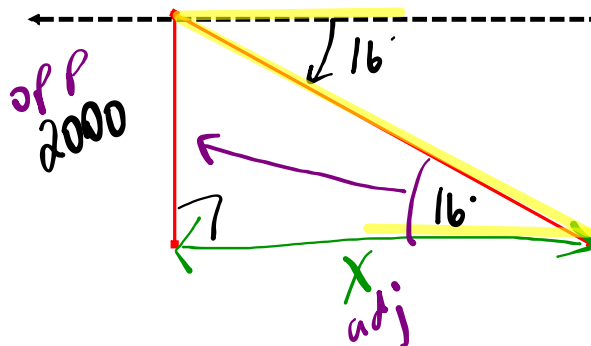OPP Rise

slope = 0.84

Run ADJ

$slope = 0.84$

$\dfrac{Rise}{Run} = 0.84$

$\dfrac{OPP}{ADJ} = 0.84$

$\tan^{-1} \tan\theta = \tan^{-1}(0.84)$

$\theta = 40°$

3. A search plane at an altitude of 2000 m determines the angle of depression of a disabled power launch to be 16°. What is the horizontal distance of the plane from the power launch?
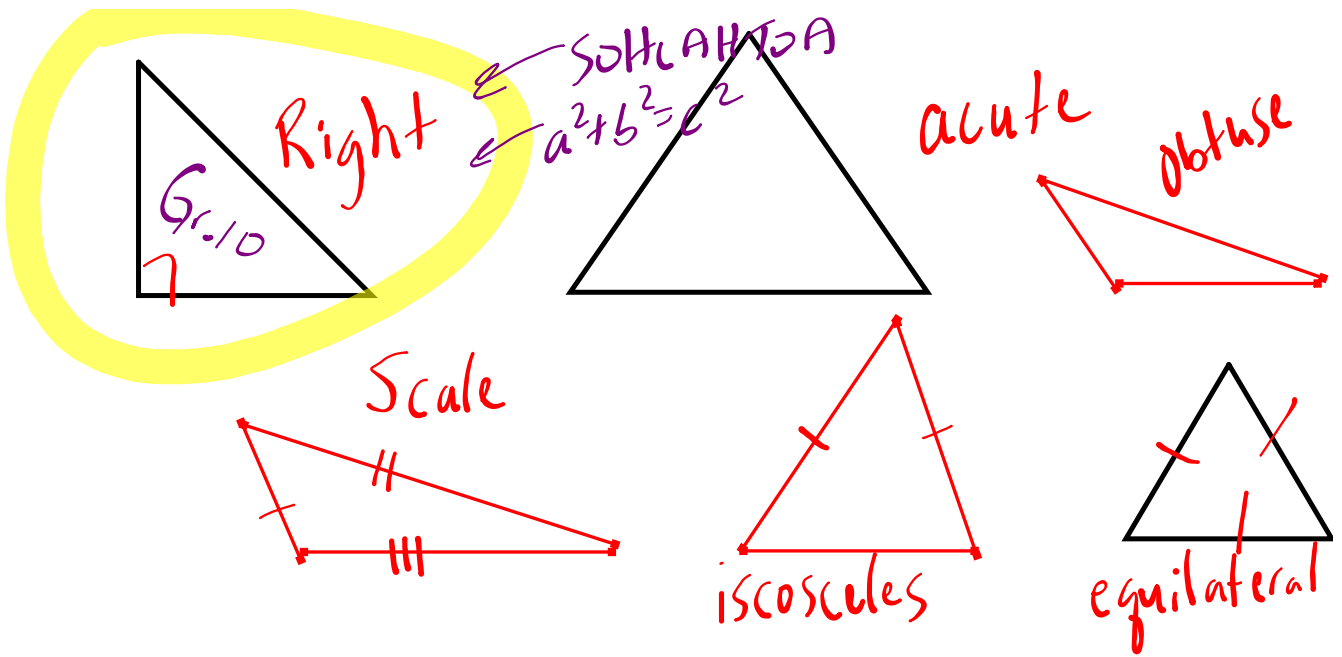
OPP 2000

16°

16°

X adj

SOH CAH [TOA]

$\tan 16° = \dfrac{2000}{X}$

$X = \dfrac{2000}{\tan 16°}$

$X = 6974.8 m$

SOHCAHTOA

Right

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

Gr.10

acute

obtuse

Scale

iscosceles

equilateral

Law of Sines

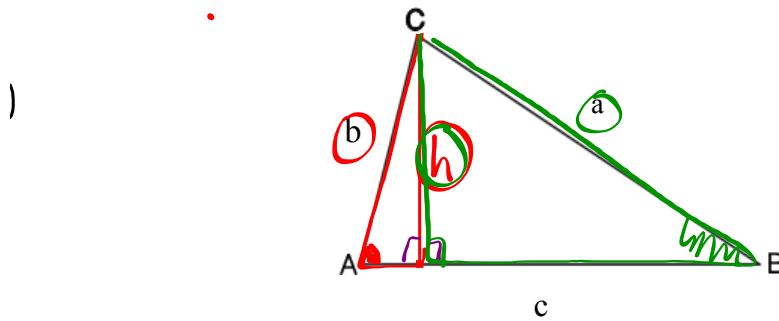** **Used when the triangle does not contain 90 angle** (Oblique Triangle)
** In order to use you must be given 1) an angle and an opposite side

2) any other side or angle
Lower case letters "a,b,c" represent side lengths
Upper case letters "A,B,C" represent angle measures

Let's derive the Law of Sines...

$$b\sin A = \frac{h}{b} \times b$$

$$a\sin B = \frac{h}{a} \times a$$

$$b\sin A = h$$

$$a\sin B = h$$

$$\frac{b\sin A}{\sin B \sin A} = \frac{a\sin B}{\sin B \sin A}$$

Law of Sines

$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$
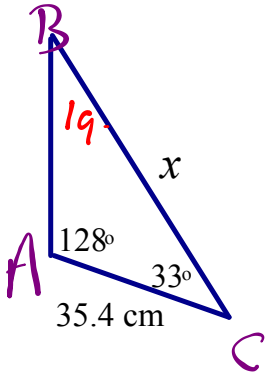
$$\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$$

"when looking for a <u>side</u>"   "when looking for an <u>angle</u>"
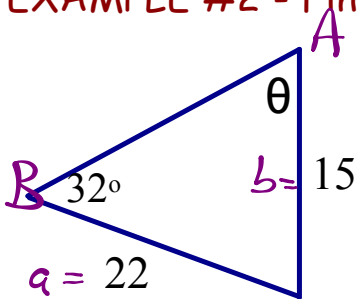
EXAMPLE #1 - Finding a side.

B

19°

x

128°

A

33°

35.4 cm

C

$$\frac{a}{\sin A} = \frac{b}{\sin B}$$

$$\frac{x \sin 128°}{\sin 128°} = \frac{35.4 \sin 128}{\sin 19°}$$

$x =$
```
35.4sin(128)/sin
(19)
          85.6827681
35.4/sin(19)*sin
(128)
          85.6827681
```
$x =$

$x = 85.68 \text{ cm}$

EXAMPLE #2 - Finding an angle.

A

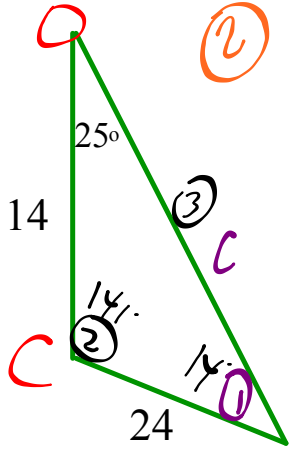θ

B

32°

b = 15

a = 22

$$\frac{\sin A}{a} = \frac{\sin B}{b}$$

$$22 \frac{\sin \theta}{22} = 22 \frac{\sin 32°}{15}$$

$$\sin^{-1} \sin \theta = \sin^{-1}(0.7772)$$

$$\theta = 51°$$

EXAMPLE #3 - Solve the triangle.

$$\boxed{\frac{\sin A}{a} = \frac{\sin B}{b}} \quad \boxed{\frac{a}{\sin A} = \frac{b}{\sin B}}$$

② $\angle C = 180°$
$\quad\quad - 25$
$\quad\quad - 14$

$\boxed{\angle C = 141°}$

① $\dfrac{14 \sin T}{14} = \dfrac{14 \sin 25°}{24}$

$\sin^{-1} \sin T = \sin^{-1}(0.2465)$

$\boxed{\angle T = 14°}$
$\quad\quad\quad\uparrow$
$\quad\quad\text{angle}$

③ $\dfrac{c \sin 141°}{\sin 141°} = \dfrac{24 \sin 141°}{\sin 25}$

$\boxed{c = 35.7}$

(triangle with vertices O, C, T; side 14 opposite, 25° angle at O, side 24, angle markings ①②③, side c)

EXAMPLE #4 - Application

Suppose that Mr. Watters was playing a straight par-3 golf hole that was 120 m long. He hits one of his regular old slices that ends up 40 º off line and is still 82 m from the hole.

(a) How far did his tee shot travel?

(b) If he somehow miraculously hits his next shot onto the green, what was the angle between the path of his first shot and the path followed by the second shot?

Homework...

Worksheet - Law of Sines.doc

10.9

Left Side...

Right Side...

#1 - 6

#1 - 4