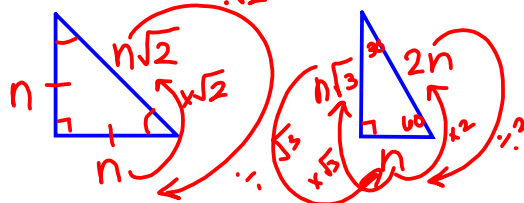


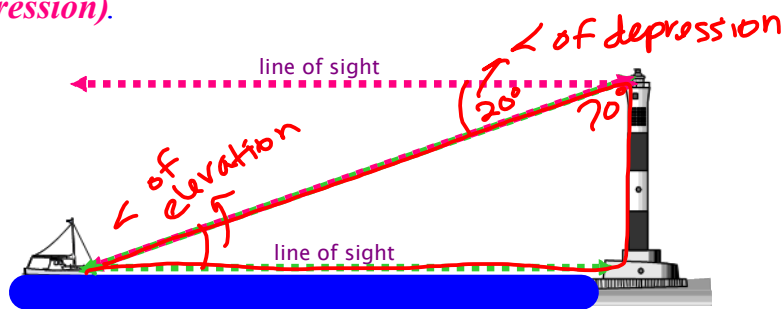
12-1 Right Triangle Trigonometry

Right Triangle Review

- Pythagorean Theorem: $a^2 + b^2 = c^2$
- Special Right Triangles: 45-45-90 $\therefore \sqrt{2}$ 30-60-90



- Angles of Elevation and Depression: The angle formed with the line of sight when looking **up** (**elevation**) or when looking **down** (**depression**).



no perfects in radicand
 no fractions in radicand
 no radicals in denom.
 index in simplest form.

no neg exp.
 no fraction exp in denom

Trigonometry: the study of the relationships among the angles and sides of a right triangle.

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6 Trigonometric Functions ratios of the sides of a right triangle.

(sine)
 $\sin\theta = \frac{\text{opp}}{\text{hyp.}}$

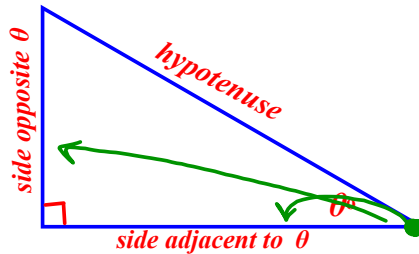
(cosecant)
 $\csc\theta = \frac{\text{hyp.}}{\text{opp.}}$

(cosine)
 $\cos\theta = \frac{\text{adj}}{\text{hyp}}$

(secant)
 $\sec\theta = \frac{\text{hyp}}{\text{adj.}}$

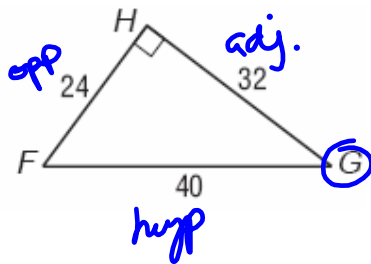
(tangent)
 $\tan\theta = \frac{\text{opp}}{\text{adj.}}$

(cotangent)
 $\cot\theta = \frac{\text{adj.}}{\text{opp.}}$



Examples:

1. Find the values of the six trigonometric functions for angle G.



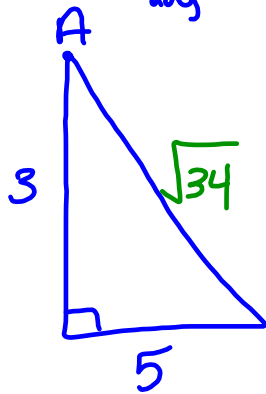
$\sin G = \frac{24}{40} = \frac{3}{5}$ $\csc G = \frac{5}{3}$

$\cos G = \frac{32}{40} = \frac{4}{5}$ $\sec G = \frac{5}{4}$

$\tan G = \frac{24}{32} = \frac{3}{4}$ $\cot G = \frac{4}{3}$

$\angle G = 37^\circ$

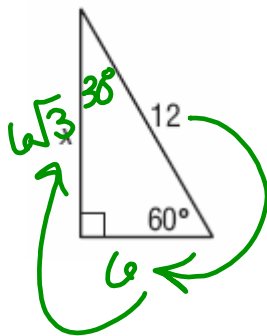
2. If $\tan A = \frac{5}{3}$, find the value of $\csc A$. TOA SOH



$$\begin{aligned}
 a^2 + b^2 &= c^2 \\
 3^2 + 5^2 &= c^2 \\
 9 + 25 &= c^2 \\
 34 &= c^2 \\
 \sqrt{34} &= c
 \end{aligned}$$

$$\csc A = \frac{\sqrt{34}}{5}$$

3. Solve for x.



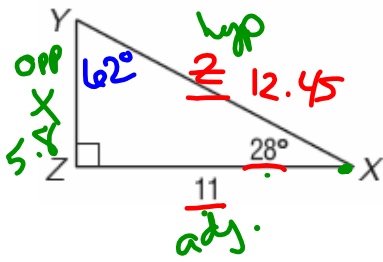
$$12 \cdot (\sin 60^\circ) = \frac{x}{12} \cdot 12$$

$$12 \cdot (\cos 30^\circ) = \frac{x}{12} \cdot 12$$

$$x = 10.4$$

$$10.4 \leftarrow x$$

4. Solve $\triangle XYZ$.



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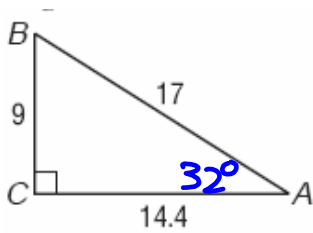
$$\frac{\cos 28^\circ}{\cos 28^\circ} = \frac{11}{z}$$

$$11 \cdot (\tan 28^\circ) = x$$

$$5.8 = x$$

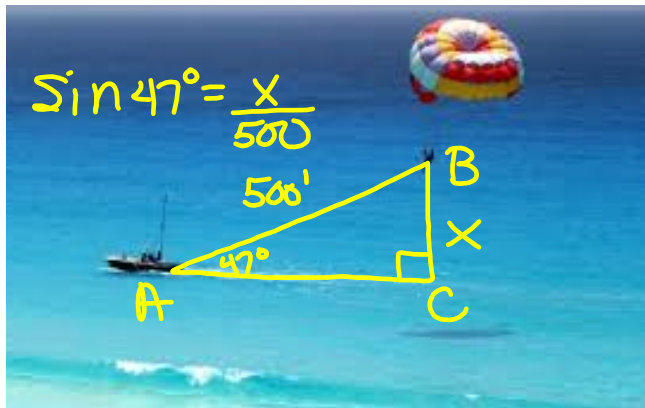
$$z = 12.45$$

5. Solve $\triangle ABC$.

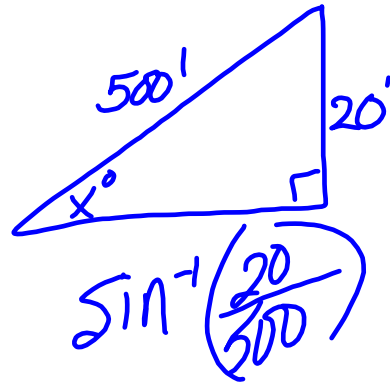


$$\begin{array}{r} \angle B = 90^\circ \\ - 32^\circ \\ \hline 58^\circ \end{array}$$

$$\begin{aligned} \angle A &= \sin^{-1}\left(\frac{9}{17}\right) \\ \angle A &= \cos^{-1}\left(\frac{14.4}{17}\right) \\ \angle A &= \tan^{-1}\left(\frac{9}{14.4}\right) \end{aligned} \quad \left. \vphantom{\begin{aligned} \angle A &= \sin^{-1}\left(\frac{9}{17}\right) \\ \angle A &= \cos^{-1}\left(\frac{14.4}{17}\right) \\ \angle A &= \tan^{-1}\left(\frac{9}{14.4}\right) \end{aligned}} \right\} = 32^\circ$$



6. Cailin is parasailing at an of elevation of 47° . The length of the towline is 500 feet. How high above the water is Cailin parasailing.



Part B:

A great white shark can jump out of the water 20 feet. At what angle of elevation is Cailin's life in danger????

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13-53 odd