7.5 Finding Angles and Solving Right Triangles

You have learned how to calculate trigonometry ratios.

$$\sin 53° = \underline{0.7986}$$

Now, you will learn how to convert the trigonometry ratio into the size of the angle.

$$0.7986 = \underline{\sin 53°}$$

calculator: (2nd) [sin] $\sin^{-1}$

__sin__ and __$\sin^{-1}$__ are inverse operations. Think of inverse terms of

subtraction and addition. What other inverse terms do you know?

__multiplication / division__   __square root / squared__
                                        $(\sqrt{})$ $(^2)$
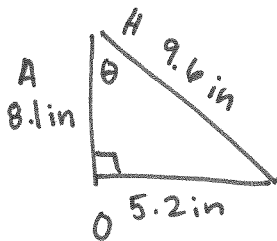
Calculate each angle to the nearest degree.

a. $\sin A = 0.2546 \rightarrow 15°$

b. $\cos B = 0.1598$

c. $\tan C = 3.2785$

d. $\cos D = 0.8564$

Ex 1. A right triangle has an opposite length if 5.2 in, an adjacent length of 8.1 in, and a hypotenuse length of 9.6 in. What is the value of the angle of sine?
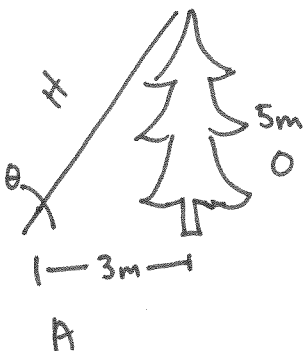
$$S = \frac{O}{H}$$

$$S = \frac{5.2}{9.6}$$

$$S = 0.5417$$

$$\sin^{-1} 0.5417 = \boxed{33°}$$

Ex 2. Determine the angle of elevation to the top of a 5-meter tree at a point 3 meters from the base of the tree.
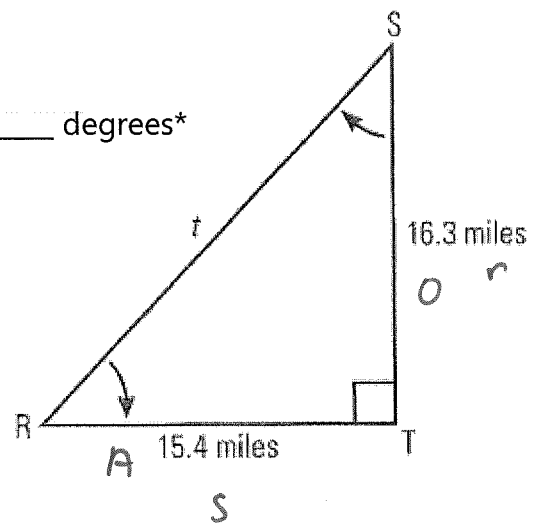
$$T = \frac{O}{A}$$

$$T = \frac{5}{3}$$

$$T = 1.\overline{6}$$

$$\tan^{-1} = \boxed{59°}$$

Ex 3. Solve the given triangle.

The three angles of a right triangle equals ____180____ degrees

Calculate ∠R :

$$T = \frac{O}{A}$$

$$T = \frac{16.3}{15.4}$$

$$T = 1.0584$$

$$\tan^{-1} = \boxed{47°}$$

Calculate ∠S using measures of angles in triangles

$$∠S = 180° - 90° - 47°$$

$$∠S = \boxed{43°}$$

Calculate t by using Pythagorean Theorem

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

$$r^2 + s^2 = t^2$$

$$15.4^2 + 16.3^2 = t^2$$

$$237.16 + 265.69 = t^2$$

$$502.85 = t^2$$

$$\sqrt{502.85} = t$$

$$\boxed{22.4 \text{ miles}} = t$$