Definitions:

Trigonometric Ratio - The ratio of two sides in a right triangle.

Hypotenuse - The longest side of a right triangle. The side across from the right angle.

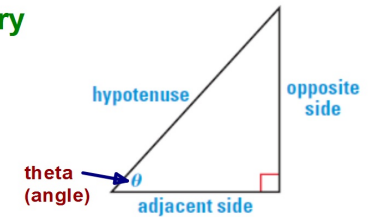**Opposite Side -** the side opposite (across from the right angle)

Adjacent Side - the side next to the angle that isn't the hypotenuse.

Right Triangle Trigonometry

$$\sin \theta = \frac{\text{opp}}{\text{hyp}}$$

$$\cos \theta = \frac{\text{adj}}{\text{hyp}}$$
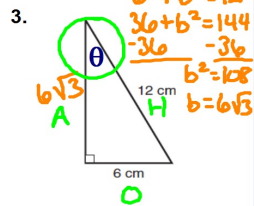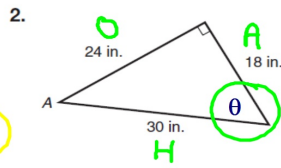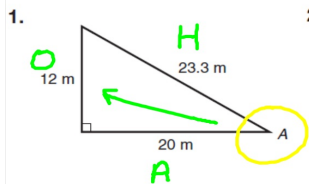
$$\tan \theta = \frac{\text{opp}}{\text{adj}}$$

3 Ways to help you remember:

1. Soh Cah Toa
2. Oscar Had A Heap Of Apples
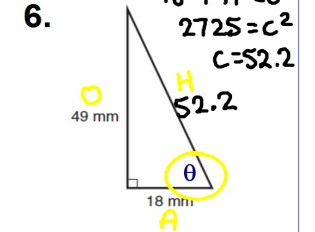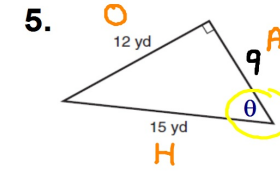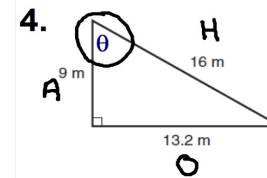3. Some Old Hippie Caught Another Hippie Trip'n On Apples

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Find the Trigonometric Ratios θ

$$\sin \theta = \frac{\text{opp}}{\text{hyp}} \quad \cos \theta = \frac{\text{adj}}{\text{hyp}} \quad \tan \theta = \frac{\text{opp}}{\text{adj}}$$

1. O H 23.3 m A 12 m 20 m A

2. O 24 in. A 18 in. A 30 in. θ H

3. θ 12 cm A H 6 cm O

$$6^2 + b^2 = 12^2$$
$$36 + b^2 = 144$$
$$-36 \quad -36$$
$$b^2 = 108$$
$$6\sqrt{3} \quad b = 6\sqrt{3}$$

$$\sin A = \frac{O}{H} = \frac{12}{23.3}$$

$$\cos A = \frac{A}{H} = \frac{20}{23.3}$$

$$\tan A = \frac{O}{A} = \frac{12}{20} = \frac{3}{5}$$

$$\sin \theta = \frac{O}{H} = \frac{24}{30} = \frac{4}{5}$$

$$\cos \theta = \frac{A}{H} = \frac{18}{30} = \frac{3}{5}$$

$$\tan \theta = \frac{O}{A} = \frac{24}{18} = \frac{4}{3}$$

$$\sin \theta = \frac{O}{H} = \frac{6}{12} = \frac{1}{2}$$

$$\cos \theta = \frac{A}{H} = \frac{6\sqrt{3}}{12} = \frac{\sqrt{3}}{2}$$

$$\tan \theta = \frac{O}{A} = \frac{6}{6\sqrt{3}} = \frac{\sqrt{3}}{3}$$

You Practice: Find the Trigonometric Ratios θ

4. θ H 16 m A 9 m 13.2 m O

5. O 12 yd A 9 θ 15 yd H

6.
$$18^2 + 49^2 = c^2$$
$$2725 = c^2$$
$$c = 52.2$$
H 52.2 49 mm O 18 mm θ A

$$\sin \theta = \frac{O}{H} = \frac{13.2}{16}$$

$$\cos \theta = \frac{A}{H} = \frac{9}{16}$$

$$\tan \theta = \frac{O}{A} = \frac{13.2}{9}$$

$$\sin \theta = \frac{O}{H} = \frac{12}{15} = \frac{4}{5}$$

$$\cos \theta = \frac{A}{H} = \frac{9}{15} = \frac{3}{5}$$

$$\tan \theta = \frac{O}{A} = \frac{12}{9} = \frac{4}{3}$$

$$\sin \theta = \frac{O}{H} = \frac{49}{52.2}$$

$$\cos \theta = \frac{A}{H} = \frac{18}{52.2}$$

$$\tan \theta = \frac{O}{A} = \frac{49}{18}$$