

Notes ~~ANSWERS~~ Trigonometry (Day 1)

8.4

"triangle measurement" (Greek word)

Trigonometric ratio - a ratio of 2 sides of a right Δ in relation to an angle (fraction/decimal)

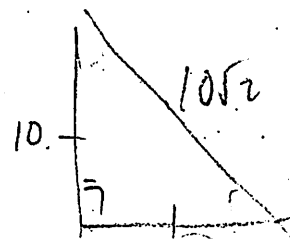
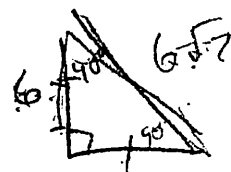
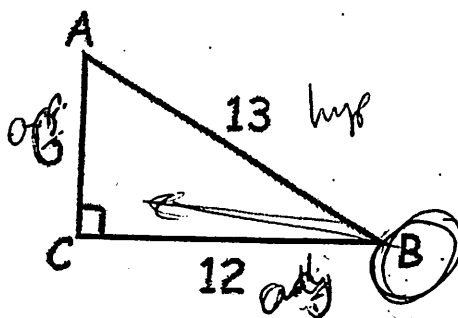
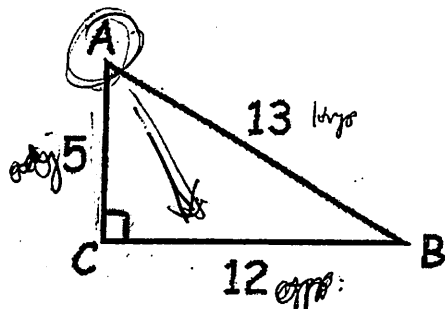
$$\text{Sine (sin)} = \frac{\text{opposite leg}}{\text{hyp}} \quad / \quad \text{cosine (cos)} = \frac{\text{adjacent leg}}{\text{hyp}} \quad / \quad \text{tangent (tan)} = \frac{\text{opp}}{\text{adj}}$$

$$S \frac{O}{H} \quad - \quad C \frac{A}{H} \quad - \quad T \frac{O}{A}$$

$$SOH \quad - \quad CAH \quad - \quad TOA$$

OBJ: To set up trigonometric ratios for a given angle in a right triangle.

①



$$\sin A = \frac{O}{H} = \frac{12}{13}$$

$$\sin B = \frac{O}{H} = \frac{5}{13}$$

$$\cos A = \frac{A}{H} = \frac{5}{13}$$

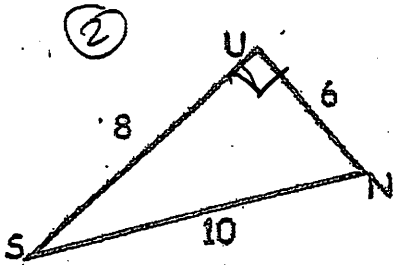
$$\cos B = \frac{A}{H} = \frac{12}{13}$$

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

$$\tan B = \frac{O}{A} = \frac{5}{12}$$

* Observe: Sin and cos ratios for opp. \angle s are the same!
tan ratios for opp. \angle s are reciprocals!

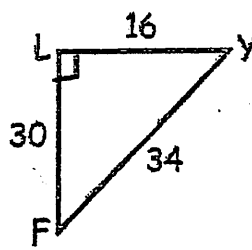
YOU TRY ... Set up trigonometric ratios for a given angle in a right triangle.



$$\sin S = \frac{6}{10} = \frac{3}{5}$$

$$\cos N = \frac{6}{10} = \frac{3}{5}$$

$$\tan S = \frac{6}{8} = \frac{3}{4}$$



$$\cos F = \frac{30}{34} = \frac{15}{17}$$

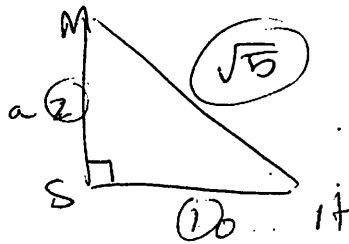
$$\tan Y = \frac{30}{16} = \frac{15}{8}$$

$$\sin Y = \frac{30}{34} = \frac{15}{17}$$

- ④ In right triangle MHS, angle S is a right angle and $\tan M = \frac{1}{2}$. Find the following ratios.

$$\tan H = \frac{2}{1} = 2$$

$$\sin M = \frac{1}{\sqrt{5}} \cdot \frac{\sqrt{5}}{\sqrt{5}} = \frac{\sqrt{5}}{5}$$



$$1^2 + 2^2 = c^2$$

$$1 + 4 = c^2$$

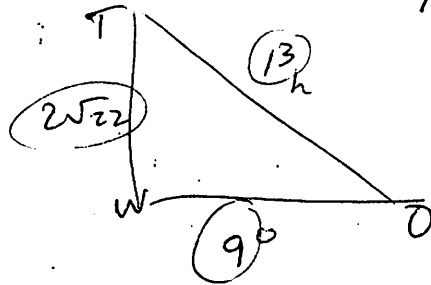
$$\sqrt{5} = \sqrt{c^2}$$

- ⑤ In right triangle TWO, W is a right angle and $\sin T = \frac{9}{13}$. Find the following ratios.

$$\cos O = \frac{9}{13}$$

$$\cos T = \frac{2\sqrt{22}}{13}$$

$$\tan T = \frac{9}{2\sqrt{22}} \cdot \frac{\sqrt{22}}{\sqrt{22}} = \frac{9\sqrt{22}}{44}$$



$$9^2 + x^2 = 13^2$$

$$81 + x^2 = 169$$

$$x^2 = \sqrt{88}$$

$$x = 2\sqrt{22}$$

- ⑥ Using prior knowledge, determine the exact ratios for the following:

$$\sin 30^\circ = \frac{1}{2}$$

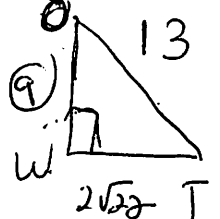
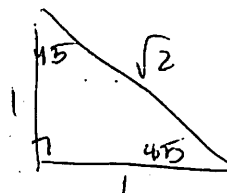
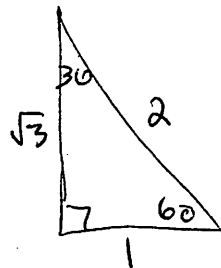
$$\cos 30^\circ = \frac{\sqrt{3}}{2}$$

$$\tan 60^\circ = \frac{\sqrt{3}}{1}$$

$$\tan 30^\circ = \frac{1}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{\sqrt{3}}{3}$$

$$\sin 45^\circ = \frac{1}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{\sqrt{2}}{2}$$

$$\tan 45^\circ = \frac{1}{1} = 1$$



$$\cos O = \frac{9}{13}$$

$$\cos T = \frac{2\sqrt{22}}{13}$$

$$\tan T = \frac{9}{2\sqrt{22}}$$