

# Day 7 Notes: Trigonometric Ratios & Pythagorean Theorem KEY

## Trig Ratios SOH CAH TOA

Sine:  $\sin A = \frac{\text{opp}}{\text{hyp}}$

Cosine:  $\cos A = \frac{\text{adj}}{\text{hyp}}$

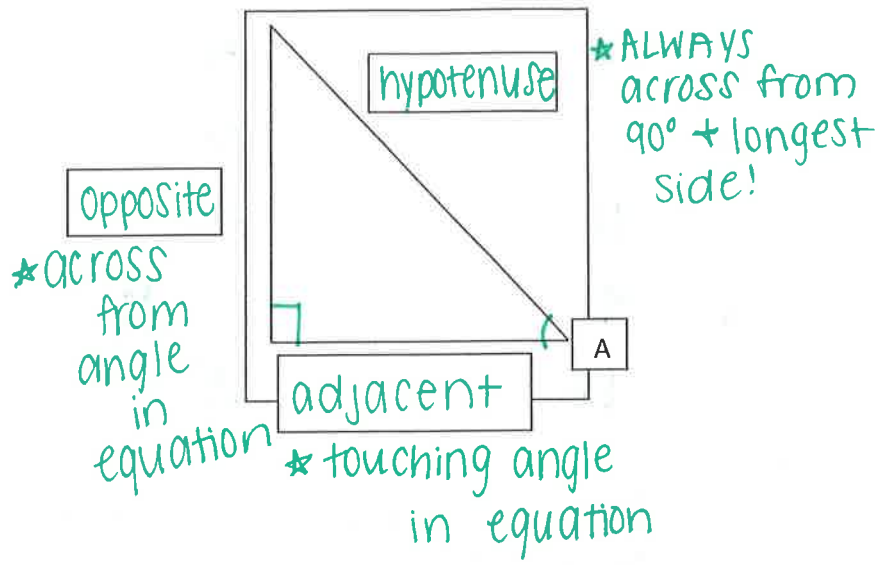
Tangent:  $\tan A = \frac{\text{opp}}{\text{adj}}$

## Reciprocal Trig Ratios

FLIP  
Cosecant:  $\csc A = \frac{1}{\sin A} = \frac{\text{hyp}}{\text{opp}}$

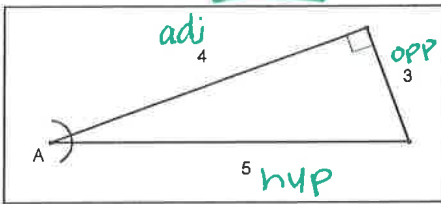
Secant:  $\sec A = \frac{1}{\cos A} = \frac{\text{hyp}}{\text{adj}}$

Cotangent:  $\cot A = \frac{1}{\tan A} = \frac{\text{adj}}{\text{opp}}$



EX.

1. Find all 6 trigonometric ratios of the following:



$\sin A = \frac{3}{5}$

$\csc A = \frac{5}{3}$

$\cos A = \frac{4}{5}$

$\sec A = \frac{5}{4}$

$\tan A = \frac{3}{4}$

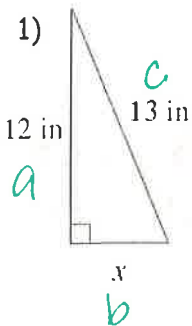
$\cot A = \frac{4}{3}$

Pythagorean Theorem:  $a^2 + b^2 = c^2$

a and b: legs (opp + adj)      c: hypotenuse

Solve for the missing side.

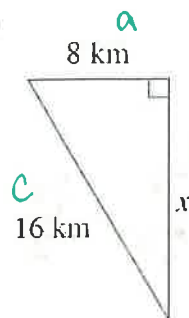
1)



$12^2 + x^2 = 13^2$

$x = 5 \text{ in}$

2)



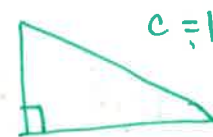
$8^2 + x^2 = 16^2$

$x = \sqrt{192}$

$x \approx 13.86 \text{ km}$

3)

$a = 11 \text{ m}, c = 15 \text{ m}$



$11^2 + x^2 = 15^2$

$x \approx 10.2 \text{ m}$

## Rationalizing Denominators

Solve the first 15 perfect square roots.

$$\sqrt{1} = \underline{1}$$

$$\sqrt{25} = \underline{5}$$

$$\sqrt{9} = \underline{3}$$

$$\sqrt{4} = \underline{2}$$

$$\sqrt{100} = \underline{10}$$

$$\sqrt{64} = \underline{8}$$

$$\sqrt{121} = \underline{11}$$

$$\sqrt{36} = \underline{6}$$

$$\sqrt{196} = \underline{14}$$

$$\sqrt{81} = \underline{9}$$

$$\sqrt{16} = \underline{4}$$

$$\sqrt{49} = \underline{7}$$

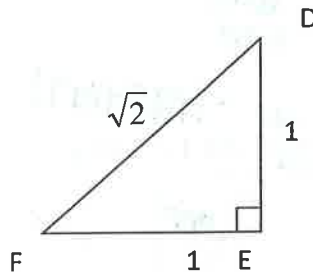
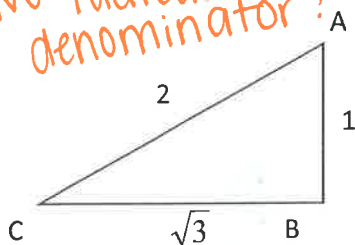
$$\sqrt{144} = \underline{12}$$

$$\sqrt{225} = \underline{15}$$

$$\sqrt{169} = \underline{13}$$

Find each ratio. Rationalize the denominator when possible.

*No radical in denominator!*



$$\text{a.) } \frac{AB}{AC} = \frac{1}{2}$$

$$\text{d.) } \frac{AB}{CB} = \frac{1 \cdot \sqrt{3}}{\sqrt{3} \cdot \sqrt{3}} = \frac{\sqrt{3}}{3}$$

$$\text{g.) } \frac{DF}{FE} = \frac{1}{1} = 1$$

$$\text{b.) } \frac{DE}{EF} = \frac{1}{1} = 1$$

$$\text{e.) } \frac{BC}{AC} = \frac{\sqrt{3}}{2}$$

$$\text{h.) } \frac{AC}{AB} = \frac{2}{1} = 2$$

$$\text{c.) } \frac{EF}{DF} = \frac{1 \cdot \sqrt{2}}{\sqrt{2} \cdot \sqrt{2}} = \frac{\sqrt{2}}{2}$$

$$\text{f.) } \frac{DE}{DF} = \frac{1 \cdot \sqrt{2}}{\sqrt{2} \cdot \sqrt{2}} = \frac{\sqrt{2}}{2}$$

$$\text{i.) } \frac{AC}{CB} = \frac{2 \cdot \sqrt{3}}{\sqrt{3} \cdot \sqrt{3}} = \frac{2\sqrt{3}}{3}$$

Rationalize each denominator. When possible, simplify by reducing the resulting fraction.

$$1. \frac{1}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{\sqrt{2}}{2}$$

$$2. \frac{2}{\sqrt{3}} = \frac{2\sqrt{3}}{3}$$

$$3. \frac{1}{\sqrt{7}} = \frac{\sqrt{7}}{7}$$

$$4. \frac{6}{\sqrt{2}} = \frac{6\sqrt{2}}{2} = 3\sqrt{2}$$

$$5. \frac{15}{\sqrt{5}} = \frac{15\sqrt{5}}{5} = 3\sqrt{5}$$

$$6. \frac{42}{\sqrt{7}} = \frac{42\sqrt{7}}{7} = 6\sqrt{7}$$

$$7. \frac{1}{\sqrt{81}} = \frac{\sqrt{81}}{81} = \frac{9}{81} = \frac{1}{9}$$

$$8. \frac{2}{\sqrt{11}} = \frac{2\sqrt{11}}{11}$$

$$9. \frac{4}{\sqrt{2}} = \frac{4\sqrt{2}}{2} = 2\sqrt{2}$$

$$10. \frac{1}{\sqrt{3}} = \frac{\sqrt{3}}{3}$$

$$11. \frac{1}{\sqrt{225}} = \frac{\sqrt{225}}{225} = \frac{15}{225} = \frac{1}{15}$$

$$12. \frac{1}{3\sqrt{16}} = \frac{\sqrt{16}}{3 \cdot 16} = \frac{4}{48} = \frac{1}{12}$$

$$13. \frac{8}{3\sqrt{2}} = \frac{8\sqrt{2}}{3 \cdot 2} = \frac{8\sqrt{2}}{6} = \frac{4\sqrt{2}}{3}$$

$$14. \frac{2}{\sqrt{3}} = \frac{2\sqrt{3}}{3}$$

$$15. \frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{2}$$

$$16. \frac{1}{\sqrt{12}} = \frac{\sqrt{12}}{12}$$

$$17. \frac{11}{\sqrt{121}} = \frac{11}{11} = 1$$

$$18. \frac{12}{\sqrt{36}} = \frac{12}{6} = 2$$

$$19. \frac{2}{\sqrt{300}} = \frac{2\sqrt{300}}{300} = \frac{20\sqrt{3}}{300}$$

$$\frac{10\sqrt{3}}{15}$$

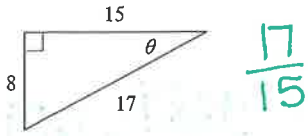
$$20. \frac{1}{3\sqrt{2}} = \frac{\sqrt{2}}{3 \cdot 2} = \frac{\sqrt{2}}{6}$$

$$21. \frac{7}{\sqrt{3}} = \frac{7\sqrt{3}}{3}$$

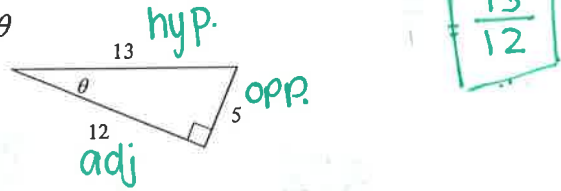
Right Triangle Trig. - Evaluating Trig. Ratios

Find the value of the trig function indicated.

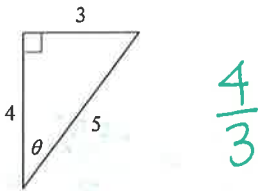
1)  $\sec \theta$



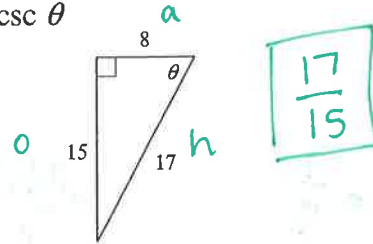
2)  $\sec \theta$



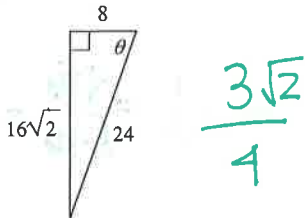
3)  $\cot \theta$



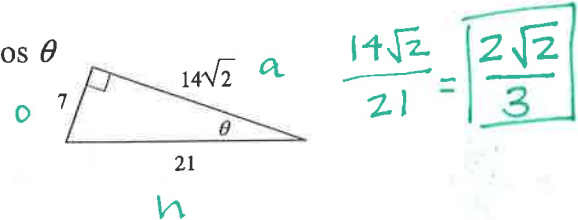
4)  $\csc \theta$



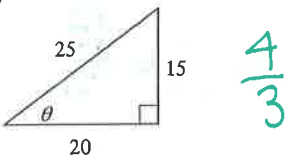
5)  $\csc \theta$



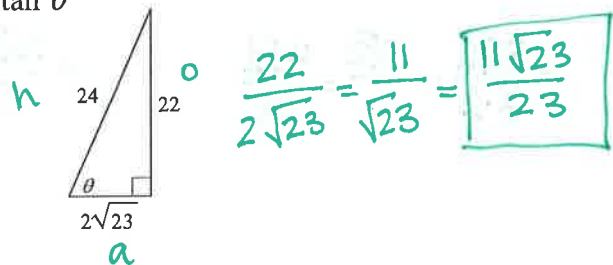
6)  $\cos \theta$



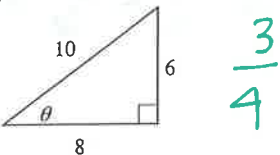
7)  $\cot \theta$



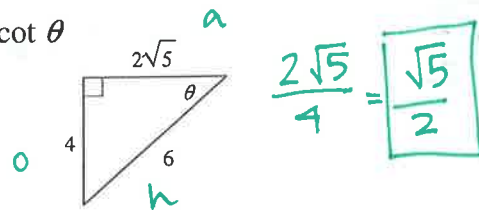
8)  $\tan \theta$



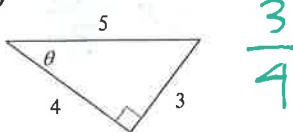
9)  $\tan \theta$



10)  $\cot \theta$



11)  $\tan \theta$



12)  $\cot \theta$

