

# Geometry Notes

Name Key

## 7.7 Solving Right Triangles

To Solve a Right Triangle means to FIND ALL sides and angles of the triangle. In this chapter we have discussed multiple ways to find the sides of a triangle. Can you list them?

Pythagorean Thm $a^2 + b^2 = c^2$	$\frac{hyp}{leg} = \frac{leg}{pt/adj}$	$\frac{pt/1}{alt} = \frac{alt}{pt/2}$	30-60-90° 45-45-90° Sin Cos tan
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What is an INVERSE OPERATION?

An operation that undoes another

Inverse of multiplication:

$$3x = 12$$

Division

$$\frac{3x}{3} = \frac{12}{3} \quad x = 4$$

Inverse of Addition:

$$x + 7 = 10$$

Subtraction

$$-7 \quad -7$$

$$x = 3$$

### TRIG INVERSE OPERATIONS:

are used to find the angles given the ratio of the sides.

To find angle measurements from the trig values, use inverse sin ( $\text{Sin}^{-1}$ ), inverse cos ( $\text{Cos}^{-1}$ ), and inverse tan ( $\text{Tan}^{-1}$ ). This means you know the values of the ratios, but you're asking your calculator for the angle measure. **BE SURE YOUR CALCULATOR IS IN DEGREES!!**

1.  $\text{Sin } A = \frac{3}{5}$  or  $\text{Sin } A = 0.6$  37°

$m\angle A = \text{Sin}^{-1}(\frac{3}{5}) \approx 36.869^\circ$

2.  $\text{Tan } B = .5774$  30°

$m\angle B = \text{tan}^{-1}(.5774) \approx 30.002^\circ$

3.  $\text{Cos } C = .5$  or  $\text{Cos } C = \frac{1}{2}$

$m\angle C = \text{Cos}^{-1}(.5) = \text{60}^\circ$

4.  $\text{Sin } D = \frac{2}{3}$  42°

$m\angle D = \text{Sin}^{-1}(\frac{2}{3}) \approx 41.8103^\circ$

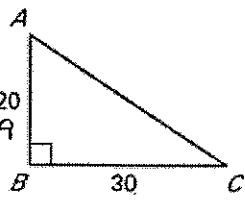
Use a calculator to approximate the measure of  $\angle A$  and  $\angle C$ . Round to the nearest degree.

5.

$\text{tan } A = \frac{30}{20}$

$A \approx 56.3099^\circ$

$A = 56^\circ$



$\text{tan } C = \frac{20}{30}$

$C \approx 33.690^\circ$

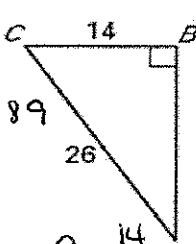
$C = 34^\circ$

6.

$\text{Sin } A = \frac{14}{26}$

$A \approx 32.5789^\circ$

$A = 33^\circ$



$\text{Cos } C = \frac{14}{26}$

$C \approx 57.4210^\circ$

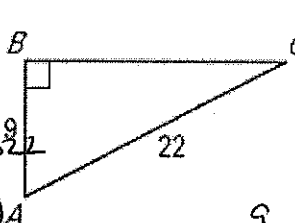
$C = 57^\circ$

7.

$\text{Cos } A = \frac{9}{22}$

$A \approx 65.9522^\circ$

$A = 66^\circ$



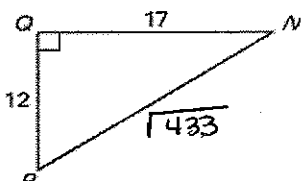
$\text{Sin } C = \frac{9}{22}$

$C \approx 24.147^\circ$

$C = 24^\circ$

Solve the right triangle. Give exact answers where appropriate. Round decimal answers to the nearest tenth.

8.

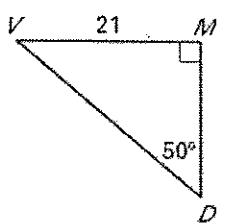


$12^2 + 17^2 = NP^2$   
 $144 + 289 = NP^2$   
 $433 = NP^2$   
 $\sqrt{433} = NP$   
 $NP = \sqrt{433}$

$\tan N = \frac{12}{17}$        $\tan P = \frac{17}{12}$

$N \approx 35.21759\dots$        $P \approx 54.7824\dots$   
 $N \approx 35^\circ$        $P = 55^\circ$

9.

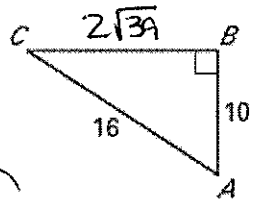


$\angle V = 40^\circ$

$\tan 50 = \frac{21}{MD}$   
 $MD = \frac{21}{\tan 50}$   
 $MD \approx 17.621$   
 $MD \approx 17.6$

$\sin 50 = \frac{21}{DV}$   
 $DV = \frac{21}{\sin 50}$   
 $DV \approx 27.413$   
 $DV \approx 27.4$

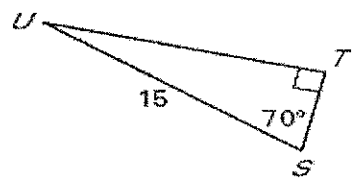
10.



$10^2 + BC^2 = 16^2$   
 $100 + BC^2 = 256$   
 $BC^2 = 156$   
 $BC = 2\sqrt{39}$

$\cos A = \frac{10}{16}$        $\sin C = \frac{10}{16}$   
 $A \approx 51.3178$        $C \approx 38.6824$   
 $A \approx 51^\circ$        $C = 39^\circ$

11.

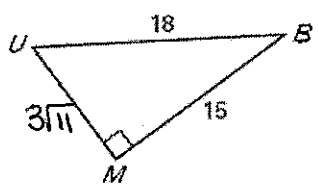


$\angle U = 30^\circ$

$\sin 70 = \frac{UT}{15}$   
 $14.0953 = UT$   
 $UT \approx 14.1$

$\cos 70 = \frac{TS}{15}$   
 $5.1303 \approx TS$   
 $TS = 5.1$

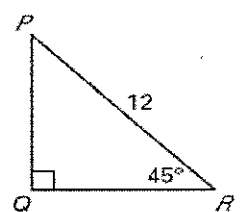
12.



$15^2 + UM^2 = 18^2$   
 $225 + UM^2 = 324$   
 $UM^2 = 99$   
 $UM = 3\sqrt{11}$

$\sin \angle U = \frac{15}{18}$        $\cos B = \frac{15}{18}$   
 $\angle U \approx 56.4426$        $\angle B \approx 33.5573$   
 $\angle U \approx 56^\circ$        $\angle B \approx 34^\circ$

13.



$\angle P = 45^\circ$

$2\sqrt{2} = 12$   
 $2 = \frac{12}{\sqrt{2}}$   
 $2 = \frac{12\sqrt{2}}{2}$   
 $2 = 6\sqrt{2}$

$PQ = 6\sqrt{2} \approx 8.5$   
 $QR = 6\sqrt{2} \approx 8.5$   
 $8.4852\dots$