

Setting up for Trigonometry

So far, you know two ways to determine the sides of a **right triangle**:

1. The Pythagorean Theorem,  $a^2 + b^2 = c^2$  (used when you have *two sides*)
2. Special triangles (used when you have *one side* and *know it's 30-60-90* or *45-45-90*)

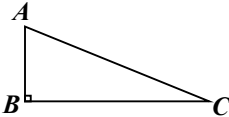
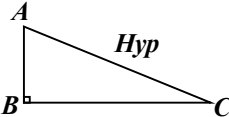
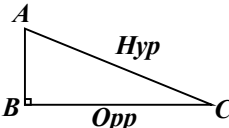
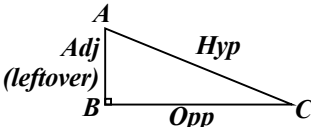
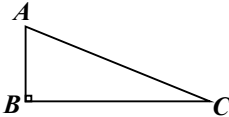
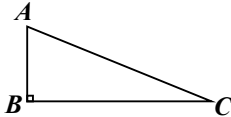
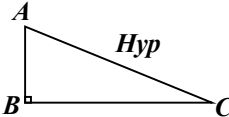
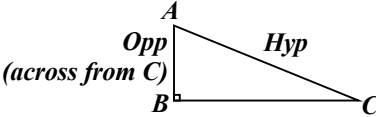
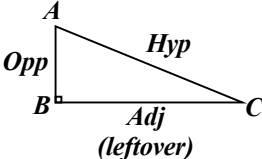
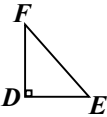
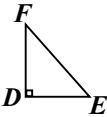
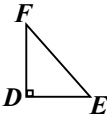
The third method for determining sides on a **right triangle** is called **Trigonometry** (used when you have *one side* and *one angle that's not the right angle*). You will not be learning trigonometry today. However, you will be learning how to identify the parts of a triangle that you will need in order to use trigonometry, as well as how to set up and reduce the fractions that will be involved in the process.

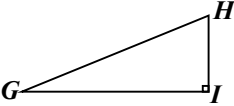
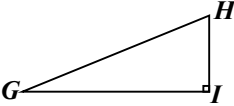
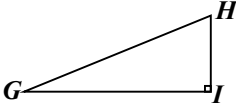
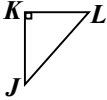
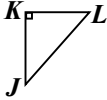
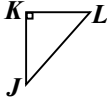
If you want to use trigonometry, the first thing that you must do, is pick the angle you want to use. It will be the angle marked with a degree measure in the problem, the angle given to you, or the angle that the problem asks you to use.

**YOU CANNOT USE THE RIGHT ANGLE FOR LABELING OR SOLVING ANY TRIGONOMETRY PROBLEM!!**

Your next task is to name the three sides *in terms of their relationship to the marked, given, or asked for angle*. Since there are three sides, there are three relationships. These relationship names are:

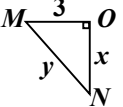
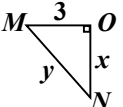
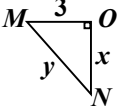
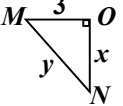
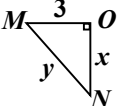
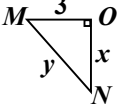
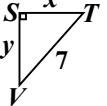
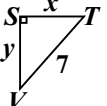
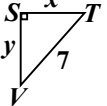
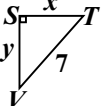
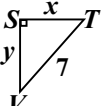
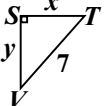
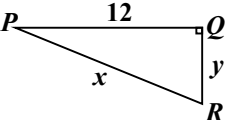
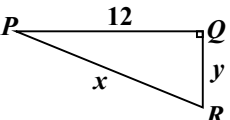
1. The **hypotenuse**. It is the only side that does not depend on the angle you are using.  
It is **always across from 90°**.
2. The **opposite side**. It is the side across from the angle you are using.
3. The **adjacent side**. It is the side that is **not the hypotenuse**, but is next to the angle you are using.  
This side is whichever side is left once you've labeled the hypotenuse and the opposite.

<p><b>EXAMPLE</b> Label the sides of the triangle for trigonometry using <math>\angle A</math>.</p>  <p>First, label the hypotenuse (<i>hyp</i>)—it's across from the 90° angle.</p>  <p>Then, label the opposite side—it's across from the requested angle, <math>\angle A</math>.</p>  <p>(<i>across from A</i>)</p> <p>Finally, label the adjacent side—it's the one that's leftover.</p> 	<p><b>EXAMPLE</b> Label the sides of the triangle for trigonometry using <math>\angle B</math>.</p>  <p><b>B is the right angle, so I CANNOT USE IT!</b></p>	<p><b>EXAMPLE</b> Label the sides of the triangle for trigonometry using <math>\angle C</math>.</p>  <p>First, label the hypotenuse (<i>hyp</i>)—it's across from the 90° angle.</p>  <p>Then, label the opposite side—it's across from the requested angle, <math>\angle C</math>.</p>  <p>Finally, label the adjacent side—it's the one that's leftover.</p> 
<p>1. Label the sides of the triangle for trigonometry using <math>\angle D</math>.</p> 	<p>2. Label the sides of the triangle for trigonometry using <math>\angle E</math>.</p> 	<p>3. Label the sides of the triangle for trigonometry using <math>\angle F</math>.</p> 

<p>4. Label the sides of the triangle for trigonometry using <math>\angle G</math>.</p> 	<p>5. Label the sides of the triangle for trigonometry using <math>\angle H</math>.</p> 	<p>6. Label the sides of the triangle for trigonometry using <math>\angle I</math>.</p> 
<p>7. Label the sides of the triangle for trigonometry using <math>\angle J</math>.</p> 	<p>8. Label the sides of the triangle for trigonometry using <math>\angle K</math>.</p> 	<p>9. Label the sides of the triangle for trigonometry using <math>\angle L</math>.</p> 

Once you have labeled the three side relationships, you have to be able to create the following fractions:

$$\frac{opp}{hyp} \quad \& \quad \frac{adj}{hyp} \quad \& \quad \frac{opp}{adj}$$

<p><b>EXAMPLE</b> Create the fraction <math>\frac{opp}{hyp}</math> using <math>\angle M</math>.</p>  <p>Identify hyp, opp, and adj for <math>\angle M</math>.</p> <p>adj is 3 x is opp y is hyp</p> <table border="1" data-bbox="370 961 500 1066"> <tr><td>Hyp = y</td></tr> <tr><td>Opp = x</td></tr> <tr><td>Adj = 3</td></tr> </table> <p>Now, plug it in: <math>\frac{opp}{hyp} = \frac{x}{y}</math></p>	Hyp = y	Opp = x	Adj = 3	<p><b>EXAMPLE</b> Create the fraction <math>\frac{adj}{hyp}</math> using <math>\angle M</math>.</p>  <p>Identify hyp, opp, and adj for <math>\angle M</math>.</p> <p>adj is 3 x is opp y is hyp</p> <table border="1" data-bbox="824 961 954 1066"> <tr><td>Hyp = y</td></tr> <tr><td>Opp = x</td></tr> <tr><td>Adj = 3</td></tr> </table> <p>Now, plug it in: <math>\frac{adj}{hyp} = \frac{3}{y}</math></p>	Hyp = y	Opp = x	Adj = 3	<p><b>EXAMPLE</b> Create the fraction <math>\frac{opp}{adj}</math> using <math>\angle M</math>.</p>  <p>Identify hyp, opp, and adj for <math>\angle M</math>.</p> <p>adj is 3 x is opp y is hyp</p> <table border="1" data-bbox="1279 961 1409 1066"> <tr><td>Hyp = y</td></tr> <tr><td>Opp = x</td></tr> <tr><td>Adj = 3</td></tr> </table> <p>Now, plug it in: <math>\frac{opp}{adj} = \frac{x}{3}</math></p>	Hyp = y	Opp = x	Adj = 3
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Hyp = y											
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Hyp = y											
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<p>10. Create the fraction <math>\frac{opp}{hyp}</math> using <math>\angle N</math>.</p> 	<p>11. Create the fraction <math>\frac{adj}{hyp}</math> using <math>\angle N</math>.</p> 	<p>12. Create the fraction <math>\frac{opp}{adj}</math> using <math>\angle N</math>.</p> 									
<p>13. Create the fraction <math>\frac{opp}{hyp}</math> using <math>\angle T</math>.</p> 	<p>14. Create the fraction <math>\frac{adj}{hyp}</math> using <math>\angle T</math>.</p> 	<p>15. Create the fraction <math>\frac{opp}{adj}</math> using <math>\angle T</math>.</p> 									
<p>16. Create the fraction <math>\frac{opp}{hyp}</math> using <math>\angle V</math>.</p> 	<p>17. Create the fraction <math>\frac{adj}{hyp}</math> using <math>\angle V</math>.</p> 	<p>18. Create the fraction <math>\frac{opp}{adj}</math> using <math>\angle V</math>.</p> 									
<p>19. Create the fraction <math>\frac{opp}{hyp}</math> using <math>\angle R</math>.</p> 	<p>20. Create the fraction <math>\frac{adj}{hyp}</math> using <math>\angle R</math>.</p> 	<p>21. Create the fraction <math>\frac{opp}{adj}</math> using <math>\angle R</math>.</p> 