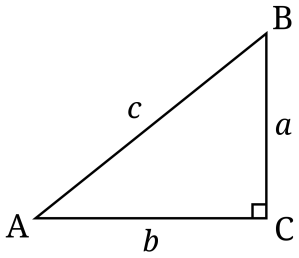
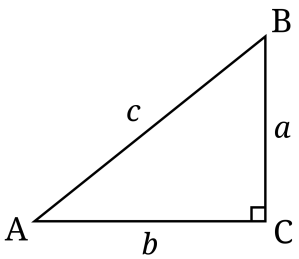
-- Simplifying Radicals & The Pythagorean Theorem --

Simplifying Radicals

Rules	Examples
1) break the number under the square/cube root into factors that can be simplified using the root given (**at least** one of them should be simplifiable) 2) determine how many of the numbers you have can be broken down into its square/cube/4th root etc. 3) take the square/cube/4th root etc. of all the factorable numbers inside the radical and move it/them outside the radical 4) multiply the numbers outside the radical (if necessary)	$\sqrt{18} \Rightarrow \sqrt{(9*2)}$ $\sqrt{9} = 3 \rightarrow 3\sqrt{2}$ $\sqrt{18} \approx 4.24$; $3\sqrt{2} \approx 4.24$ $\sqrt{252} \Rightarrow \sqrt{(4*9*7)}$ $\sqrt{4} = 2$; $\sqrt{9} = 3$ $(2*3)\sqrt{7} \Rightarrow 6\sqrt{7}$ $\sqrt{252} \approx 15.87$; $6\sqrt{7} \approx 15.87$ $\sqrt[3]{108} \Rightarrow \sqrt[3]{(27*4)}$ $\sqrt[3]{27} = 3 \rightarrow 3(\sqrt[3]{4})$ $\sqrt[3]{108} \approx 4.76$; $3(\sqrt[3]{4}) \approx 4.76$ $\sqrt[3]{48} \Rightarrow \sqrt[3]{(8*6)}$ $\sqrt[3]{8} = 2 \rightarrow 2(\sqrt[3]{6})$ $\sqrt[3]{48} \approx 3.63$; $2(\sqrt[3]{6}) \approx 3.63$

Pythagorean Theorem

Rules	Example
• The Pythagorean Theorem **can only be used on right triangles**  • a right triangle will always have straight vertical and horizontal legs, with a small box at the intersection, indicating a 90° angle • the formula for the Pythagorean Theorem ($a^2+b^2=c^2$) will **ALWAYS** be true for any and all right triangles. "a" and "b" represent the smaller, vertical/horizontal sides ("legs"). "c" represents the diagonal side (hypotenuse). use this formula to find the missing side length • to use the formula, simply plug in the numbers given, whether "a" and "b", "a" and "c", or "b" and "c". the lengths of the legs added together **MUST BE** larger than the length of the hypotenuse alone • Pythagorean Triples are any 3 numbers that fit the rule for the Pythagorean Theorem. There are some common Pythagorean Triples that you should consider memorizing should you ever encounter them. **Some of these triples include: 3, 4, 5; 5 ,12, 13; and 9, 40, 41**	Ex. Suppose in the figure below, "a" is equal to 4 and "b" is equal to 6. Find the length of "c"  Pythagorean Theorem: $a^2+b^2=c^2$ $(4)^2+(6)^2 = c^2$ $16+36 = c^2$ $\sqrt{52} = \sqrt{(c^2)}$ ($\sqrt{(c^2)}$ will cancel out, leaving just c) $c \approx 7.21$