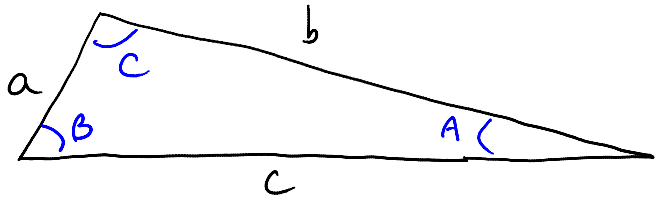
Section 6.1 : cont'd

Wednesday, January 07, 2015
12:30 PM

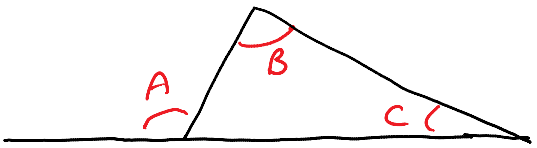
naming convention for triangles:

if the sides are a, b, and c (in any order)

and the angles are A, B, and C



another (not quite as useful) property of triangles:



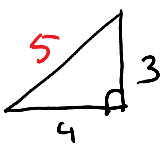
external angle $\angle A = \angle B + \angle C$

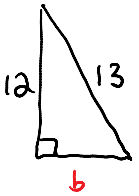
<u>useful</u> property of right triangles:

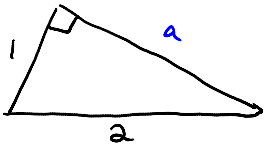
If (and only if) a triangle is a right triangle, then $a^2 + b^2 = c^2$ where c is the length of the hypotenuse and a and b are lengths of the other two sides

=> Pythagorean theorem

examples: Find the remaining sides. Give exact answers.







$a^2 + b^2 = c^2$

$b^2 = c^2 - a^2$

$= 13^2 - 12^2$

$= 25$

$b = 5$

$a^2 + b^2 = c^2$

$a^2 = c^2 - b^2$

$= 2^2 - 1^2$

$= 3$

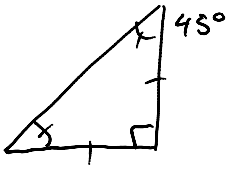
$a = \sqrt{3}$

this is the exact answer

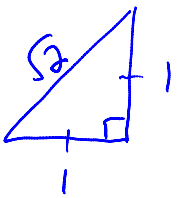
1.7 is the decimal approximation (to one decimal place)

Special triangles:

isosceles right triangle: (45-45-90 triangle)



ratio of sides:



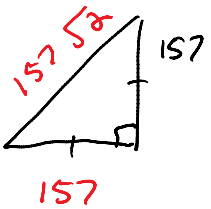
$a^2 + b^2 = c^2$

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

$2 = c^2$

$c = \sqrt{2}$

example: (why do we care?)



$a^2 + b^2 = c^2$

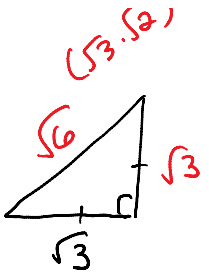
$157^2 + 157^2 = c^2$

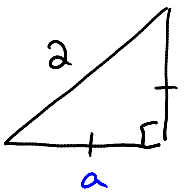
$c^2 = 2 \cdot 157^2$

$c = \sqrt{2 \cdot 157^2}$

$= 157\sqrt{2}$

$(\sqrt{3} \cdot \sqrt{2})$

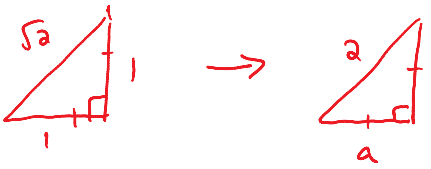




method #1:

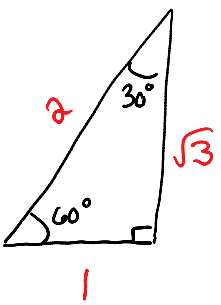
$$a^2 + b^2 = c^2$$
$$a^2 + a^2 = 2^2$$
$$2a^2 = 4$$
$$a^2 = 2$$
$$a = \sqrt{2}$$

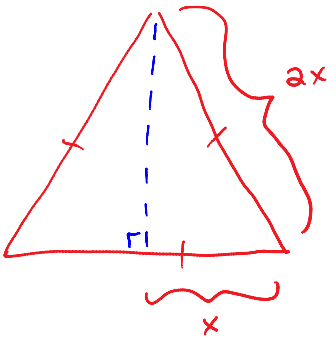
method #2:



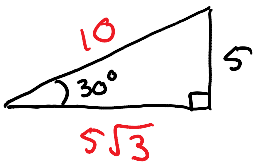
$$a = 1 \cdot \left(\frac{2}{\sqrt{2}}\right)\frac{\sqrt{2}}{\sqrt{2}}$$
$$= \frac{2\sqrt{2}}{2} = \sqrt{2}$$

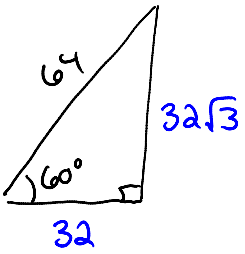
second special triangle (30-60-90 triangle)

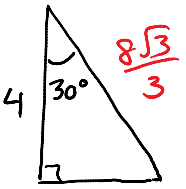




examples: find the remaining sides. Give exact answers.

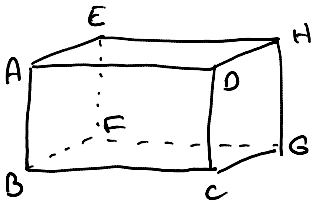




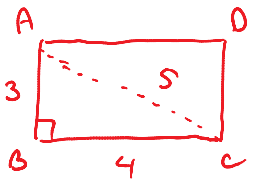


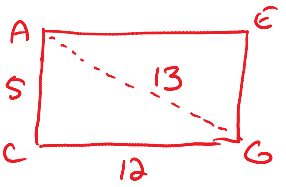
$\frac{4}{\sqrt{3}}\frac{\sqrt{3}}{\sqrt{3}} = \frac{4\sqrt{3}}{3}$

one last example of the Pythagorean theorem:



If AB = 3, BC = 4, and CG = 12, calculate EC for this rectangular box.





CE = AG = 13

don't memorize this!

$$d^2 = \ell^2 + w^2 + h^2$$

interior diagonal

for a rectangular box