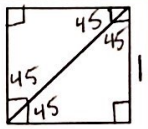
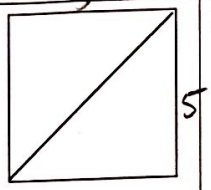
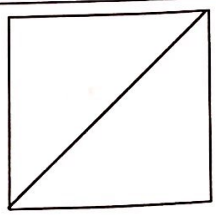
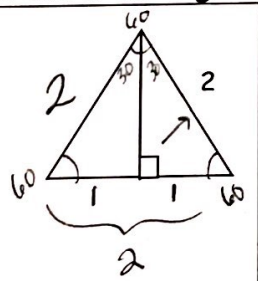
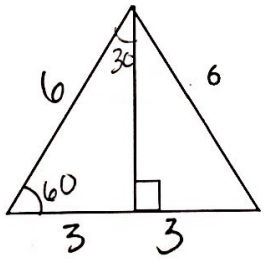
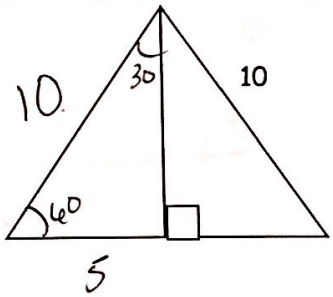
Name Key

Geometry Notes
7.4 Special Right Triangles
45-45-90 and 30-60-90 Right Triangles

Below are 3 SQUARES. Given each side length, use the Pythagorean theorem to determine the diagonal length (simplified radicals). Determine all angle measures in each triangle.

1.	2.	3.
 $1^2+1^2=c^2$ $2=c^2$	 $5^2+5^2=c^2$ $\sqrt{50}=c$ $25\hat{}2$	 $10^2+10^2=c^2$ $\sqrt{200}=c$ $100\hat{}2$
Δ Angle measures: 45, 45, 90	Δ Angle measures: 45, 45, 90	Δ Angle measures: 45, 45, 90
Leg Measures: 1	Leg Measures: 5	Leg Measures: 10
Hypotenuse Measure: $\sqrt{2}$	Hypotenuse Measure: $5\sqrt{2}$	Hypotenuse Measure: $10\sqrt{2}$

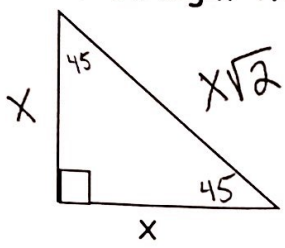
Below are 3 EQUILATERAL TRIANGLES, each with a median/altitude drawn in. Given each side length, determine the length of the shorter leg of each right triangle and use the Pythagorean theorem to determine the longer leg length (simplified radicals). Also, determine and mark all angle measures in each triangle formed.

4.	5.	6.
 $a^2+1^2=2^2$ $a^2+1=4$ $a^2=3$ $a=\sqrt{3}$	 $3^2+b^2=6^2$ $9+b^2=36$ $b^2=27$ $b=\sqrt{27}\to 3\sqrt{3}$ $9\hat{}3$	 $5^2+b^2=10^2$ $b^2=75$ $b=\sqrt{75}$ $25\hat{}3$
Δ Angle measures: 30, 60, 90	Δ Angle measures: 30, 60, 90	Δ Angle measures: 30, 60, 90
Shorter Leg Measure: 1	Shorter Leg Measure: 3	Shorter Leg Measure: 5
Longer Leg Measure: $\sqrt{3}$	Longer Leg Measure: $3\sqrt{3}$	Longer Leg Measure: $5\sqrt{3}$
Hypotenuse Measure: 2	Hypotenuse Measure: 6	Hypotenuse Measure: 10

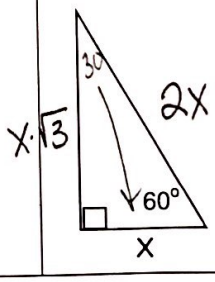
$H = S \cdot 2$
$L = S \cdot \sqrt{3}$

SUMMARY

45-45-90 Right Triangle



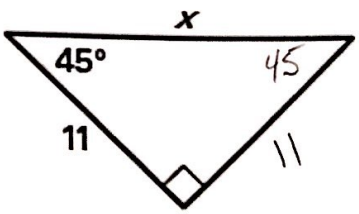
30-60-90 Right Triangle



* short is across from 30° *

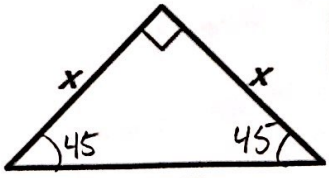
Find the missing lengths as simplified radicals.

7.



$X = 11\sqrt{2}$

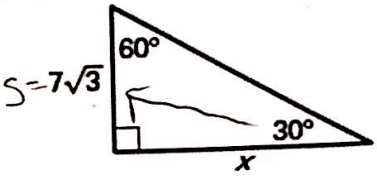
8.



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

$X = 2\sqrt{3}$

9.



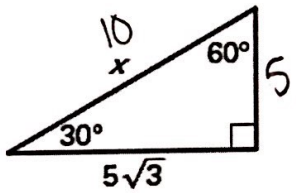
$L = 7\sqrt{3} \cdot \sqrt{3}$

$= 7\sqrt{9}$

$= 7 \cdot 3$

$= 21$

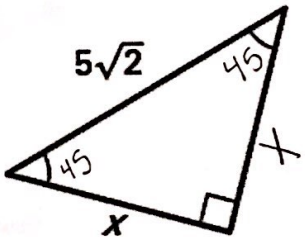
10.



$X = 2.5$

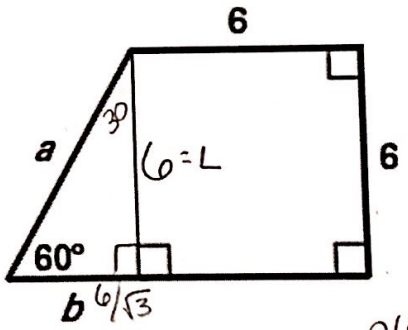
$= 10$

11.



$X = 5$

12.



$b \cdot \sqrt{3} = 6$

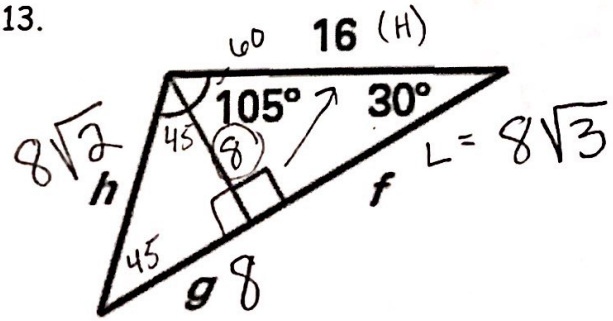
$b = 6/\sqrt{3}$

$= 2\sqrt{3}$ ← cannot have in denominator — Rationalize

$a = 2(6/\sqrt{3})$

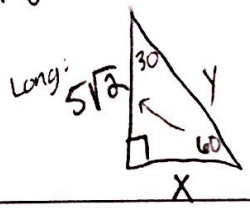
$= 12/\sqrt{3} = 4\sqrt{3}$

13.



$S = 16/2 = 8$

Try Also:



Short · √3 = Long

Short · √3 = 5√2

$\text{short} = \frac{5\sqrt{2}}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}}$

$X = \frac{5\sqrt{6}}{3}$

$y = \frac{10\sqrt{6}}{3}$