Name: _____ Date: _____ Row: _____ Period: _____

NOTES SECTION 8.2: THE PYTHAGOREAN THEROEM

THE PYTHAGOREAN THEREOM

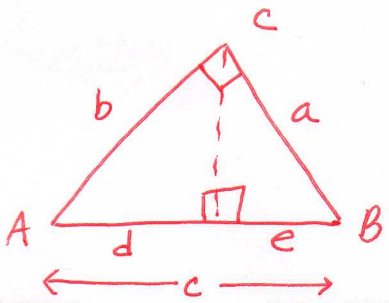
In a right triangle, the square of the hypotenuse is equal to the sum of the squares of the legs.

THE PROOF

Given: $\triangle ABC$; $\angle ACB$ is a right angle

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

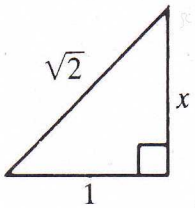
Proof:



STATEMENTS	REASONS
① ΔABC ; $\angle ACB$ is a rt $\angle$	① Given
~~1~~ ② Draw a $\perp$ from C to $\overline{AB}$	~~1~~ ② through a point outside a line there is exactly 1 line perpendicular to the given line
~~2~~ ③ $\frac{c}{a} = \frac{a}{e}$; $\frac{c}{b} = \frac{b}{d}$	~~2~~ ③ When the alt is drawn to the hyp of a rt Δ, each leg is the geometric mean between the hyp and the segment of the hyp adj to that leg
~~3~~ ④ $ce = a^2$; $cd = b^2$	~~3~~ ④ means-extremes prop
~~4~~ ⑤ $ce + cd = a^2 + b^2$	~~4~~ ⑤ Add Prop of =
~~5~~ ⑥ $c(e+d) = a^2 + b^2$	~~5~~ ⑥ Distributive Prop
~~6~~ ⑦ $c = e + d$	~~6~~ ⑦ seg add past
⑧ $c^2 = a^2 + b^2$	⑧ substitution prop

Find the value of x.

5.

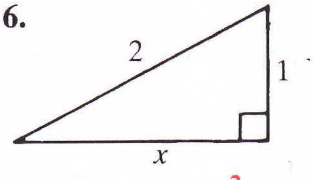


$1^2 + x^2 = (\sqrt{2})^2$

$1 + x^2 = 2$

$x = 1$

6.

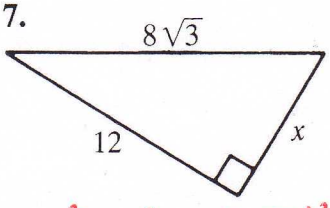


$x^2 + 1^2 = 2^2$

$x^2 + 1 = 4$

$x = \sqrt{3}$

7.



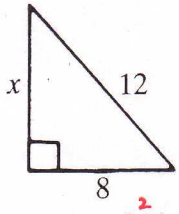
$12^2 + x^2 = (8\sqrt{3})^2$

$144 + x^2 = 192$

$x^2 = 48$

$x = 4\sqrt{3}$

8.



$x^2 + 8^2 = 12^2$

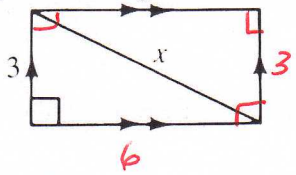
$x^2 + 64 = 144$

$x^2 = 80$

$x = 4\sqrt{5}$

Find the value of x.

9.

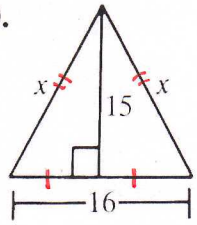


$3^2+6^2=x^2$

$x^2=45$

$x=3\sqrt{5}$

10.

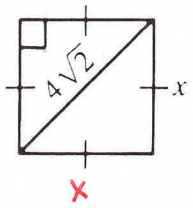


$15^2+8^2=x^2$

$289=x^2$

$x=17$

11.



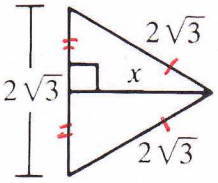
$x^2+x^2=(4\sqrt{2})^2$

$2x^2=32$

$x^2=16$

$x=4$

12.

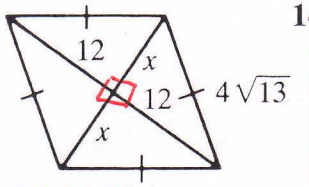


$(\sqrt{3})^2+x^2=(2\sqrt{3})^2$

$3+x^2=12$

$x=3$

13.



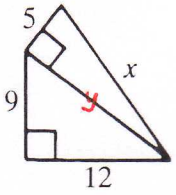
RHOMBUS

$x^2+12^2=(4\sqrt{13})^2$

$x^2+144=208$

$x=8$

14.



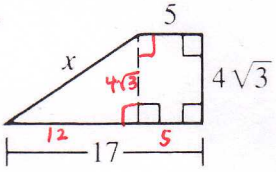
$9^2+12^2=y^2$

$y=15$

$5^2+15^2=x^2$

$x=5\sqrt{10}$

15.



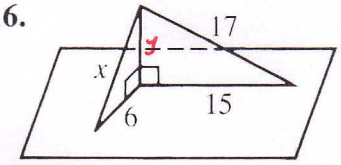
$12^2+(4\sqrt{3})^2=x^2$

$144+48=x^2$

$x^2=192$

$x=8\sqrt{3}$

16.



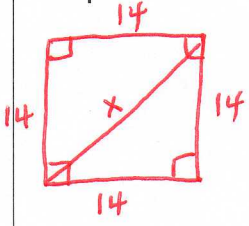
$15^2+y^2=17^2$

$y^2=64$ $y=8$

$8^2+6^2=x^2$

$x^2=100$ $x=10$

17) Find the length of the diagonals of a square with perimeter 56.

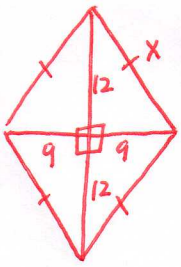


$14^2+14^2=x^2$

$x^2=392$

$x=14\sqrt{2}$

18) The diagonals of a rhombus have lengths 18 and 24. Find the perimeter.

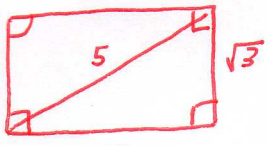


$12^2+9^2=x^2$

$x=15$

perimeter $=60$

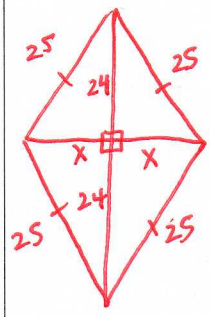
19) A rectangle has diagonals of 5 cm and its width is $\sqrt{3}$ cm. Find the length.



$x^2+(\sqrt{3})^2=5^2$

$x^2=22$ $x=\sqrt{22}$ cm

20) The perimeter of a rhombus is 100 cm, and one diagonal is 48 cm long. Find the length of the other diagonal.



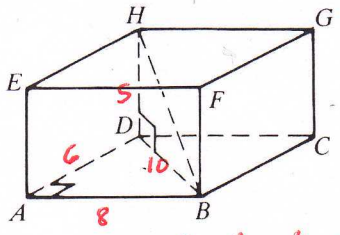
$24^2+x^2=25^2$

$x^2=49$

$x=7$

diagonal $=14$cm

21) If $AB=8$ and $AD=6$, then $DB=$ 10 . And if $HD=5$, then $HB=$ $5\sqrt{5}$.



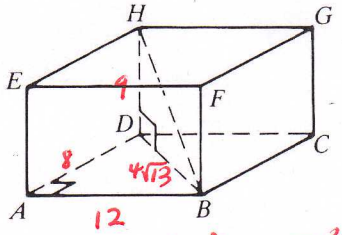
$6^2+8^2=(DB)^2$

$DB=10$

$5^2+10^2=(HB)^2$

$HB=5\sqrt{5}$

22) If $AB=12$ and $AD=8$, then $DB=$ $4\sqrt{13}$. And if $HD=9$, then $HB=$ 17 .



$8^2+12^2=(DB)^2$

$DB^2=208$

$DB=4\sqrt{13}$

$9^2+(4\sqrt{13})^2=(HB)^2$

$HB=17$