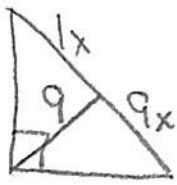


Homework #3

(1) The altitude to the hypotenuse of a right triangle divides the hypotenuse into two segments whose lengths are in the ratio of 1 : 9. If the length of the altitude is 9, find the lengths of the two segments.

SAS



$$\frac{9}{1x} = \frac{9x}{9}$$

$$\frac{9x^2}{9} = \frac{81}{9}$$

$$x^2 = 9$$

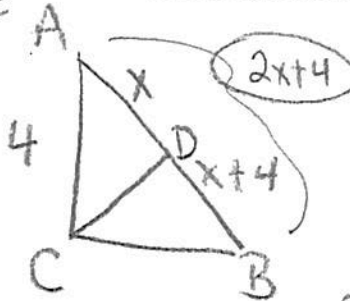
$$\boxed{x=3}$$

$$\boxed{\text{Seg}_1 = x = 3}$$

$$\boxed{\text{Seg}_2 = 9x = 27}$$

(2) In right triangle ABC, altitude CD is drawn to hypotenuse AB. If AC = 4 and DB is 4 more than AD, find AD.

HLLS



$$\frac{2x+4}{4} = \frac{4}{x}$$

$$16 = x(2x+4)$$

$$16 = 2x^2 + 4x$$

$$0 = 2x^2 + 4x - 16$$

$$0 = 2(x^2 + 2x - 8)$$

$$0 = 2(x^2 + 2x - 8)$$

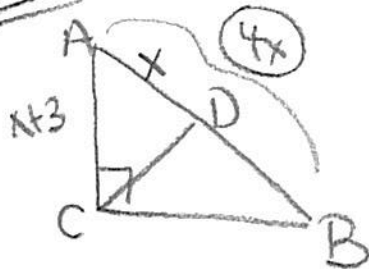
$$0 = 2(x-2)(x+4)$$

$x-2=0$	$x+4=0$
$x=2$	$x=-4$

$$\boxed{AD = x = 2}$$

(3) In right triangle ABC, altitude CD is drawn to hypotenuse AB. If AB is four times as large as AD and AC is 3 more than AD, find the length of AD.

HLLS



$$\frac{4x}{x+3} = \frac{x+3}{x}$$

$$4x^2 = (x+3)(x+3)$$

$$4x^2 = x^2 + 6x + 9$$

$$-x^2 - 6x - 9 = 0$$

$$3x^2 = 6x + 9$$

$$-6x - 9$$

$$3x^2 - 6x - 9 = 0$$

$$3(x^2 - 2x - 3) = 0$$

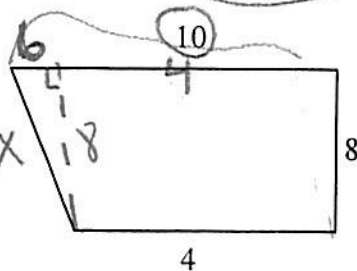
$$3(x+1)(x-3) = 0$$

$x+1=0$	$x-3=0$
$x=-1$	$x=3$

$$\boxed{AD = x = 3}$$

(4) Find the perimeter of the diagram below:

Pythag
Thm



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

$$36 + 64 = x^2$$

$$100 = x^2$$

$$10 = x$$

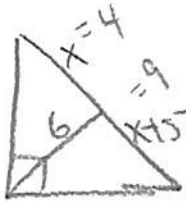
$$\text{Perim} = 10 + 8 + 4 + 10$$

$$\boxed{\text{Perim} = 32}$$

(Not Drawn to Scale)

(5) In right triangle ABC, altitude CD divides hypotenuse AB into segments of length x and $x+5$. If $CD=6$, find the length of the hypotenuse.

SAS



$$\frac{x}{6} = \frac{6}{x+5}$$

$$36 = x(x+5)$$

$$36 = x^2 + 5x$$

$$0 = x^2 + 5x - 36$$

$$0 = (x-4)(x+9)$$

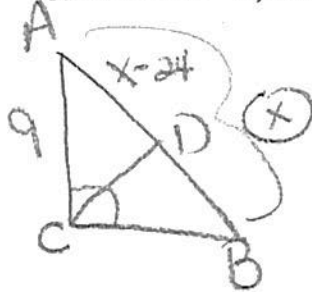
$$0 = (x-4)(x+9)$$

$x-4=0$	$x+9=0$
$x=4$	$x=-9$

$$\text{Hyp} = 4 + 9 = \boxed{13}$$

(6) In right triangle ABC, altitude CD is drawn to hypotenuse AB. If AD is 24 less than AB and $AC = 9$, find AB.

HL



$$\frac{x}{9} = \frac{9}{x-24}$$

$$81 = x(x-24)$$

$$81 = x^2 - 24x$$

$$0 = x^2 - 24x - 81$$

$$0 = (x-27)(x+3)$$

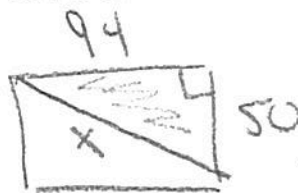
$$0 = (x-27)(x+3)$$

$x-27=0$	$x+3=0$
$x=27$	$x=-3$

$$\boxed{AB = x = 27}$$

(7) A basketball court is 94 feet by 50 feet rectangular. If a player runs from one corner of the court to the other corner opposite it, how far did he run to the nearest tenth of a foot?

Pythag
Thm



$$94^2 + 50^2 = x^2$$

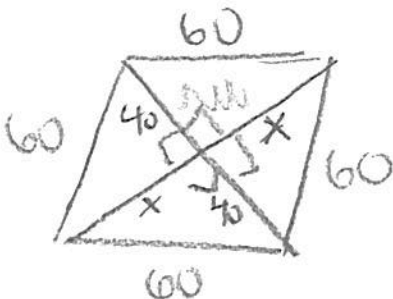
$$8836 + 2500 = x^2$$

$$11336 = x^2$$

$$\boxed{106.5 \text{ ft} = x}$$

(8) The perimeter of a rhombus is 240 feet with one diagonal measuring 80 feet. What is the length of the other diagonal to the nearest integer?

Pythag
Thm



$$40^2 + x^2 = 60^2$$

$$1600 + x^2 = 3600$$

$$x^2 = 2000$$

$$x = \sqrt{2000} = 44.721 \times 2 = \boxed{89}$$

$$P = 240$$

$$\frac{240}{4} = 60 \text{ each side}$$