P. 267 Review

5. George is replacing the halyards (ropes that lift the sails) and sheets (ropes that control side movement of the sails) on his boat.
   - He wants no more than 50 m of rope for the halyards.
   - He needs no more than 120 m of rope altogether.
   - **a)** What are the restrictions on the variables? How do you know?
   - **b)** Create a graphical model of this situation and use it to choose two possible combinations of lengths of rope.

$x \rightarrow$ # of meters for halyard

$y \rightarrow$ # of meters for sheets

$x \in \mathbb{R}$ $y \in \mathbb{R}$

Quad I

$x \leq 50$

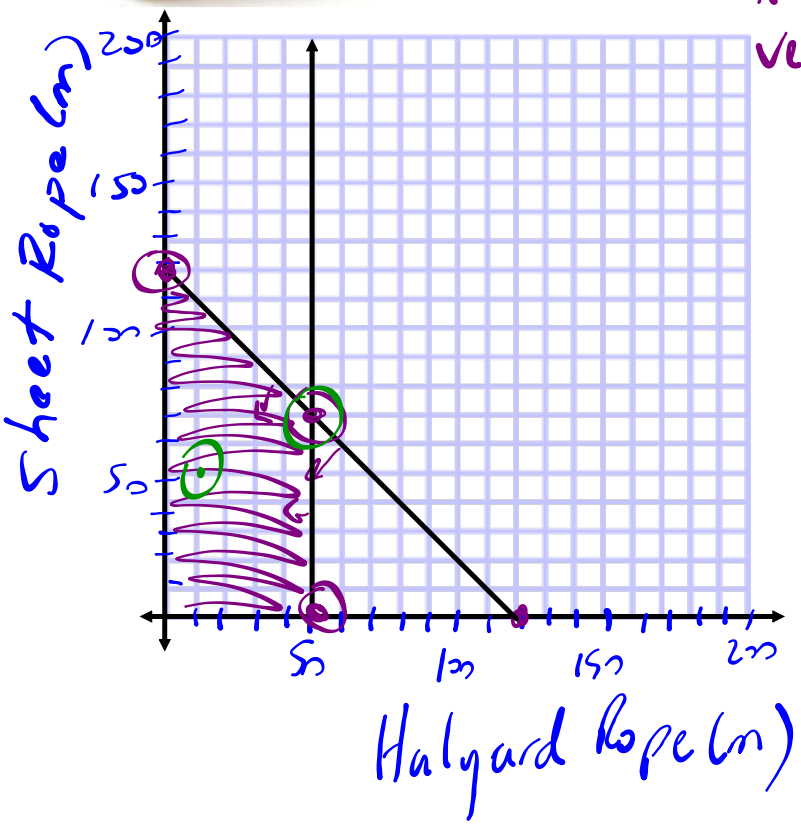
$x = 50$ vertical

$x + y \leq 120$

$x + y = 120$

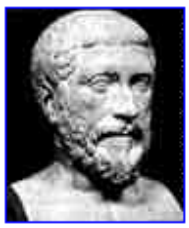
x int $(120, 0)$

y int $(0, 120)$



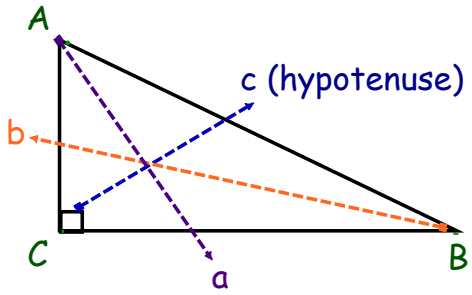
Solution

1) $(0, 50)$
2) $(50, 70)$



Pythagorean Theorem

- is a fundamental relationship amongst the sides on a **RIGHT triangle.**



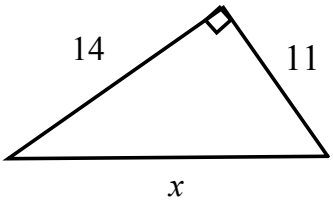
$$c^2 = a^2 + b^2$$

OPTIONS...

#1. Finding the unknown hypotenuse:

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

ex:



$x^2 = 14^2 + 11^2$

$x^2 = 196 + 121$

$\sqrt{x^2} = \sqrt{317}$

$x = 17.8$

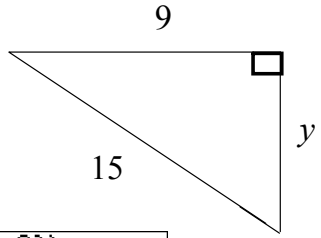
#2. Finding an unknown side

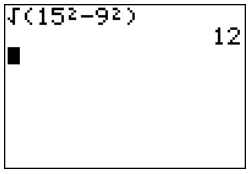
$$a^2 = c^2 - b^2$$

3-4-5 $\times x^2$

9-12-15

ex:





$y^2 = 15^2 - 9^2$

$y^2 = 225 - 81$

$\sqrt{y^2} = \sqrt{144}$

$y = 12$

Pythagorean Triples

1) 3-4-5
2) 5-12-13
3) 7-24-25

Any multiple of these is a triple too!

Pythagorean Triples

Verifying a Pythagorean Triple...

LS	RS
$6^2 + 6^2$	12^2
$36 + 36$	144
$72 \neq$	Not a triple

9-12-20

LS	RS
$9^2 + 12^2$	20^2
$81 + 144$	400
225	