# Homework... Questions?

2. Camille lives in Utshimassits, NL. She is an avid kayaker and is building a small shed to store her new kayak and fishing equipment in. Before building, she draws a plan for the shed. Consider her sketch of the shed's roof, which will be supported by a king post roof truss.

   a) If the right rafter and the left rafter make up the two main line segments, name one possible transversal for the rafters.

   King Post & Tie Beam

   b) What type of angles are angles 3 and 5?

   Supplementary

   c) If the walls are the line segments and the tie beam is the transversal, what type of angles are angles 7 and 8?

   6 - interior

   d) If angles 1 and angles 2 and 4 combined are a pair of interior angles on the same side of a transversal, which components of the truss must form the two main line segments and the transversal?

Transversal

main line p. 304 #2

main ? line !

rafter

king post

tie beam

← wall
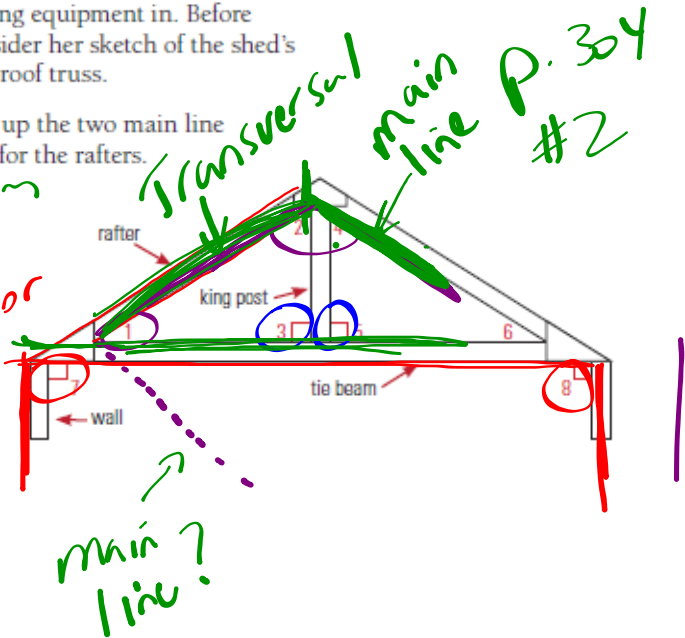
P.320

3. Suppose that you are the skipper of the boat depicted by the white symbol in the map below. Place a sheet of paper over the map. Draw a clockwise course made up of three legs that will take you just past each of the buoys (marked in red), to a spot right beside the boat (depicted in black). Use the vertical gridlines, which point north, to determine what true bearing the boat must be on during each leg, and record those bearings.

315 NW   0 N   45 NE
270 W   E 90
225 SW   S   SE 135
         180
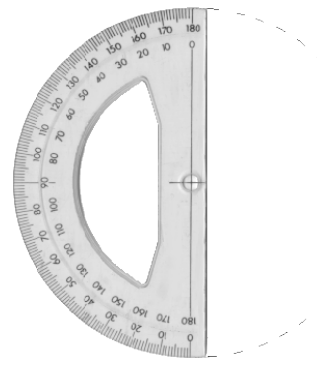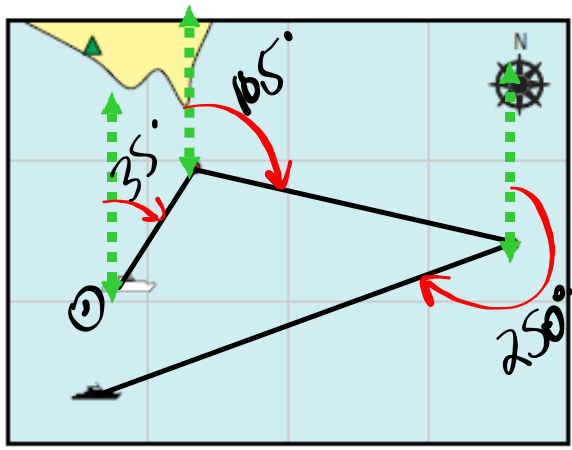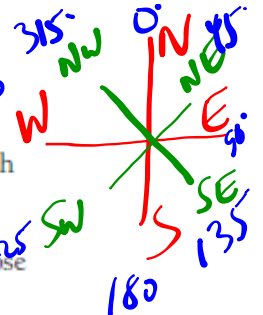
8.1 - The Pythagorean Theorem

MATH *ON THE JOB*

Jani Mroshaj is a stone mason in Halifax, NS. Jani learned his trade from his father while growing up in Albania, and then refined his skills while working as a stone mason in Greece and Italy. He immigrated to Canada in 2002, and is now the proud owner of Mr. Masonry, a business in Halifax that builds stone staircases, walls, patios, pathways, and fireplaces.

Jani uses math on the job every day. He calculates, estimates, and designs projects for clients, and does bookkeeping. When designing custom work, Jani needs to calculate how much material to order, knowing that this depends both on the dimensions of the stone that is available, and the size of the project he is building.

Jani is working on designing an outdoor patio. His client would like the patio design to feature squares of one kind of stone framing squares of a different kind of stone, with these rotated, as shown in the illustration.

Jani wants the inner squares to be rotated according to the measurements shown in the illustration.

What will be the side lengths of the inner squares?

Jani Mroshaj uses a level to make sure the stone he just placed in this wall is straight.

12 in

9 in
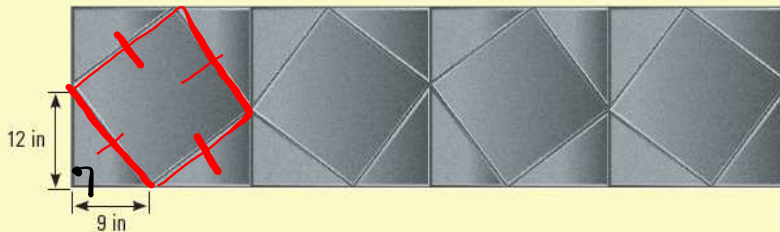
SOLUTION

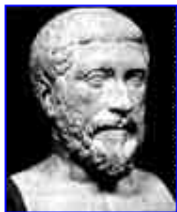Use the Pythagorean theorem to solve the problem.

$$a^2 + b^2 = c^2$$
$$12^2 + 9^2 = s^2$$
$$144 + 81 = s^2$$
$$225 = s^2$$
$$\sqrt{225} = s$$
$$15 \text{ in} = s$$

's Theorem...

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

Euclid (born circa 300 BCE) is called the Father of Modern Geometry. In his famous book *The Elements*, he generalized the Pythagorean theorem by stating that if one erects similar figures on the sides of a right triangle, then the sum of the areas of the two smaller figures will equal the area of the larger figure.

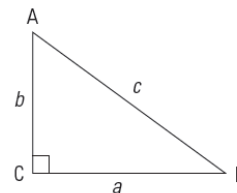**right triangle:** a triangle with one right angle

hypotenuse: the longest side of a right triangle, opposite the 90° angle

leg: in a right triangle, the two sides that intersect to form a right angle

Pythagorean theorem: in a right triangle, the sum of the squares of the lengths of the legs is equal to the square of the length of the hypotenuse

Leg AC, or *b*, is adjacent to angle A and opposite angle B

Leg BC, or *a*, is adjacent to angle B and opposite angle A

OPTIONS...

$Irrational \ \overline{Q}$

#1. Finding the unknown hypotenuse:

$$c^2 = \underline{\underline{a}}^2 + b^2$$

ex:

14 11

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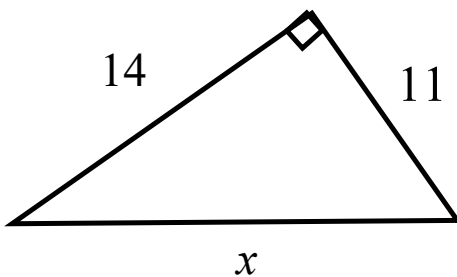
$$x^2 = 14^2 + 11^2$$

$$x^2 = 196 + 121$$

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

$$X = 17.8$$

#2. Finding an unknown side

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

ex:

9

y

15

$$c^2 = \overset{-b^2}{(a^2)} + b^2 \overset{2}{-b}$$

$$c^2 - b^2 = a^2$$
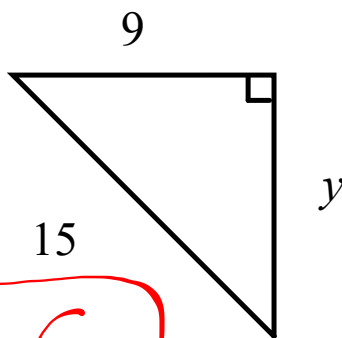
3 - 4 - 5

$9 - (12) - 15$ ×3

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

$$y = \sqrt{15^2 - 9^2}$$

$$y = 12$$

Pythagorean Triples

Verifying a Pythagorean Triple...

12 - 16 - 20 ?

LS	RS
$12^2 + 16^2$	20^2
$144 + 256$	400 ✓
400	

5 - 12 - 13

LS	RS
$5^2 + 12^2$	13^2
$25 + 144$	169 ✓
169	

Remember... Common Pythagorean Triples

1) 3 - 4 - 5
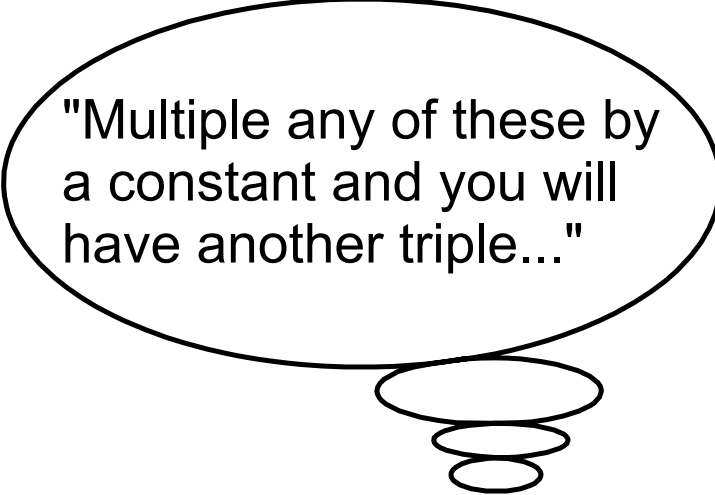2) 5 - 12 - 13
3) 8 - 15 - 17
4) 7 - 24 - 25

"Multiple any of these by a constant and you will have another triple..."

HOMEWORK...

p. 332 - Build Your Skills #1 - 9, 12

8.1 Build Your Skills Detailed Solutions.pdf

Attachments

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