APRIL 25, 2016

UNIT 7: SIMILARITY AND TRANSFORMATIONS

7.3: SIMILAR POLYGONS

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MATH 9

WHAT'S THE POINT OF TODAY'S LESSON?

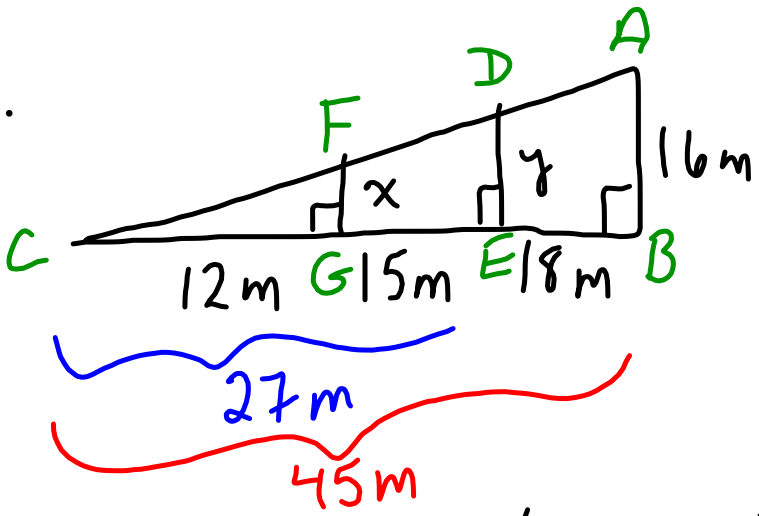
We will continue working on the Math 9 Specific Curriculum Outcome (SCO) "Shape and Space 3" OR "SS3" which states:

"Demonstrate an understanding of similarity of polygons."

HOMEWORK QUESTIONS?

(page 351, #14 & #15 ; page 352, #1 & #7 ; page 377, #3 ; page 378, #9, #10 & #11)

15.



$\angle B = \angle E = \angle G$ (GIVEN)

$\angle C = \angle C = \angle C$ (COMMON)

$\angle A = \angle D = \angle F$ (SATT)

$\therefore \triangle ABC \sim \triangle DEC \sim \triangle FGC$ (AAA)

$$\frac{x}{16} = \frac{12}{45} \qquad \frac{y}{16} = \frac{27}{45}$$

$$45x = 192 \qquad 45y = 432$$

$$x = 4.2\overline{6} \qquad y = 9.6\text{m}$$

$$x \doteq 4.3\text{m}$$

HOMEWORK QUESTIONS?

(page 351, #14 & #15 ; page 352, #1 & #7 ; page 377, #3 ; page 378, #9, #10 & #11)

3. O 270 cm × 138 cm

S 180 cm × 92 cm

a) $SF = \frac{S}{O} = \frac{180}{270} = \frac{2}{3}$

$SF = \frac{S}{O} = \frac{92}{138} \div 46 \div 46 = \frac{2}{3}$

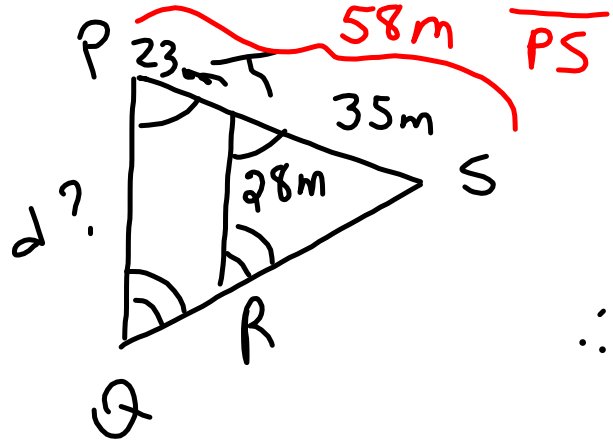
b) $\frac{144}{1}$ cm × $\frac{2}{3}$ (48, 1)

$= 96$ cm

HOMEWORK QUESTIONS?

(page 351, #14 & #15 ; page 352, #1 & #7 ; page 377, #3 ; page 378, #9, #10 & #11)

9.



$\angle P = \angle T$ (GIVEN)

$\angle Q = \angle R$ (GIVEN)

$\angle S = \angle S$ (Common)

$\therefore \Delta PQS \sim \Delta TRS$ (AAA)

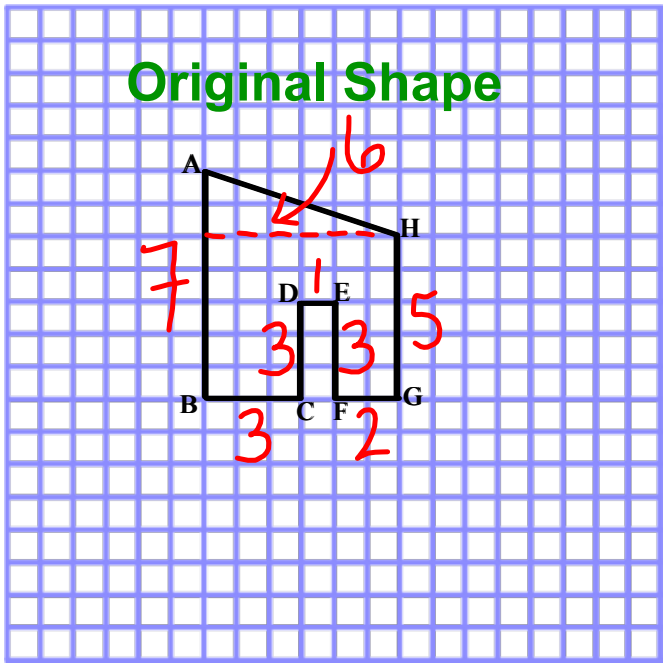
$$\frac{d}{28} = \frac{58}{35}$$

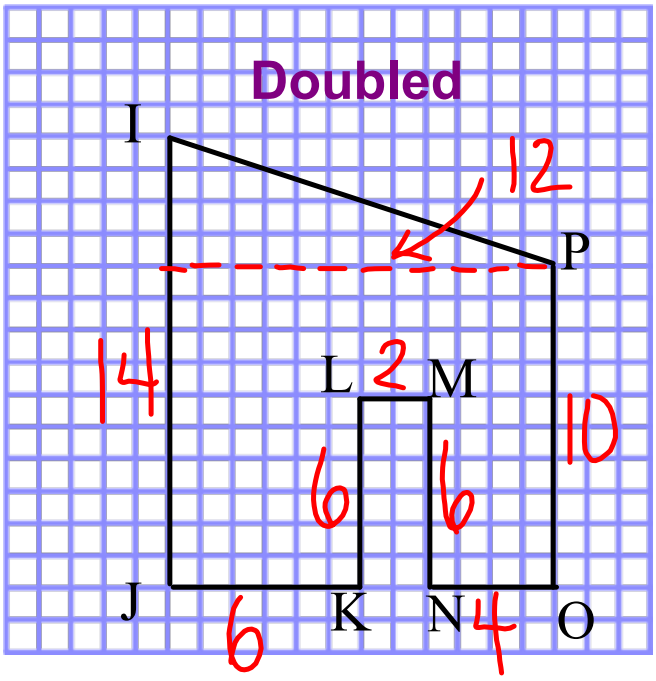
$$35d = 1624$$

$$d = 46.4\text{m}$$

Activity

(Label your second polygon IJKLMNOP counterclockwise from the top left corner.)





SIMILAR POLYGONS

TO IDENTIFY SIMILAR POLYGONS:

* **the measures of corresponding angles must be EQUAL**

**** AND ****

* **the ratios of the lengths of the corresponding sides must be EQUAL; in other words, corresponding sides are proportional**

EXAMPLE: **PROVE** that quadrilateral ABCD is **SIMILAR TO** quadrilateral PQRS.

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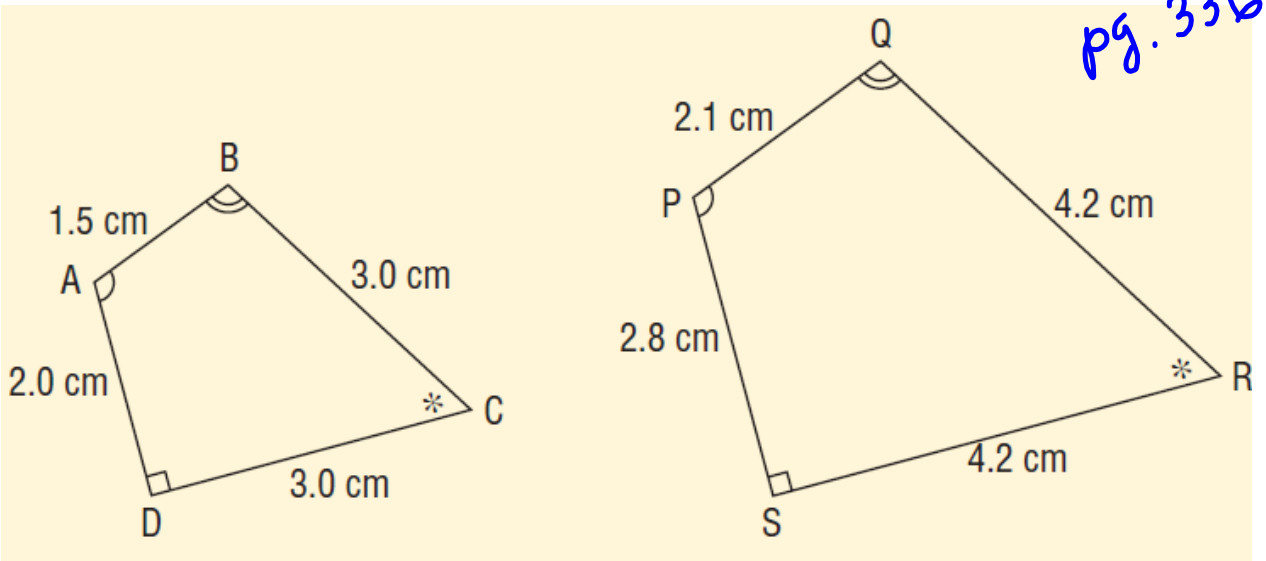


$\angle A = \angle P$ (Given)
$\angle B = \angle Q$ (Given)
$\angle C = \angle R$ (Given)
$\angle D = \angle S$ (Given)

AND

$$\frac{PQ}{AB} = \frac{QR}{BC} = \frac{RS}{CD} = \frac{PS}{AD}$$

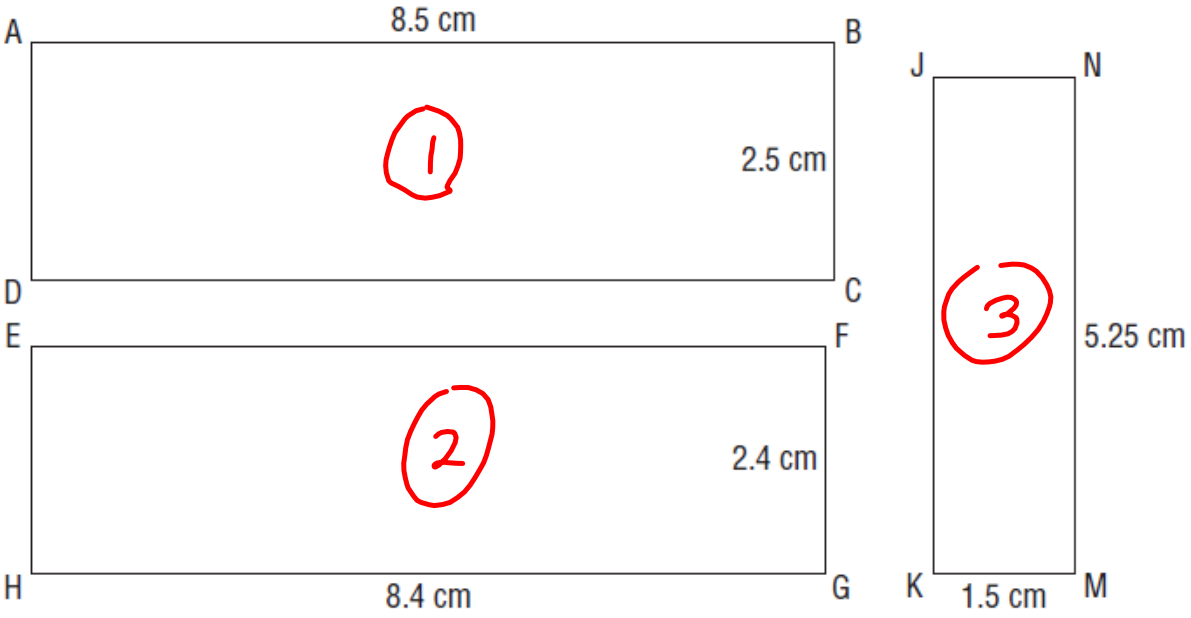
$$\frac{2.1}{1.5} = \frac{4.2}{3.0} = \frac{4.2}{3.0} = \frac{2.8}{2.0}$$

$$1.4 = 1.4 = 1.4 = 1.4$$

$\therefore$ quadrilateral ABCD ~ quadrilateral PQRS

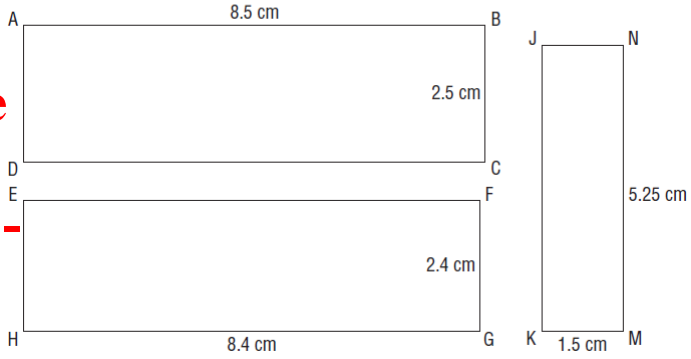
EXAMPLE:

Identify pairs of similar rectangles. Justify the answer.

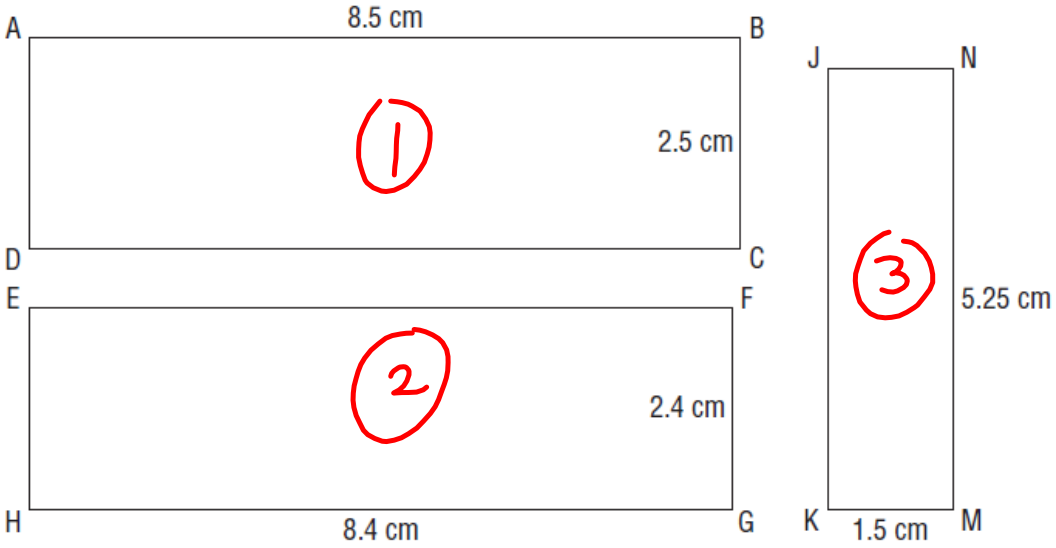


We are told that these shapes are rectangles. All angles in a rectangle measure 90° ; therefore, we do not have to "prove" anything about the angles - it is "given" that these shapes are rectangles.

Identify pairs of similar rectangles. Justify the answer.



We also know that rectangles have two pairs of congruent sides; therefore, the only thing we need to "prove" are the ratios of two pairs of corresponding sides are equal.

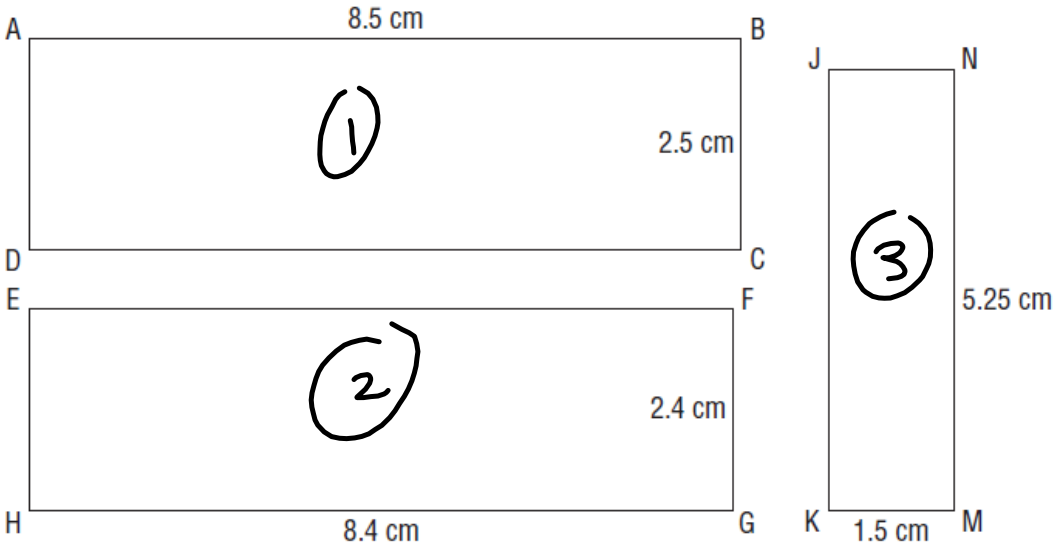


① & ②: $\frac{AB}{HG} = \frac{BC}{FG}$

$\frac{8.5}{8.4} = \frac{2.5}{2.4}$

$1.0119 \neq 1.041\overline{6}$

∴ ① & ② are NOT similar.

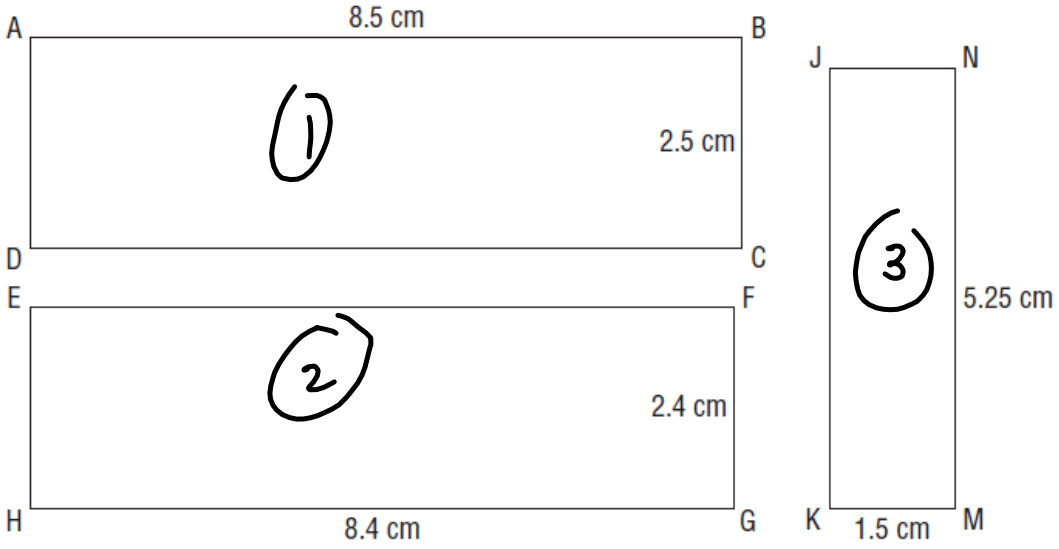


① & ③ : $\frac{AB}{NM} = \frac{BC}{KM}$

$\frac{8.5}{5.25} = \frac{2.5}{1.5}$

$1.6191 \neq 1.6$

∴ ① & ③ are NOT similar.



(2) & (3) : $\frac{GH}{MN} = \frac{FG}{KM}$

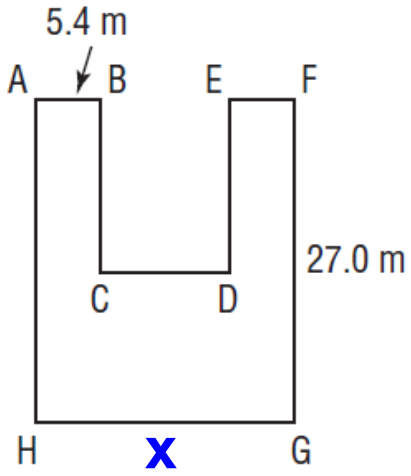
$\frac{8.4}{5.25} = \frac{2.4}{1.5}$

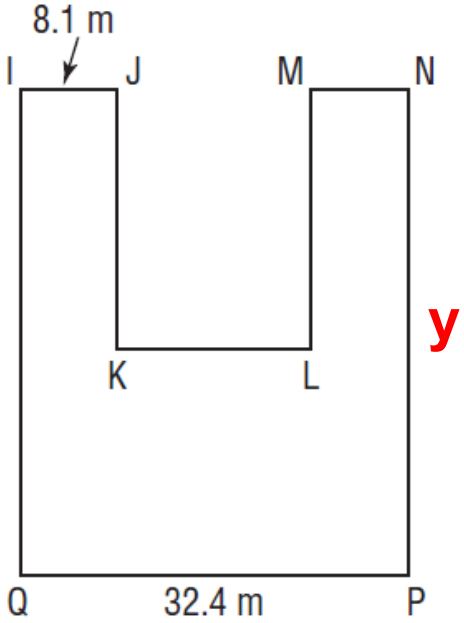
$1.6 = 1.6$

$\therefore$ rectangle EFGH ~ rectangle JKMN

EXAMPLE 2:

These 2 octagonal garden plots are SIMILAR. Calculate the length of GH and NP.



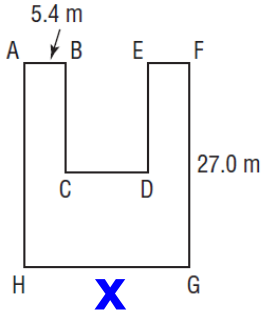


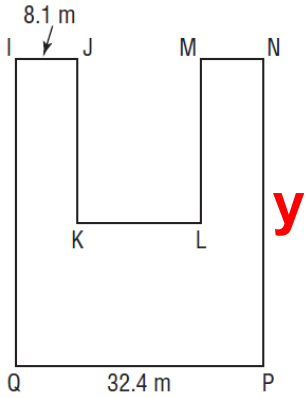
$$\frac{GH}{PQ} = \frac{AB}{IJ}$$

$$\frac{x}{32.4} = \frac{5.4}{8.1}$$

$$8.1x = 174.96$$

$$x = 21.6 \text{ m}$$





$$\frac{NP}{FG} = \frac{IJ}{AB}$$

$$\frac{y}{27.0} = \frac{8.1}{5.4}$$

$$5.4y = 218.7$$

$$y = 40.5 \text{ m}$$

CONCEPT REINFORCEMENT:

MMS9:
PAGE 341: #4, #5 & #9
PAGE 342: #13