Similar Figures Printable Notes

Corresponding Sides & Angles

Week 1 (4/20-4/24)
Topic: Identify corresponding sides and corresponding congruent angles of similar quadrilaterals and triangles.
Topic: Given two similar quadrilaterals or triangles, write similarity statements using symbols.

similar figures

For figures to be similar, the figures must meet three requirements:

· corresponding __angles__ must be __congruent (equal)__

· corresponding __Sides__ must be __proportional__ ➞

· the figures must be the same __Shape__ but **NOT** necessarily the same __Size__

☆ The symbol to show figures are <u>similar</u> is __∼__. ☆

Use the symbols for similar figures to show triangle ABC is similar to triangle DEF. Then set up a proportion to prove the two triangles are similar and identify the scale factor.
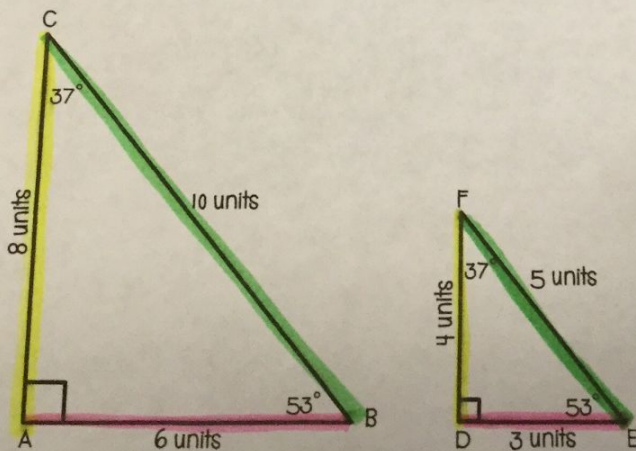
PROPORTIONAL   EQUAL

Corresponding Sides	Corresponding Angles
$\overline{AC} \sim \overline{DF}$ $\overline{CA} \sim \overline{FD}$	$\angle A = \angle D$ $90°$
$\overline{AB} \sim \overline{DE}$ $\overline{BA} \sim \overline{ED}$	$\angle B = \angle E$ $53°$
$\overline{BC} \sim \overline{EF}$ $\overline{CB} \sim \overline{FE}$	$\angle C = \angle F$ $37°$
	$180°$

____ = ____

____ = ____

____ = ____

Scale Factor: _____

(Triangle ABC: C, 37° at C, 8 units side CA, 10 units hypotenuse, 53° at B, 6 units AB, right angle at A)

(Triangle DEF: F, 37°, 4 units, 5 units, 53° at E, 3 units DE, right angle at D)

Corresponding Sides & Angles

Topic: Identify corresponding sides and corresponding congruent angles of similar quadrilaterals and triangles.
Topic: Given two similar quadrilaterals or triangles, write similarity statements using symbols.

Topic: Given angle measures in a quadrilateral or triangle, determine unknown angle measures in a similar quadrilateral or triangle.

Similar Figures

Similar Figures are figures that are *similar*, have the *same shape*, but **NOT** necessarily the *same size*.

When two figures are similar,
- Corresponding angles must be congruent.
- Corresponding sides must be proportional.

Vocabulary:

Symbol	Representation
~	Similar Same shape, different size
$\triangle ABC$	Triangle ABC

Symbol	Representation
$\overline{DE}$	Line segment DE
$\cong$	Congruent (equal)

$\triangle ABC \sim \triangle EGF$
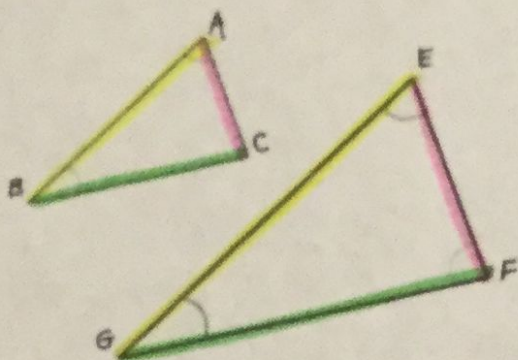
PROPORTIONAL   EQUAL

Corresponding Sides	Corresponding Equivalent Angles
$\overline{AB} \sim \overline{EG}$	$\angle A = \angle E$
$\overline{BC} \sim \overline{GF}$	$\angle B = \angle G$
$\overline{CA} \sim \overline{FE}$	$\angle C = \angle F$

Using the above similar triangles, complete the statement of proportionality.

$$\frac{\overline{AB}}{\overline{EG}} = \frac{\overline{BC}}{\overline{GF}} = \frac{\overline{CA}}{\overline{FE}}$$

Determining Similar Figures

Topic: *Write proportions to express the relationships between the lengths of corresponding sides of similar quadrilaterals and triangles.*)

Quadrilateral MNOP ~ QRST.
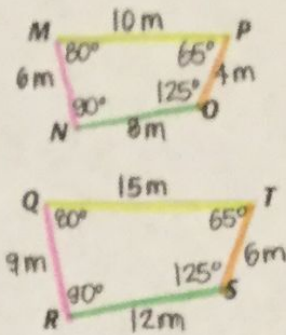
Corresponding Sides	Corresponding Angles
$\frac{MN}{QR}$ $\overline{MN}$ corresponds to $\overline{QR}$.	∠O corresponds to ∠ S
$\frac{NO}{RS}$ $\overline{NO}$ corresponds to $\overline{RS}$.	∠T corresponds to ∠ P
$\frac{TS}{PO}$ $\overline{TS}$ corresponds to $\overline{PO}$.	∠M corresponds to ∠ Q
$\frac{PM}{TQ}$ $\overline{PM}$ corresponds to $\overline{TQ}$.	∠R corresponds to ∠ N

Using the above similar quadrilaterals, complete the statement of proportionality.

$$\frac{MN}{QR} = \frac{MP}{QT} = \frac{PO}{TS} = \frac{ON}{SR}$$

big: MN MP PO ON

$$\frac{6}{9} = \frac{10}{15} = \frac{4}{6} = \frac{8}{12}$$

Small: QR QT TS SR

$$\frac{6 \div 3}{9 \div 3} = \boxed{\frac{2}{3}}$$

$$\frac{10 \div 5}{15 \div 5} = \boxed{\frac{2}{3}}$$

$$\frac{4 \div 2}{6 \div 2} = \boxed{\frac{2}{3}}$$

$$\frac{8 \div 4}{12 \div 4} = \boxed{\frac{2}{3}}$$
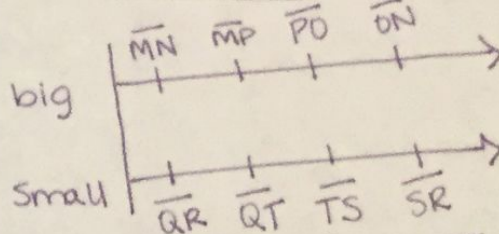
**In two similar geometric figures, the ratio of their corresponding sides is called the scale factor.
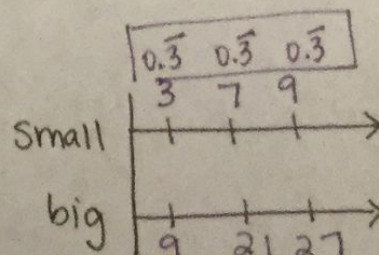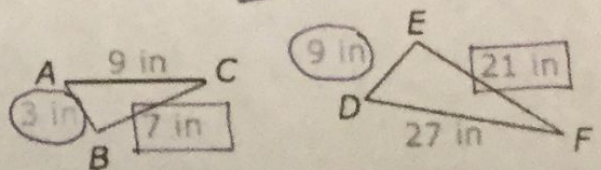
Determining Similarity: Identify the corresponding sides in the pair of figures. Then use ratios to determine whether the figures are similar.

EX: Determine if △ABC ~ △DEF.

Small: 10 6 8
0.6 0.6 0.6
big: 15 9 12

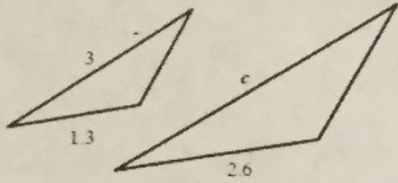yes, the figures are similar.

EX: Determine if ABC ~ △DEF.

Small: 3 7 9
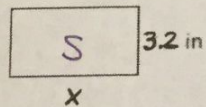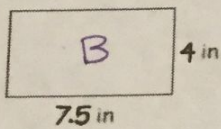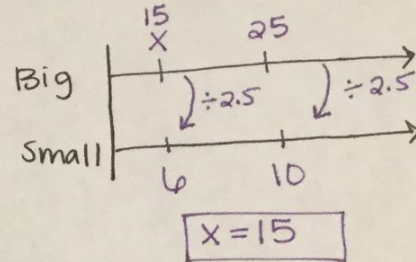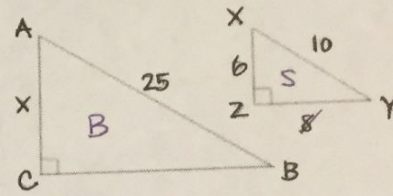0.3 0.3 0.3
big: 9 21 27
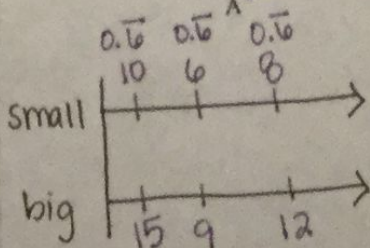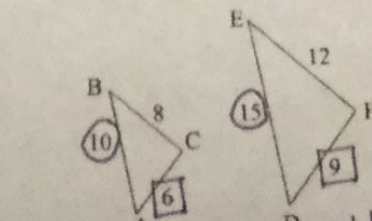
✓ similar

Solving for a Missing Side

Topic: Solve a proportion to determine a missing side length of similar quadrilaterals or triangles.

Solving for a Missing Side:
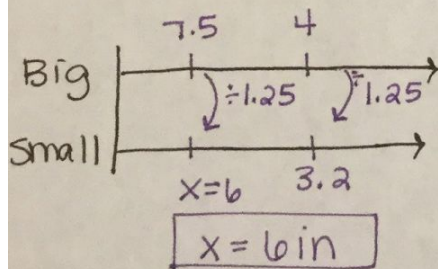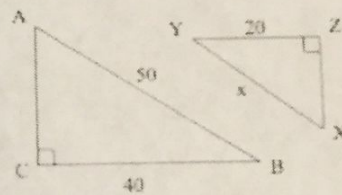
ΔABC~ΔXYZ

Big

Small

6   10

$$X = 15$$

ΔABC ~ ΔXYZ

B	4 in

7.5 in

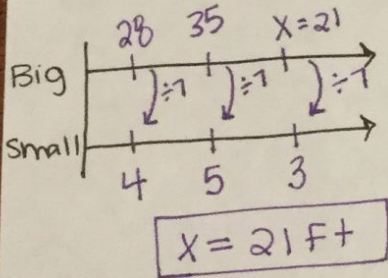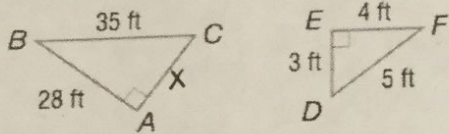| S	3.2 in

x

7.5   4

Big

Small

X=6   3.2

$$x = 6 \text{ in}$$
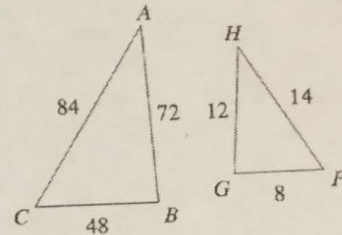
Solving for a Missing Side

Topic: Solve a proportion to determine a missing side length of similar quadrilaterals or triangles.

Redrawing Similar Figures: To help set up a proportion for similar figures, make sure the figures are in the same orientation. *Hint: Use the letters to help!!*
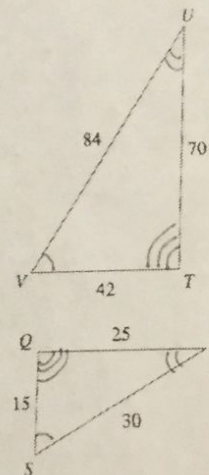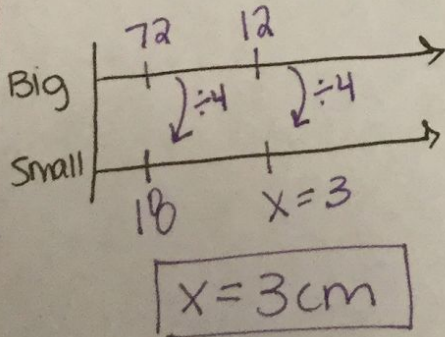
$\triangle ABC \sim \triangle EFD$

$\triangle ABC \sim \triangle HGF$

35 ft · C   E 4 ft F
B   3 ft ⌐   5 ft
28 ft   D
      A   X

84   72   12   14
48   G   8   F
C   B

28   35   X=21

Big

Small
4   5   3

$X = 21 ft$

$\triangle TUV \sim \triangle QRS$

72cm
B
12 cm
18 cm
S x

72   12

Big

Small
18   X=3

$X = 3 cm$

84   70
V   42   T
U

Q   25   R
15   30
S
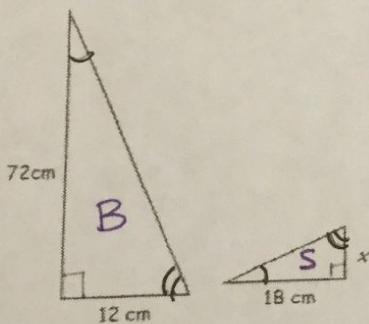
Overlapping Similar Figures

Topic: Solve a proportion to determine a missing side length of similar quadrilaterals or triangles.

S   B
$\triangle ABC \sim \triangle ADE$

D

12.5

y

B
3   5

A
4   C   E

$x = 10$

$y = 7.5$

X

3   5   4

small

$\cdot 2.5$ $\cdot 2.5$ $\cdot 2.5$

big

y   12.5   X
7.5   10