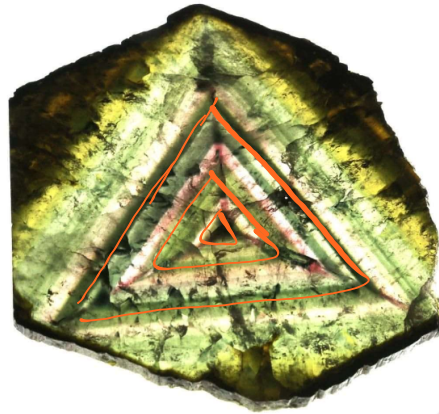


7.3 Similar triangles pg. 204-210



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Similar Triangles in Nature



Tourmaline Crystal cross sections contain Similar Triangles

Similar Triangles in Nature

Tourmaline is found in Mozambique, and is a gem used to make spectacular jewellery such as these colorful cufflinks.



Similar Triangles can create striking effects when used in Art and Cra

Similar Triangles in Craft

Similar Triangles can also be used to great effect in Art and Craft, as seen in this colourful and creative patchwork quilt.



Similar Triangles in Art

Many Similar Triangles are present in this modern art piece.



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Similar Triangles provide reinforced strength and rigidity to structures, as well as greatly reducing the weight of the objects they are used in.

Similar Triangles in Structures




Many Similar Triangles are present in the structure of the Sydney Harbour Bridge to give it strength and stability.





Image Source: Copyright 2012 Passy's World of Mathematics

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Similar Objects

When objects are the exact same shape, but they are different sizes, we say that they are "**Similar**" objects or figures.


Images from Google Images
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Scale Factor


Scale Factor

The amount by which we increase, or decrease, the size of an object is called the "Scale Factor" or "S.F."

The following examples of enlarging and reducing the size of a photo illustrate the concept of Scale Factor.



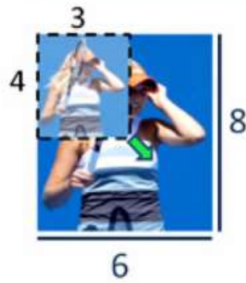
When we **double** the Length and Width of our Photo we **ENLARGE** it using a **SCALE FACTOR** of 2.



When we **halve** the Length and Width of our Photo we **REDUCE** it using a **SCALE FACTOR** of 1/2.

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Enlargement and Reduction



If the **SCALE FACTOR** is Greater than 1 the resulting object is an **ENLARGEMENT**.

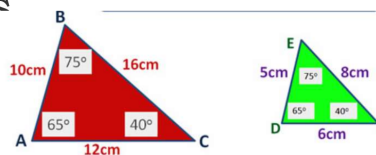


If the **SCALE FACTOR** is Less than 1 the resulting object is a **REDUCTION**.

Scale Factors less than 1 are expressed as Fractions: $\frac{1}{4}$, $\frac{1}{2}$, or as decimals: 0.3 etc

430

In this lesson we look at the nature of similar figures, concentrating on Similar Triangles



$\triangle ABC \sim \triangle DEF$

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SIMILAR TRIANGLES

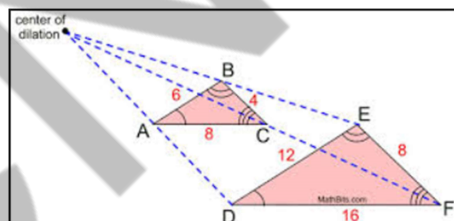
Two figures are similar (symbol is \sim) when

- All corresponding angles are congruent
- All corresponding sides are proportional

Therefore, similar figures have the same shape, but are not necessarily the same size.

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The scale factor K or coefficient of proportionality is equal to the ratio of the measures of two corresponding sides.



$$K = 2 \text{ or } \frac{1}{2}$$

Proportionality

$$\frac{1}{2} = \frac{2}{4} = \frac{4}{8} = \frac{8}{16} = \frac{10}{20} = \frac{21}{42} = \frac{75}{150}$$

Are the following proportional?

1.) $\frac{4}{6} = \frac{8}{12}$ Yes

2.) $\frac{5}{6} = \frac{29}{30}$ No

3.) $\frac{10}{90} = \frac{1}{9}$ Yes

4.) $\frac{4}{60} = \frac{2}{30}$ Yes

$$\rightarrow \frac{18}{25} = \frac{x}{100}$$

If you obtain $\frac{18}{25}$ on a test, what is your %? 72%Find the value of x if both fractions are proportional.

1. $\frac{x}{6} = \frac{8}{12}$

$x = 4$

2. $\frac{4}{2x} = \frac{8}{9}$

$16x = 36$

$x =$

3. $\frac{3}{500} = \frac{3x}{2x-6}$

$1500x = 6x - 18$

$1494x = -18$

$x = -18/1494$

4. $\frac{x}{5} = \frac{40}{10x}$

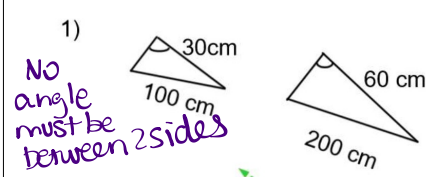
$10x^2 = 200$

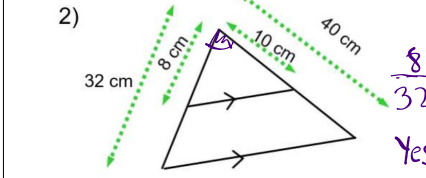
$\frac{10}{10} \quad \frac{10}{10}$

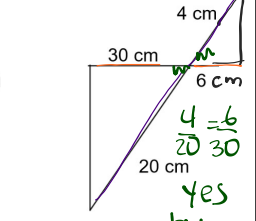
$x^2 = 20$

$x = 4.5$

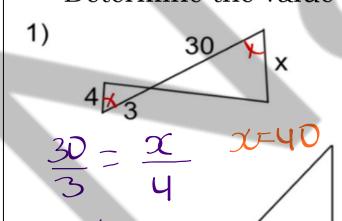
Are they similar? By which rule?

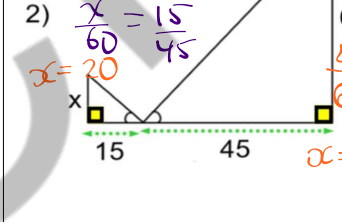
1) 
 No angle must be between 2 sides

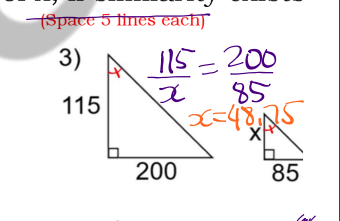
2) 
 $\frac{8}{32} = \frac{10}{40} = \frac{1}{4}$
 Yes by SAS

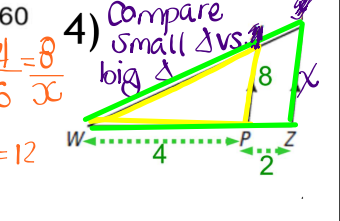
3) 
 $\frac{4}{20} = \frac{6}{30}$
 Yes by SAS

Determine the value of x, if similarity exists

1) 
 $\frac{30}{3} = \frac{x}{4}$
 $x = 40$

2) 
 $\frac{x}{60} = \frac{15}{45}$
 $x = 20$
 $\frac{4}{6} = \frac{8}{x}$
 $x = 12$

3) 
 $\frac{115}{x} = \frac{200}{85}$
 $x = 48.75$

4) Compare small Δ vs big Δ

 $\frac{4}{2} = \frac{8}{x}$