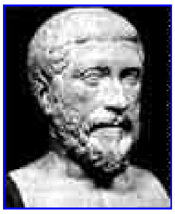


's Theorem...

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

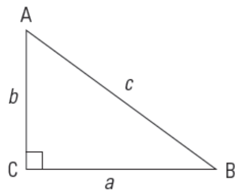
Euclid (born circa 300 BCE) is called the Father of Modern Geometry. In his famous book *The Elements*, he generalized the Pythagorean theorem by stating that if one erects similar figures on the sides of a right triangle, then the sum of the areas of the two smaller figures will equal the area of the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

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..."

3 - 4 - 5

$\downarrow \times 2$

6 - 8 - 10

Pythagorean Triples

Verifying a Pythagorean Triple...

12-16-20 ← 3-4-5 ×4

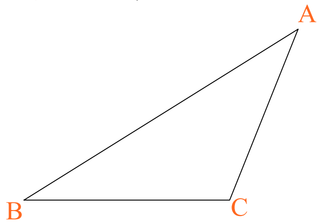
LS	RS
12^2+16^2	20^2
$144+256$	400
400	✓

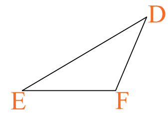
LS	RS

Similar Triangles

????

- have the same shape but are different in size.
- versus congruent triangles that have the same shape AND the same size.





$$\boxed{\Delta ABC \sim \Delta DEF}$$

"is similar to"

The above statement would be read...
"Triangle ABC is similar to triangle DEF"
- **The order that the triangles are labelled is important!**

- corresponding angles are EQUAL.
- ratios of corresponding sides are EQUAL, so...

$$\boxed{\frac{AB}{DE} = \frac{BC}{EF} = \frac{AC}{DF}}$$

- thus, we can use these ratios to solve for unknowns!!!

NOTE: "AAA" is needed for similarity.

REVIEW: "BIG" geometry theorems...

- SATT (sum of the angles in a triangle theorem)
  - all angles in a triangle must add to 180 degrees.

- OAT (opposite angle theorem)
  - vertically opposite angles are equal in measure.

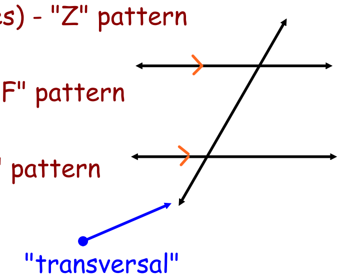
- ITT (iscosceles triangle theorem)
  - two equal sides, two equal angles.

- SAT (supplementary angles theorem)
  - angle sum of 180 degrees.

- CAT (complementary angles theorem)
  - angle sum of 90 degrees

PARALLEL LINE THEOREMS...

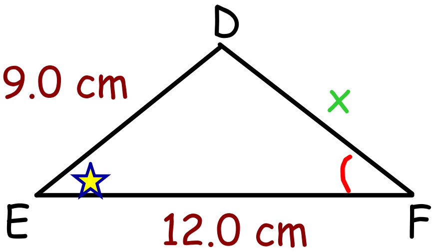
- AIA (alternate interior angles) - "Z" pattern
  - angles are equal in measure
- CA (corresponding angles) - "F" pattern
  - angles are equal in measure
- CIA (co-interior angles) - "C" pattern
  - angle sum of 180 degrees

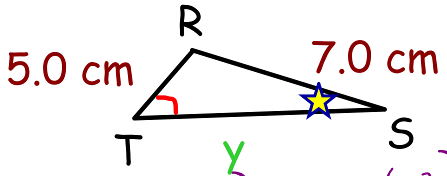


EXAMPLES...

$\triangle DEF \sim \triangle RST$

#1.





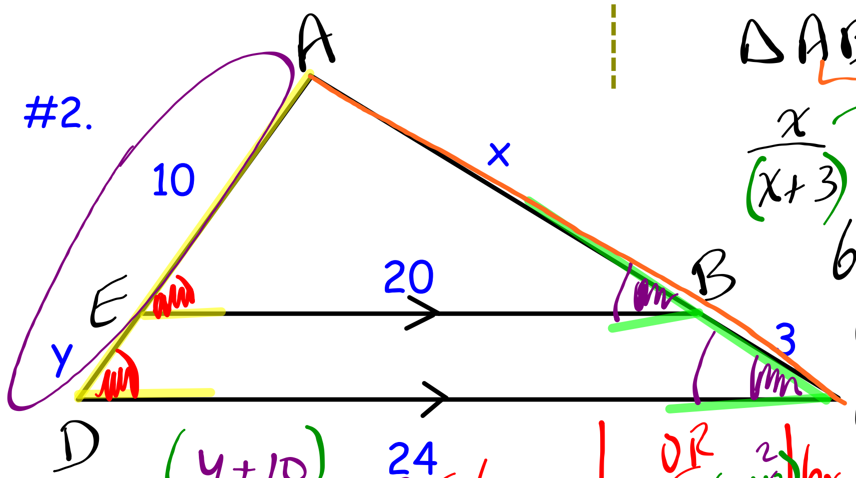
$$\cancel{5}\cdot\frac{x}{\cancel{5}} = \frac{9}{7}(5)$$

$$x = 6.42\text{ cm}$$

$$\cancel{12}\cdot\frac{y}{\cancel{12}} = \frac{7}{9}(12)$$

$$y = 9.3\text{ cm}$$

#2.



$\triangle ABE \sim \triangle ACD$

$$\frac{x}{(x+3)} = \frac{\cancel{20}\ 5}{\cancel{24}\ 6}$$

$$6x = 5(x+3)$$

$$6x = 5x + 15$$

$$6x - 5x = 15$$

$$x = 15$$

$$\frac{(y+10)}{10} = \frac{\cancel{24}\ 6}{\cancel{20}\ 5}$$

$$5(y+10) = 10(6)$$

$$5y + 50 = 60$$

$$5y = 60 - 50$$

$$\frac{\cancel{5}y}{\cancel{5}} = \frac{10}{5}$$

$$y = 2$$

OR

$$\cancel{10}\cdot\frac{(y+10)}{\cancel{10}} = \frac{6}{\cancel{5}}\,(\cancel{10}\ 2)$$

$$y + 10 = 12$$

$$y = 12 - 10$$

$$y = 2$$

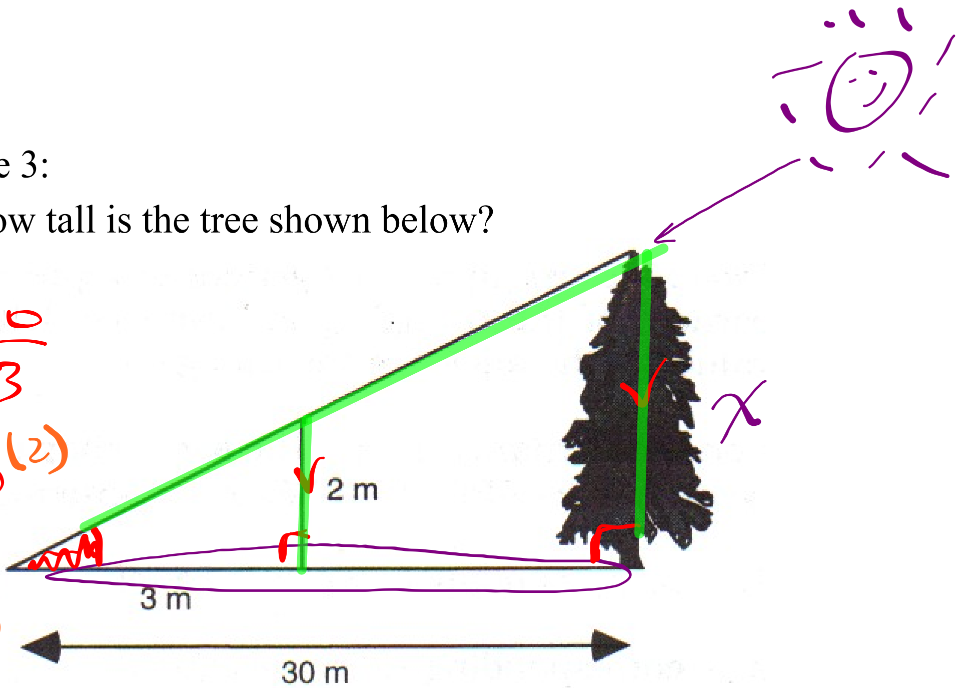
Example 3:

How tall is the tree shown below?

$$\frac{x}{2} = \frac{30}{3}$$

$$\frac{x(2)}{2} = 10(2)$$

$$x = 20$$



#6 $ST \parallel QR$

Parallel

HOMEWORK....

Worksheet - Similar Triangles Exercise.doc

Omit #2 #3

Attachments

Worksheet - Similar Triangles Exercise.doc