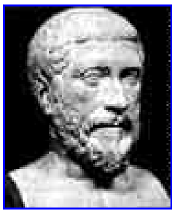


's Theorem...

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.

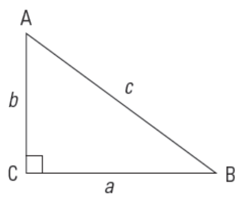
$$a^2 + b^2 = c^2$$

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

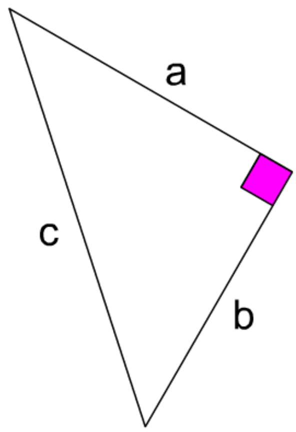
"Multiple any of these by a constant and you will have another triple..."

Pythagorean Triples

Figure out which of the following are Pythagorean Triples by putting them into $a^2 + b^2 = c^2$

Click on the corresponding button to see if it is a Pythagorean Triple

12	16	20
5	12	13
9	12	20
7	24	25
6	6	12



END

3-4-5
6-8-10
9-12-15

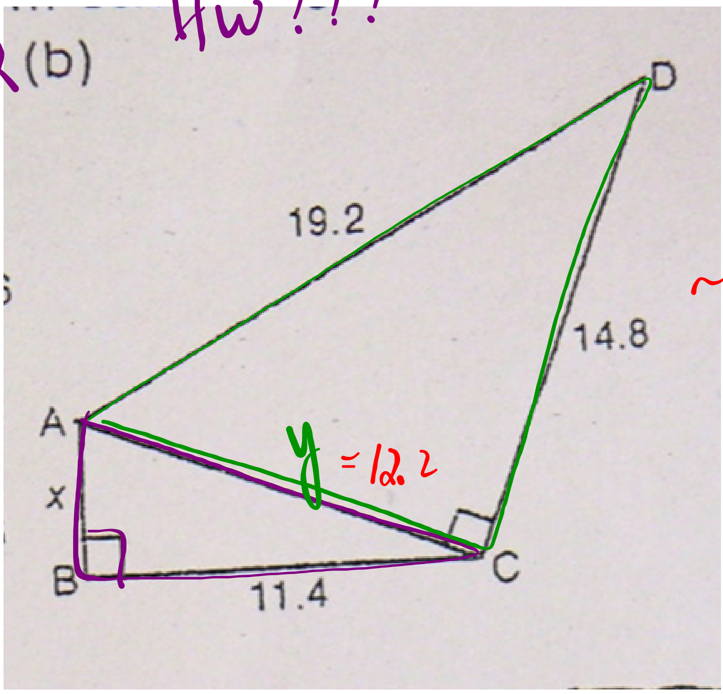
Verifying a Pythagorean Triple...

12-16-20 ← 3-4-5 ×4

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

LS	RS

12 (b) HW???



$\sqrt{\cancel{y^2}} = \sqrt{19.2^2 - 14.8^2}$

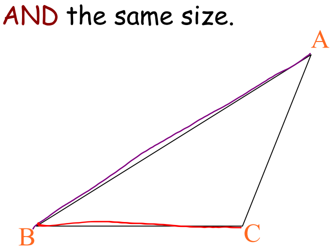
$y = 12.2$

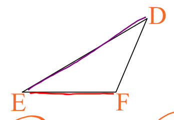
$\sqrt{x^2} = \sqrt{12.2^2 - 11.4^2}$

$x = 4.4$

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.

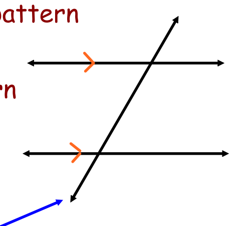
- ITT (iscosceles triangle theorem)
  - two equal sides, two equal angles.

- 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

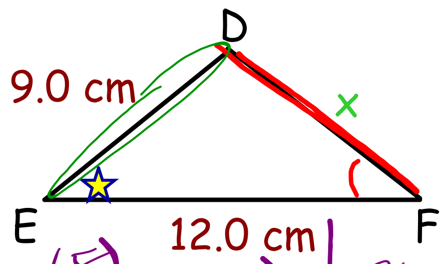


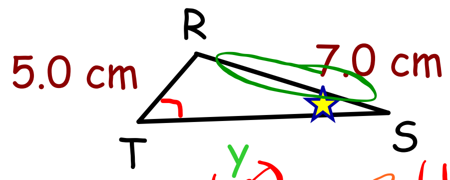
"transversal"

EXAMPLES...

$\Delta DEF \sim \Delta RST$

#1.





$\frac{x}{5} = \frac{9}{7}$

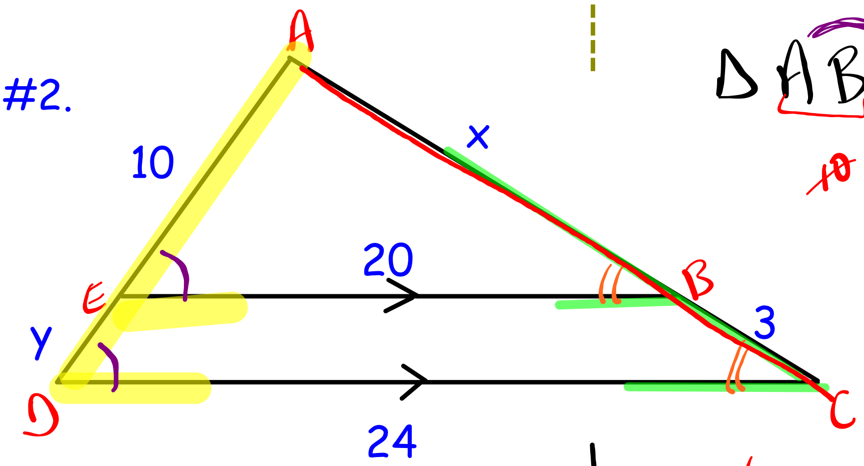
$7x = 9(5)$

$x = 6.43$

$\frac{y}{12} = \frac{7}{9}$

$y = 9.3$

#2.



$\Delta ABE \sim \Delta ACD$

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

$6x = 5(x+3)$

$6x = 5x + 15$

$6x - 5x = 15$

$x = 15$

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

$y + 10 = 12$

$y = 12 - 10$

$y = 2$

OR

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

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

$5y + 50 = 60$

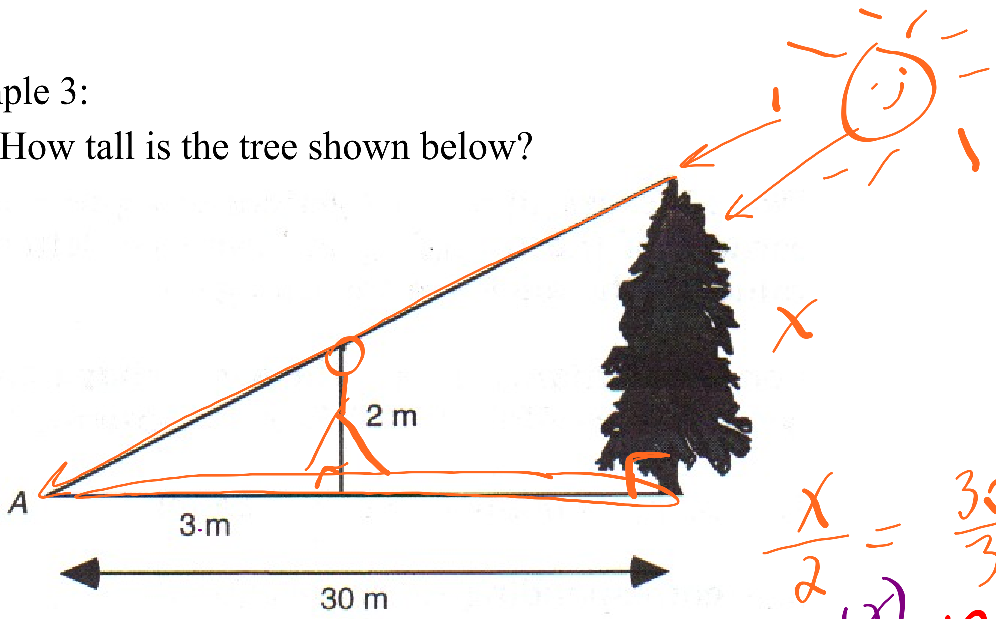
$5y = 60 - 50$

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

$y = 2$

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