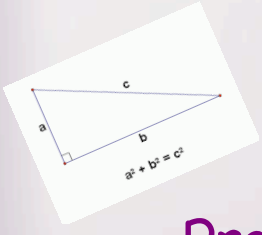
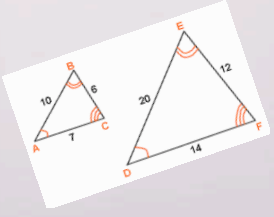
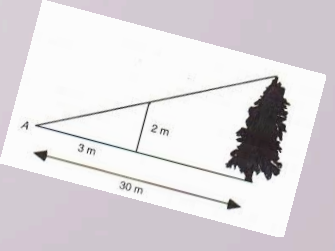


Math 1030 #18c

Problem Solving in Geometry

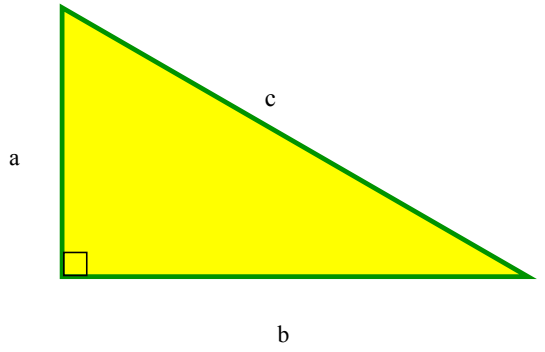


Triangles



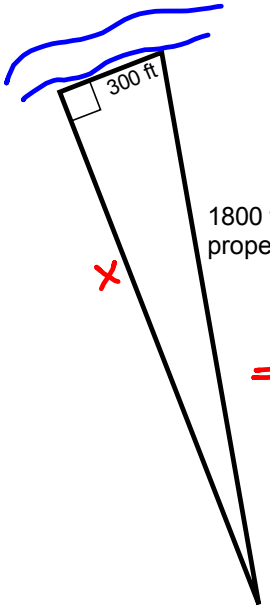
Pythagorean Theorem: In a right triangle, the square of the hypotenuse is equal to the sums of the squares of the two legs.

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



EX 1: Determine the acres in this piece of river front property.

1 acre = 43,560 ft^2.



$x^2 + 300^2 = 1800^2$

$x^2 = 1800^2 - 300^2$

$x = \sqrt{1800^2 - 300^2}$

$x \approx 1775$ ft

$\Rightarrow$ area $= \frac{1}{2}(1775)(300)$

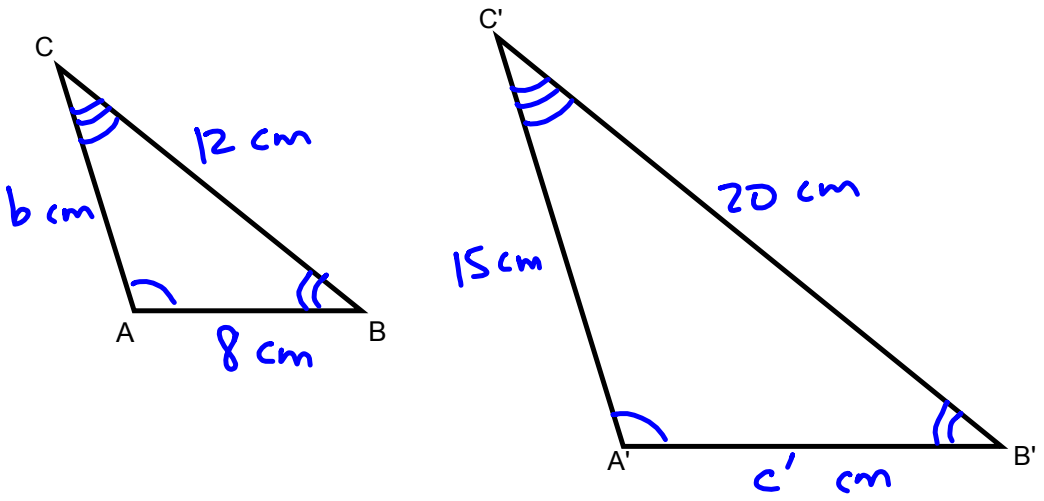
$\approx 266{,}224$ ft^2

convert to acres:

$266{,}224 \text{ ft}^2 \left(\frac{1 \text{ acre}}{43{,}560 \text{ ft}^2}\right) \approx 6.1$ acres

Similar Triangles

Similar triangles have the same shape.
Their corresponding angles are equal in measure.
Their sides are proportional. That is, the ratios of corresponding sides are equal.



EX 2: If the sides of the smaller triangle above are (from shortest to longest) 8 cm, *b* cm, 12 cm and the sides of the larger triangle are *c'* cm, 15 cm and 20 cm, find the measures of all sides of both triangles.

$\frac{b}{15} = \frac{12}{20}$ (or $\frac{b}{12} = \frac{15}{20}$)

$b = \frac{12(15)}{20}$

$b = 9$ cm

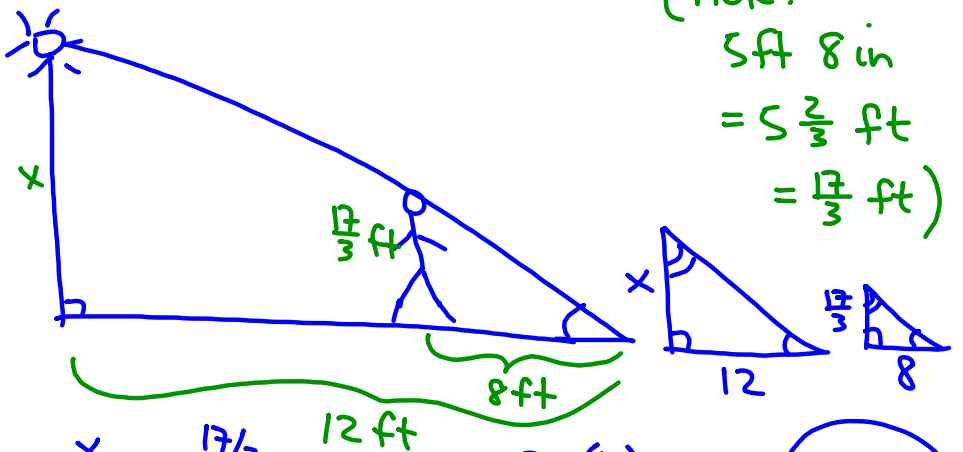
next solve for c':

$\frac{c'}{8} = \frac{20}{12}$

$c' = \frac{20(8)}{12} = \frac{40}{3} \approx 13.3$ cm

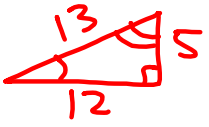
EX 3: The shadow cast by a 5 ft 8 inch person is 8 ft. How tall is the light post which casts a 12 foot shadow?

(note: 5 ft 8 in $= 5\frac{2}{3}$ ft $= \frac{17}{3}$ ft)



$\frac{x}{12} = \frac{17/3}{8} \Rightarrow x = \frac{17}{3(8)}(12) = \frac{17}{2} = 8.5$ ft

EX 4: If a skateboard ramp is to have a slope of 5/12 and takes the skater from ground level to ten feet high, how long is the board necessary to do that?



now we can solve for x:

$\frac{x}{10} = \frac{13}{5}$

$x = \frac{13(10)}{5} = 13(2)$

$x = 26$ ft

use Pythagorean Thm to compute hypotenuse length:

$h^2 = 5^2 + 12^2 = 25 + 144 = 169$

$h = \sqrt{169} = 13$