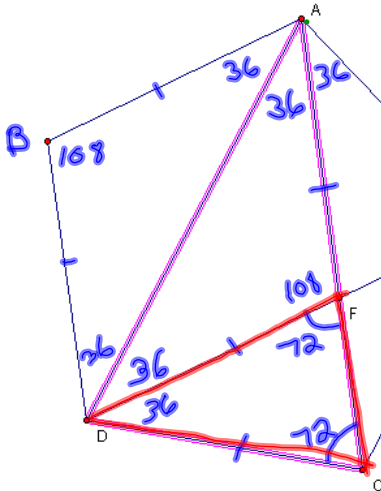


The Golden Ratio



1. Label the measure of each angle. ✓

2. Explain why $CD = DF = AF$.

$\triangle CDF \cong \triangle ADF$ are each isosceles

3. Explain why triangle ACD and triangle DCF are similar.

corresp. angles are congruent (72-72-36)

4. Explain why $AC/DC = DF/FC$.

$\frac{AC}{DC} = \frac{DF}{FC}$ (by similar \triangle 's)

5. Explain why $AC/AF = AF/FC$.

$$\frac{AC}{AF} = \frac{AF}{FC}$$

Definition: Two lengths x and y (with $x > y$) are related by the golden ratio if "whole:larger = larger:smaller", or simply $(x+y)/x = x/y$.

Observe: If $x = AC$ and $y = FC$, then x and y are related by the golden ratio, as the proportion in #5 demonstrates.

Sep 16-1:28 PM

Suppose $CD = 1$.

6. If $CD = 1$, use the fact that $AC/AF = AF/FC = \text{phi}$ to show that:

a) $AC = \text{phi}$ and $\frac{AC}{AF} = \frac{AF}{FC} = \text{phi}$

b) $FC = 1/\text{phi}$

Since $CD = DF = AF = 1$, $\frac{AC}{1} = \frac{1}{FC} = \text{phi}$

7. Use the fact that $AC = AF + FC$ to calculate the value of the golden ratio.

$$\text{phi}(\text{phi}) = (1 + \frac{1}{\text{phi}})\text{phi}$$

$$\text{phi}^2 = \text{phi} + 1$$

$$\text{phi}^2 - \text{phi} - 1 = 0$$

$$\text{phi} = \frac{+1 \pm \sqrt{1 - 4(1)(-1)}}{2(1)} = \frac{1 \pm \sqrt{5}}{2} > 0$$

$$\text{phi} = \frac{1 + \sqrt{5}}{2} \approx 1.618$$

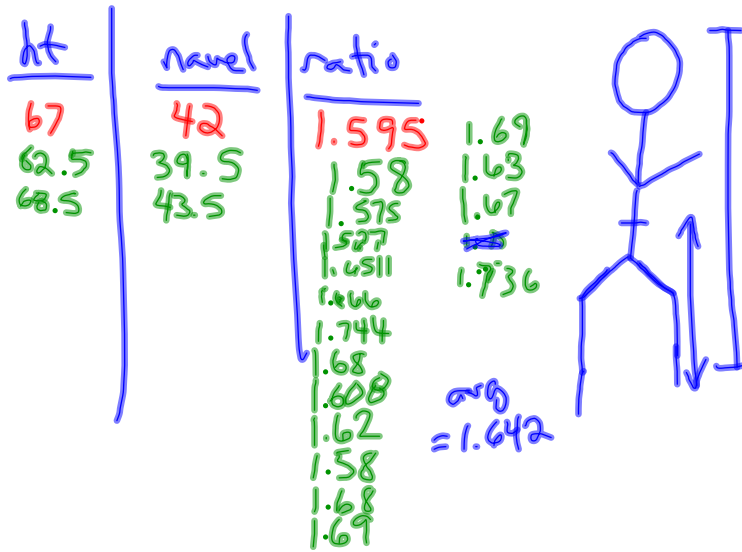
8. Given that $\text{phi}^2 = \text{phi} + 1$, find a simple expression for $1/\text{phi}$.

(see above...) $\frac{1}{\text{phi}} = \text{phi} - 1$

Sep 16-1:56 PM

Measure the height of your bellybutton and measure your total height.

What is the ratio of (height) / (bellybutton height)?



Sep 16-2:04 PM