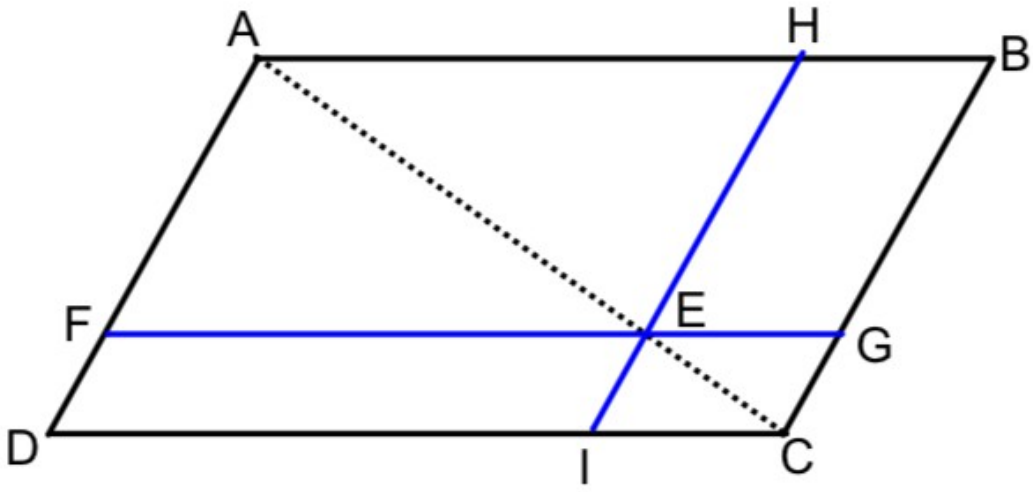
Math5700 Notes
Chapter 10 Notes—Area

First, let's discuss the pervasive problems in our society with misunderstanding and misusing dimensionality!

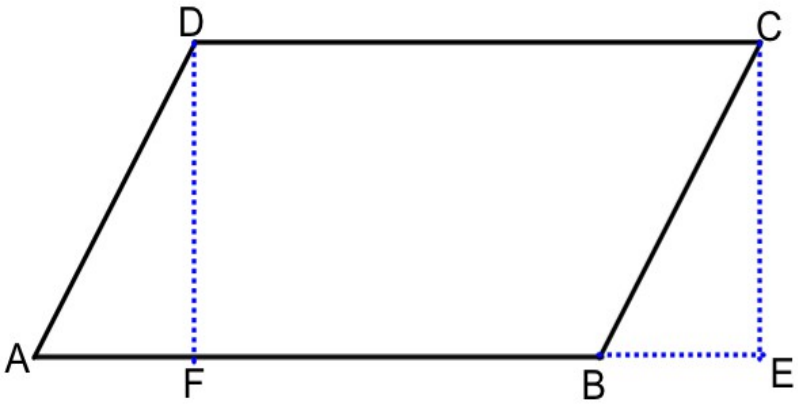
Ex 1:
(a) A rhombus has diagonals of lengths a and b. Show three different ways to find its area.

(b) Is this also true for a kite?

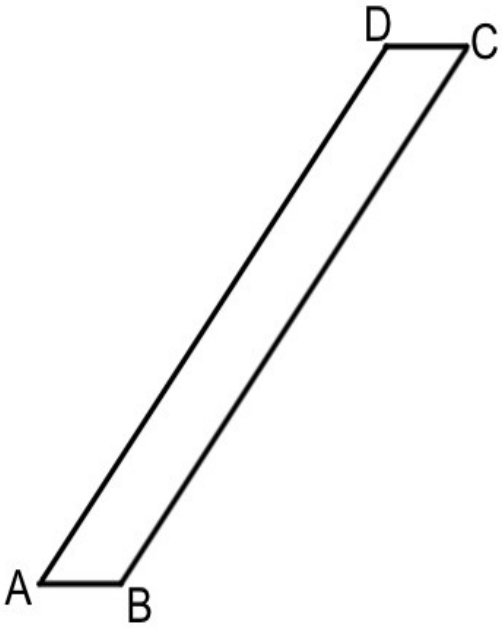
Ex 2: Given the following parallelogram, prove that the area of quadrilateral FDIE is the same as the area for quadrilateral EGBH.



Ex 3: (a) An area formula for parallelograms, A = bh, is often found by finding a rectangle of equal area. Explain.



(b) What if we have this parallelogram. Can we still make the argument work?



(c) How can we extend this argument to explain the formula for the area of a triangle?

Ex 4: Claim: If a right circular cylinder's base is a great circle of a sphere, and the cylinder's height is the diameter of the sphere, then the cylinder's surface area is 3/2 of the surface area of the sphere.

Ex 5: Show that the surface area of a spherical cap of depth h on a sphere of radius r is given by $S = 2\pi r h$

Ex 6: Let $A_n(r)$ be the area of an n-sided regular polygon inscribed in a circle of radius r, and $P_n(r)$ be its perimeter.

(a) Find an expression for $A_n(r)$ and $P_n(r)$.

(b) Investigate the behavior of $A'_n(r)$ as n increases.