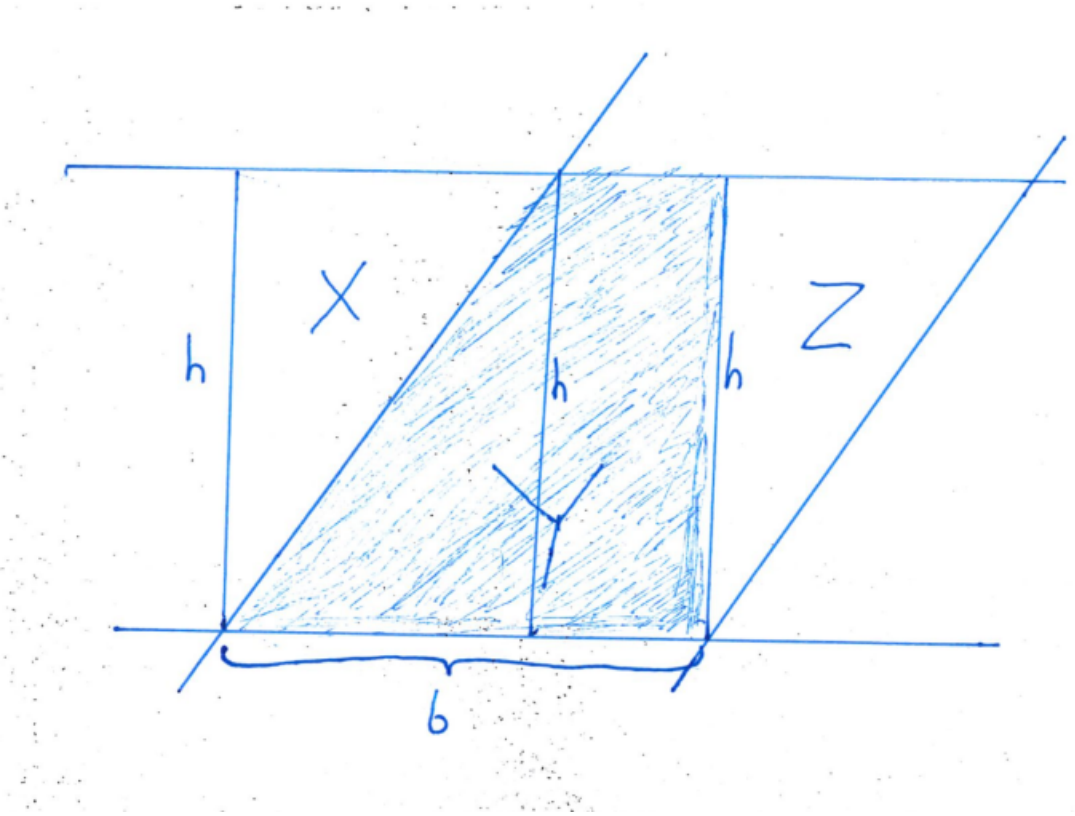
February 1, 2025

The Parallelogram Area Theorem: The area of a parallelogram is base*height.

Proof. The area of the parallelogram is Y + Z, so we have to show that Y + Z equals base*height.



We know that X + Y is a rectangle, because it has 4 right angles. Since it is a rectangle,

X + Y = base*height.

But triangles X and Z are the same size, because they both have the same height, they both have a 90-degree angle, and their diagonals are the same length because the diagonals are two sides of a parallelogram. Thus,

X = Z

But if X = Z, then

X + Y = Z + Y,

so the parallelogram and the rectangle have the same area. Since the rectangle's area is base*height, so must be the parallelogram's.

Q.E.D.