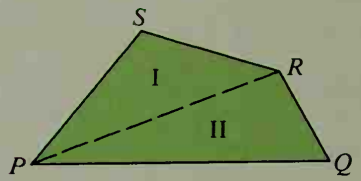
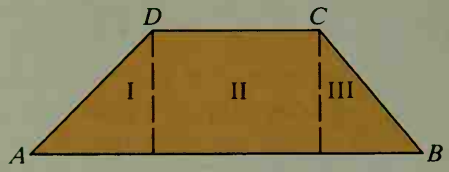
Postulate 19 *Area Addition Postulate*

The area of a region is the sum of the areas of its non-overlapping parts.

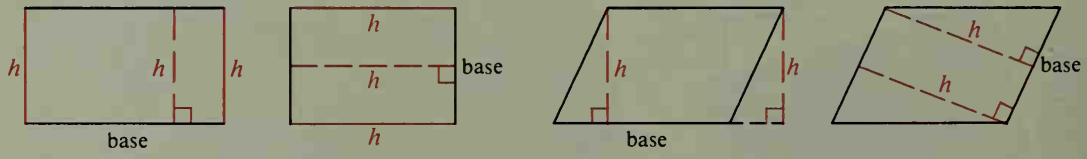


Area of $PQRS$ = Area I + Area II



Area of $ABCD$ = Area I + Area II + Area III

Any side of a rectangle or other parallelogram can be considered to be a **base.** The length of a base will be denoted by b. In this text the term *base* will be used to refer either to the line segment or to its length. An **altitude** to a base is any segment perpendicular to the line containing the base from any point on the opposite side. The length of an altitude is called the **height** (h). All the altitudes to a particular base have the same length.

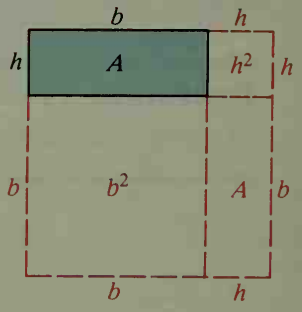


Theorem 11-1

The area of a rectangle equals the product of its base and height. ($A = bh$)

Given: A rectangle with base b and height h

Prove: $A = bh$



Proof:

Building onto the given shaded rectangle, we can draw a large square consisting of these non-overlapping parts:

the given rectangle with area A
a congruent rectangle with area A
a square with area b^2
a square with area h^2

Area of big square $= 2A + b^2 + h^2$	(Area Addition Postulate)
Area of big square $= (b + h)^2 = b^2 + 2bh + h^2$	($A = s^2$)
$2A + b^2 + h^2 = b^2 + 2bh + h^2$	(Substitution Prop.)
$2A = 2bh$	(Subtraction Prop. of =)
$A = bh$	(Division Prop. of =)