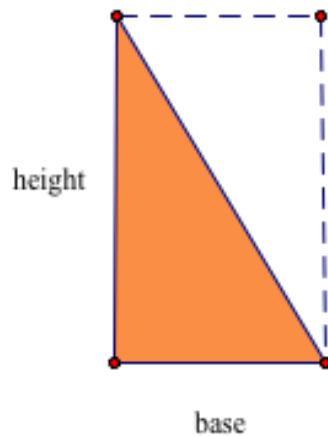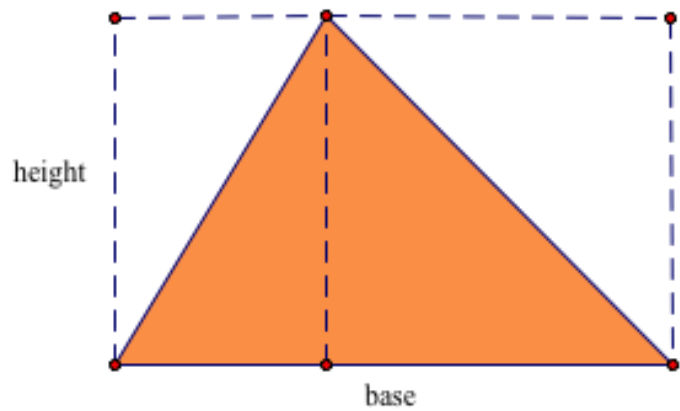Deriving the formula for the area of a triangle

We know that the area of a rectangle is
base times height.
Why is the area of a triangle equal to
one half times the base times the height?
First consider a right triangle.
Do you see it?

Now let's consider an acute triangle.
We split it into two right triangles.

height

base

height

base

Now consider an obtuse triangle ABC (shaded below). We
first draw a height. Now we can see two right
triangles: ABD and BCD. We know how to find the area of
a right triangle.
Area of right triangle ABD = one half * base AD*height
Area of right triangle BCD = one half * base CD*height
So (DRUMROLL)
Area of triangle ABC (shaded below) is the difference of the
two areas, the bigger right triangle minus the smaller right
triangle, namely, 1/2*x*height - 1/2*y*height =
1/2 (x-y)*height = 1/2*z*height =
1/2 * base AC * height!

B

height

A

C

D

x =base of triangle ABD

y = base of triangle BCD

z = base of triangle ABC= x - y