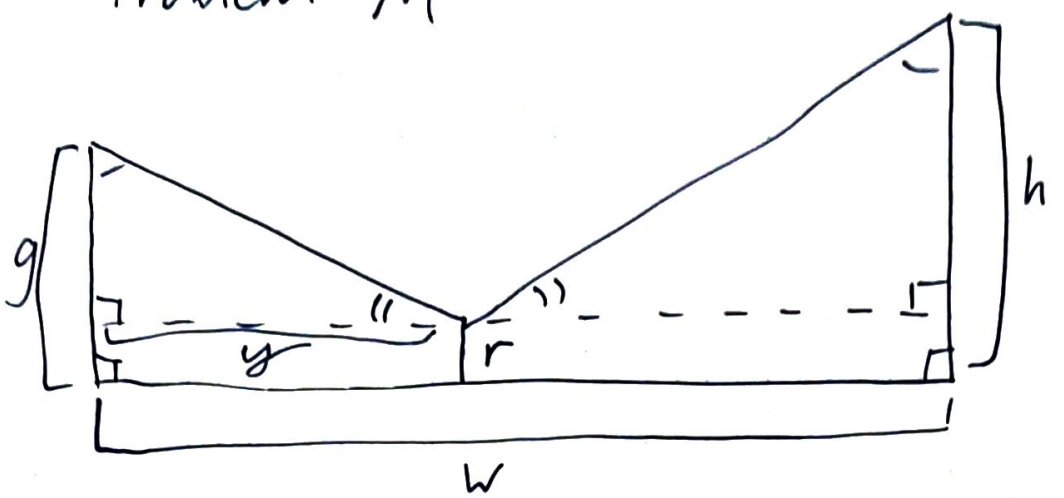
Problem M



Similar triangles

Find ratio of $\frac{g-r}{h-r} = \frac{y}{w-y}$

$g-r = G$ (numbers not variables)
$h-r = H$

$$\frac{G}{H} = \frac{y}{w-y}$$

$$G(w-y) = Hy$$

$$Gw - Gy = Hy$$

$$Gw = Hy + Gy$$

$$Gw = (H+G)y$$

$$\frac{Gw}{H+G} = y$$

$$\text{length} = \sqrt{G^2 + y^2} + \sqrt{H^2 + (w-y)^2}$$