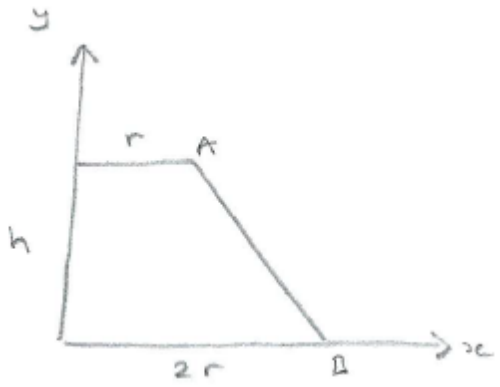
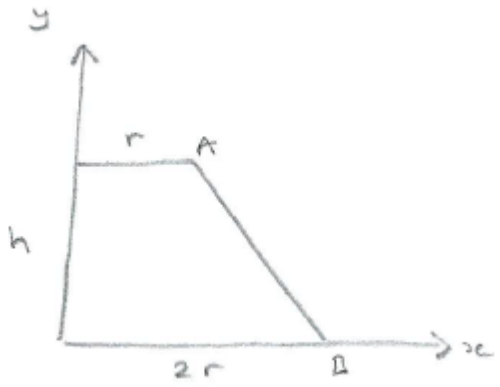
Geometry – Q2 [Practice/E](15/5/21)

Find as many ways as possible of deriving the equation of the sloping side of the trapezium shown below.



Find as many ways as possible of deriving the equation of the sloping side of the trapezium shown below.



Solution

Method 1

Coordinates of A and B are (r, h) & $(2r, 0)$, so equation is:

$\frac{y-0}{x-2r} = \frac{h-0}{r-2r}$, giving $y = \frac{h(x-2r)}{-r} = 2h - \frac{hx}{r}$

Method 2

y-intercept will be $(0,2h)$ and gradient is $-\frac{h}{r}$, so equation is:

$y = 2h - \frac{hx}{r}$

Method 3a

By linear interpolation, $x = 2r - r\left(\frac{y}{h}\right)$, giving $\frac{ry}{h} = 2r - x$

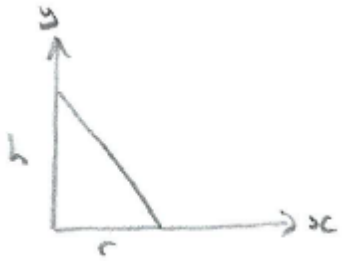
and $y = 2h - \frac{hx}{r}$

Method 3b

By linear interpolation, $y = h - h\left(\frac{x-r}{r}\right) = 2h - \frac{hx}{r}$

Method 4

The equation of the line shown below is $y = h - \frac{hx}{r}$



The required line is a translation of this line by r units to the right, and so has equation:

$y = h - \frac{h(x-r)}{r} = 2h - \frac{hx}{r}$