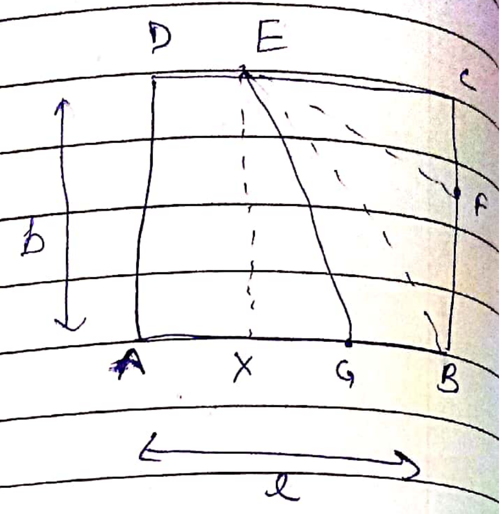
Q: 1068804 Let ABCD be a rectangle (a type of parallelogram)

$AG = 2GB$

$CE = 2DE$

$BF = 2FC$



a) $ar(ADEG) = ar(GBCE)$

$\Rightarrow$ $CD = AB = l$ cm

$AD = BC = b$ cm

In ▱ ADEG (trapezium)

$\because AD = b$

$AG = \frac{2}{3}l$ & $DE = \frac{1}{3}l$

$\therefore ar$ ▱ $ADEG \Rightarrow \frac{1}{2} \times$ [(Sum of $\parallel$ sides) $\times$ Distance b/w]

$= \frac{1}{2} \times \left(\frac{2}{3}l + \frac{1}{3}l\right) \times b$

$= \frac{1}{2} \times l \times b$

In ▱ GBCE

$BC = b$

$GB = \frac{1}{3}l$; $EC = \frac{2}{3}l$

ar ▱ $GBCE = \frac{1}{2} \times \left(\frac{1}{3}l + \frac{2}{3}l\right) \times b$

$= \frac{1}{2} \times l \times b$

ar ▱ $ADEG = ar$ ▱ $GBCE$, H.P.

b) $ar\ \Delta EGB = \frac{1}{6} ar(ABCD)$

$ar(ABCD) = l \times b$ ($\because \Rightarrow AB \times BC$)

$ar(EGB) = ar(ExB) - ar(EXG)$

$= \frac{1}{2} \times (EX) \times (XB) - \frac{1}{2} \times (EX) \times (XG)$

$= \frac{1}{2} \times b \times \frac{2}{3} l - \frac{1}{2} \times b \times \frac{1}{3} l$

$= \frac{1}{2} \times b \times l \left(\frac{2}{3} - \frac{1}{3}\right)$

$ar(DEGB) = \frac{1}{2} \times \frac{1}{3} \times b \times l \quad = \frac{1}{6} \times ar(ABCD)$

Hence Prove.

c) $ar(\Delta EFC) = \frac{1}{2} ar(DEBF) = \frac{1}{2}$ ~~ar~~

$\frac{1}{2} \times (EC) \times (CF) = \frac{1}{2}\left[ar(DEEB) - ar(DEFC)\right]$

$\left(1 + \frac{1}{2}\right)\left(\frac{1}{2} \times (EC) \times (FC)\right) \quad = \frac{1}{2}\left(ar\left(\frac{1}{2}(EC) \times BC\right)\right)$

$\frac{3}{2} \times \frac{1}{2} \times \frac{2}{3} l \times \frac{1}{3} b \quad = \frac{1}{2} \times \frac{1}{2} \times \frac{2}{3} l \times b$

$\frac{2 \, l b}{2 \times 2 \times 3} \quad = \frac{2 \, l b}{2 \times 2 \times 3}$

$1 = 1$, H.P.

d) $ar(DEGB) = \frac{1}{2} ar(\Delta EFC)$

$\frac{1}{6} ar(ABCD) = \frac{1}{2}\left(\frac{1}{2} \times \frac{2}{9} ar(ABCD)\right)$

$\frac{1}{6} = \frac{1}{2 \times 3} \times \frac{1}{3}$

$\therefore$ Not True,

or $\frac{2}{3} ar(DEGB) = ar(DEFC)$

or

$\frac{1}{3} ar(DEGB) = \frac{1}{2} ar(DEFC)$

e) ar $DEFG = ar(DEGB) + ar(DBFE) = \left(\frac{1}{6} + \frac{2}{9}\right) ar(ABCD)$

$= \left(\frac{7}{18}\right) ar(ABCD)$