

MT 453 Elements

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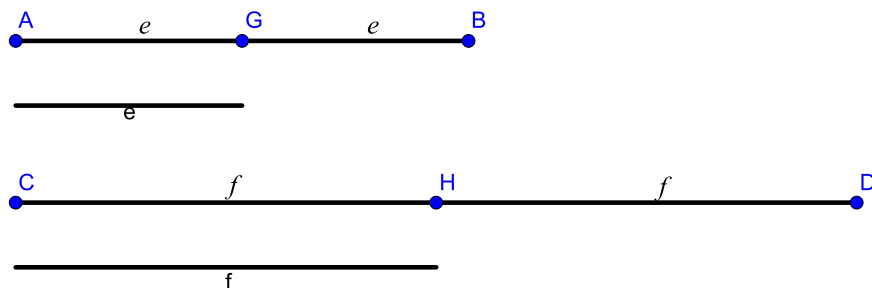
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Proposition V.1

Given X_1, X_2, \dots, X_n such that $X_1 = mY_1, X_2 = mY_2, \dots, X_n = mY_n$
Then $X_1 + X_2 + \dots + X_n = m(Y_1 + Y_2 + \dots + Y_n)$.



Let $AB = mE$ and $CD = mF$.

Claim: $AB + CD = m(E + F)$

$AG = BG = E$ and $CH = HD = F$

So $AB = 2E$.

And $CD = 2F$.

So $AG = E$

And $CH = F$.

Thus $AG + CH = E + F$.

Similarly, $GB + HD = E + F$.

So $AG + GB + CG + HD = AB + CD = E + E + F + F$.

Thus $AB + CD = 2E + 2F = 2(E + F)$.

So if $AB = 2E$ and $CD = 2F$, then $AB + CD = 2(E + F)$.

It follows that if $AB = mE$ and $CD = mF$, then $AB + CD = m(E + F)$.

Q.E.D.

