1. $m(a+bX) = \frac{1}{N}\sum_{i=1}^{N} a+bX_i = \frac{1}{N}\left(\sum_{i=1}^{N} a + b\sum_{i=1}^{N} X_i\right) = \frac{1}{N}\left(Na + b\sum_{i=1}^{N} X_i\right)$

$= a + b\left(\frac{1}{N}\sum_{i=1}^{N} X_i\right) = a + b\,m(X)$

2. $Cov(X, a+bY) = \frac{1}{N}\sum_{i=1}^{N} (X_i - m(X))\left((a+bY_i) - m(a+bY)\right)$

$(a+bY_i) - m(a+bY) = b(Y_i - m(Y))$

$= \frac{1}{N}\sum_{i=1}^{N} (X_i - m(X)) \cdot b(Y_i - m(Y)) = b\left(\frac{1}{N}\sum_{i=1}^{N} (X_i - m(X))(Y_i - m(Y))\right)$

$= b\,cov(X, Y)$

3. $cov(a+bX, a+bX) = \frac{1}{N}\sum_{i=1}^{N} (Z_i$