1) $m(a+bX) = \frac{1}{N}\sum_{i=1}^{N} a + \frac{1}{N}\sum_{i=1}^{N} bx_i = a + b\cdot\frac{1}{N}\sum_{i=1}^{N} x_i =$

$a + b\cdot m(X)$

2) $cov(X, a+bY) = \frac{1}{N}\sum_{i=1}^{N}(x_i - m(x))(b(y_i - m(Y))) =$

$b\cdot\frac{1}{N}\sum_{i=1}^{N}(x_i - m(x))(y_i - m(y)) = b\cdot cov(X,Y)$

3) $cov(X,X) = \frac{1}{N}\sum_{i=1}^{N}(x_i - m(x))^2 = s^2$

$cov(a+bX, a+bX) = b^2\cdot\frac{1}{N}\sum_{i=1}^{N}(x_i - m(x))^2 = b^2 s^2$

$cov(a+bX, a+bX) = b^2\, cov(X,X)$

4) For non-decreasing transformations, the median transformation property holds. Yes this applies to any quantile. The IQR and range don't always preserve linear transformations.

5) No, this is not always true. $m(g(X)) \neq g(m(X))$