

**Question # 35****Answer: C**

The Bühlmann credibility estimate is  $Zx + (1 - Z)\mu$  where  $x$  is the first observation. The Bühlmann estimate is the least squares approximation to the Bayesian estimate. Therefore,  $Z$  and  $\mu$  must be selected to minimize

$$\frac{1}{3}[Z + (1 - Z)\mu - 1.5]^2 + \frac{1}{3}[2Z + (1 - Z)\mu - 1.5]^2 + \frac{1}{3}[3Z + (1 - Z)\mu - 3]^2.$$

Setting partial derivatives equal to zero will give the values. However, it should be clear that  $\mu$  is the average of the Bayesian estimates, that is,

$$\mu = \frac{1}{3}(1.5 + 1.5 + 3) = 2.$$

The derivative with respect to  $Z$  is (deleting the coefficients of  $1/3$ ):

$$2(-Z + .5)(-1) + 2(.5)(0) + 2(Z - 1)(1) = 0$$

$$Z = .75.$$

The answer is

$$.75(1) + .25(2) = 1.25.$$