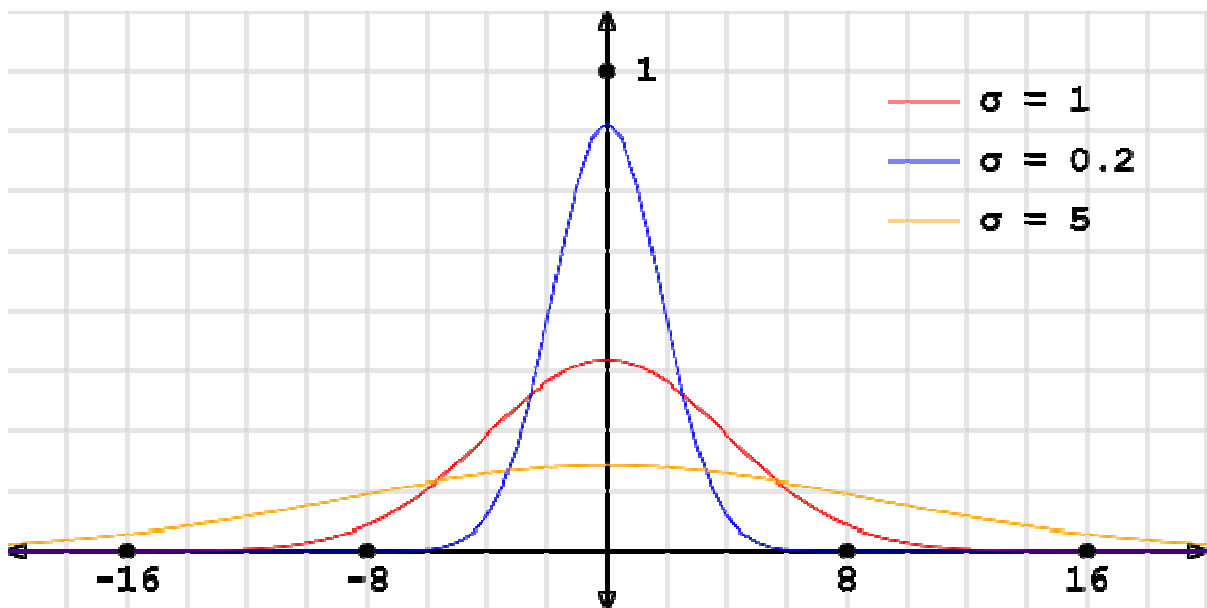


Sampling Distributions

6.1 Minimum Variance Unbiased Point Estimators

1. Assume that \bar{t} is being used as an estimator of θ and that $E(\bar{t}) = \theta - 2$, is \bar{t} biased as an estimator of θ ? If so, what is the bias?
2. If b is used as an estimator of β and $E(b) = \beta$, is b biased or unbiased as an estimator of β ?
3. Consider the drawings below which represent the sampling distributions of three unbiased estimators of some parameter. Which estimator (blue, red, or yellow) of the parameter would be the best choice among the options provided here?



Answers:

1. The estimator is biased since the expected value is not equal to the parameter. The expected value is instead equal to the parameter minus 2. This means on average the estimator will underestimate the parameter by 2, so the bias is -2.

2. The estimator b is unbiased since its expected value equals the parameter it is trying to estimate.
3. Since the problem states that all three of the estimators are unbiased, we will choose the estimator with the smallest variance. That is the estimator represented by the blue curve.