

name: solution

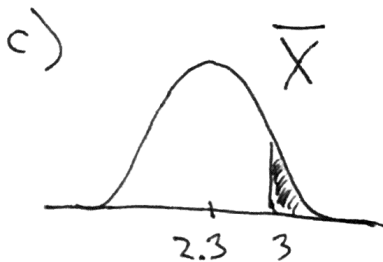
1 (4 points each). Indiana University posts the grade distributions for its courses online. Students in one section of MATH118 in the fall semester received 18% A's, 31% B's, 26% C's, 13% D's, and 12% F's.

- (a) Using the common scale (i.e. A=4, B=3, C=2, D=1, F=0), take X to be the grade of a randomly chosen MATH118 student. Noting that X is a discrete random variable, what is the mean and standard deviation of X ?
- (b) Taking an SRS of 25 students in MATH118, denote by \bar{x} the average of the grades (i.e. it's the sample distribution). What is the mean and standard deviation of \bar{x} ?
- (c) What is the probability that a randomly chosen student gets a B or better, i.e. $P(X \geq 3)$?

$$a) \quad \text{mean} = 4(.18) + 3(.31) + 2(.26) + 1(.13) + 0(.12) \\ = 2.3$$

$$\text{st. dev} = \left[(4-2.3)^2(.18) + (3-2.3)^2(.31) + (2-2.3)^2(.26) + (1-2.3)^2(.13) + (0-2.3)^2(.12) \right]^{1/2} \\ = 1.24$$

$$b) \quad \text{mean} = 2.3 \quad \text{stand. dev} = \frac{1.24}{\sqrt{25}} = 0.25$$



$$Z = \frac{3 - 2.3}{0.25} = 2.8$$

$$\left. \begin{aligned} P(Z > 2.8) \\ &= 1 - P(Z < 2.8) \\ &= 1 - .9974 \\ &= .0026 \end{aligned} \right\}$$