# Unit 06 Practice Problems

**6.1**
Refer to Practice Problem 5.16.
$X$ = weight of a randomly selected 12-year-old American boy
$X \sim N(\mu = 40 \text{ kg}, \sigma = 2.1 \text{ kg})$
Instead of randomly selecting one boy, suppose more than one boy is randomly selected and the sample mean weight among them is calculated.

a
If $n = 4$, find $P(\overline{X} > 41)$. Draw a picture.

b
If $n = 8$, find $P(\overline{X} > 41)$. Draw a picture.

**6.2**
Refer to Practice Problem 5.17.
Engineers have designed a process to fill plastic milk jugs.
$X$ = amount of milk dispensed into a plastic jug (gallons)
$X \sim N(\mu = 1.02, \sigma = 0.01)$
Instead of randomly selecting one milk jug, suppose more than one milk jug is randomly selected and the sample mean among them is calculated.

a
What is the probability the sample mean amount of milk among $n = 7$ randomly selected milk jugs will be less than 1.01 gallons? Draw a picture.

b
What is the probability the sample mean amount of milk among $n = 3$ randomly selected milk jugs will be between 1.015 and 1.022 gallons? Draw a picture.

**6.3**
Refer to Practice Problem 5.7.
$X$ = circumference of a randomly selected baseball (inches)
$X \sim UNIF(9.0, 9.1)$
Instead of randomly selecting one baseball, suppose more than one baseball is randomly selected and the sample mean circumference among them is calculated.

a
If $n = 30$, describe the approximate distribution of the sample mean.

b
If $n = 30$, approximate $(9.04 < \overline{X} < 9.06)$. Draw a picture.

c
If you were to continue approximating $P(9.04 < \overline{X} < 9.06)$ with larger and larger sample sizes, do you think the probability would increase or decrease?

**6.4**
Refer to Practice Problem 5.19. Also refer to the Famous Continuous Random Variables page of the Super Handout for the population mean, variance, and standard deviation of the random variable named Gamma.

$GAMMA(\alpha = 4, \beta = 3)$

a
If $n = 34$, describe the approximate distribution of the sample mean.

b
If $n = 34$, approximate $(11.8 < \overline{X} < 13.2)$. Draw a picture.