4	A	4. Z-scores

a) Calculate μ and σ for the following set of scores and then convert each score to a z score:
64, 45, 58, 51, 53, 60, 52, 49.

Mean: μ	Standard Deviation: σ
μ =	σ =

z-scores:

b) Calculate the mean and standard deviation of these z scores.

Mean: μ	Standard Deviation: σ
μ =	σ =

Did you obtain the values you **expected**?
Explain.

☐ yes   ☐ no

4	A	*9a.	Z-scores & the z-table

a) Use Table A.1 to find the **area** of the normal distribution **between the mean and z ,**
when **z equals 0.18**

4	A	10a.	Z-scores & the z-table

a) Use Table A.1 to find the **area** of the normal distribution **beyond z ,**
when z equals when **z equals 0.09**

4	A	11.	Z-scores & the z-table

Assuming that IQ is normally distributed with a **mean of 100** and a **standard deviation of 15**

<u>**describe completely**</u> the sampling distribution of the mean for a sample size (n) equal to 20.

4	A	*12.	Standard error for the mean

If the **population** standard deviation (σ) for some variable equals 17.5, what is the value of the **standard error of the mean** when

a. N = 5

$SE_\mu =$

b. N = 25

$SE_\mu =$

c. N = 125

$SE_\mu =$

d. N = 625

$SE_\mu =$

If the sample size is cut in half, what happens to the standard error of the mean for a particular variable?

4	A	13. Standard error for the mean

a) In one college, freshman English classes always contain exactly **20 students**. An English teacher wonders how much these classes are **likely to vary** in terms of their verbal scores on the SAT. What would you expect for the standard deviation (i.e., **standard error) of class means** on the verbal SAT?

$SE_\mu =$

b) Suppose that a crew for the space shuttle consists of **seven people**, and we are interested in the average weights of all possible shuttle crews. If the **standard deviation for weight is 30 pounds**, what is the **standard deviation for the mean weights** of shuttle crews (i.e., the standard error of the mean)?

$SE_\mu =$

4	A	*14. Standard error for the mean

If for a particular sampling distribution of the mean we know that the **standard error is 4.6**, and we also know that $\sigma = 32.2$, what is the sample size (n)?
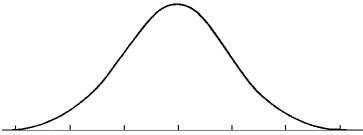
$n =$

| 4 | B | *3. Area under a normal curve |

Assume that the resting heart rate in humans is normally distributed with μ = 72 bpm (i.e., beats per minute) and σ = 8 bpm.
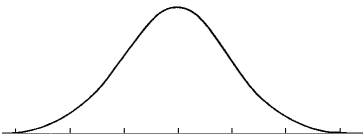
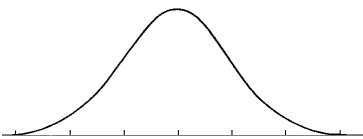a) What proportion of the population has resting heart rates **above** 82 bpm?
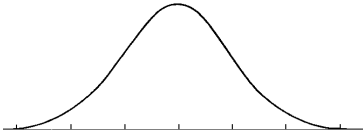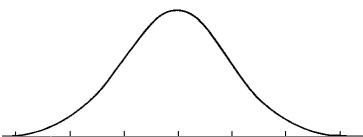
Above 70 bpm?

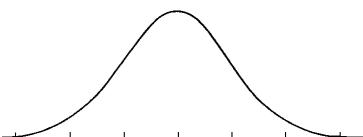b) What proportion of the population has resting heart rates **below** 75 bpm?
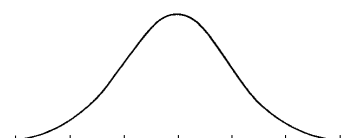
Below 50 bpm?

c) What proportion of the population has resting heart rates **between** 80 and 85 bpm?
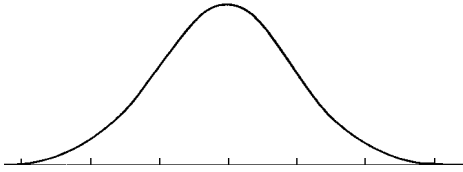
Between 60 and 70 bpm?

Between 55 and 75 bpm?

4	B	4. Area under a normal curve

Assume that the resting heart rate in humans is normally distributed with $\mu = 72$ bpm (i.e., beats per minute) and $\sigma = 8$ bpm.
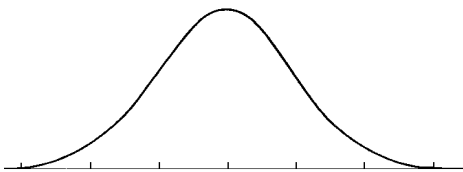
a) **Above** what heart rate do you find the upper 25% of the people? (That is, what heart rate is at the 75th percentile, or third quartile?)

b) **Below** what heart rate do you find the lowest 15% of the people? (That is, what heart rate is at the 15th percentile?)
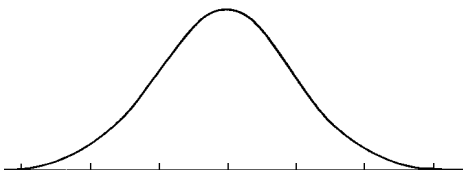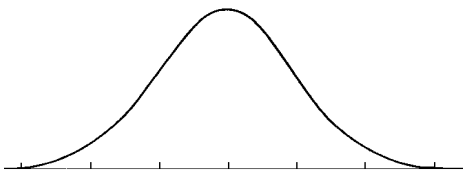
c) **Between** which two heart rates do you find the middle 75% of the people?

4	B	*5. Area under a normal curve

A new preparation course for the math SAT is open to those who have already taken the test once and scored in the **middle 90%** of the population.

In what **range** must a testtaker's previous score have fallen for the test-taker to be eligible for the new course?
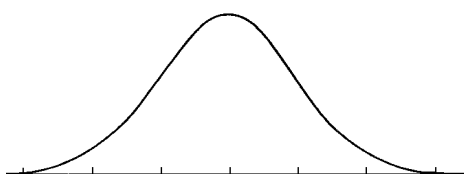
4	B	6. Area under a normal curve

A teacher thinks her class has an unusually high IQ, because her 36 students have an average IQ (X) of 108. If the population mean is 100 and σ = 15.

a) What is the **z score** for this class?

b) What **percentage** of classes (n = 36, randomly selected) would be even higher on IQ?

4	B	*7. Area under a normal curve

An aerobics instructor thinks that his class has an unusually low resting heart rate. If μ = 72 bpm and σ = 8 bpm, and his class of 14 pupils has a mean heart rate (X) of 66,

a) What is the **z score** for the aerobics class?

b) What is the **probability** of randomly selecting a group of 14 people with a mean resting heart rate **lower** than the mean for the aerobics class?