

## Quiz 2

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1 / 1  
points

1.

What is the variance of the distribution of the average an IID draw of  $n$  observations from a population with mean  $\mu$  and variance  $\sigma^2$ .

☐  $\sigma/n$

☐  $2\sigma/\sqrt{n}$

☒  $\frac{\sigma^2}{n}$



**Correct**

$\text{Var}(\bar{X}) = \sigma^2/n$

☐  $\sigma^2$



1 / 1  
points

2.

Suppose that diastolic blood pressures (DBPs) for men aged 35-44 are normally distributed with a mean of 80 (mm Hg) and a standard deviation of 10. About what is the probability that a random 35-44 year old has a DBP less than 70?

☐ 22%

☒ 16%



**Correct**

1 pnorm(70, mean = 80, sd = 10)

```
1 ## [1] 0.1587
```

☐ 32%

☐ 8%



1 / 1  
points

3.

Brain volume for adult women is normally distributed with a mean of about 1,100 cc for women with a standard deviation of 75 cc. What brain volume represents the 95th percentile?

☐ approximately 1247

☐ approximately 1175

☐ approximately 977

☒ approximately 1223

**Correct**

```
1 qnorm(0.95, mean = 1100, sd = 75)
```

```
1 ## [1] 1223
```



1 / 1  
points

4.

Refer to the previous question. Brain volume for adult women is about 1,100 cc for women with a standard deviation of 75 cc. Consider the sample mean of 100 random adult women from this population. What is the 95th percentile of the distribution of that sample mean?

☐ approximately 1088 cc

☐ approximately 1115 cc

☐ approximately 1110 cc

☒ approximately 1112 cc

**Correct**

```
1 qnorm(0.95, mean = 1100, sd = 75/sqrt(100))
```

```
1 [1] 1112
```



1 / 1  
points

5.

You flip a fair coin 5 times, about what's the probability of getting 4 or 5 heads?

☐ 6%

☒ 19%

**Correct**

$$\binom{5}{4}2^{-5} + \binom{5}{5}2^{-5} \approx 19\%$$

```
1 pbinom(3, size = 5, prob = 0.5, lower.tail = FALSE)
```

```
1 ## [1] 0.1875
```

☐ 12%

☐ 3%



1 / 1  
points

6.

The respiratory disturbance index (RDI), a measure of sleep disturbance, for a specific population has a mean of 15 (sleep events per hour) and a standard deviation of 10. They are not normally distributed. Give your best estimate of the probability that a sample mean RDI of 100 people is between 14 and 16 events per hour?

☐ 95%

☒ 68%

**Correct**

The standard error of the mean is  $10/\sqrt{100} = 1$ . Thus between 14 and 16 is with one standard deviation of the mean of the distribution of the sample mean. Thus it should be about 68%.

```
1 pnorm(16, mean = 15, sd = 1) - pnorm(14, mean = 15, sd = 1)
```

```
1 ## [1] 0.6827
```

☐ 47.5%

☐ 34%



1 / 1  
points

7.

Consider a standard uniform density. The mean for this density is .5 and the variance is  $1/12$ . You sample 1,000 observations from this distribution and take the sample mean, what value would you expect it to be near?

☐ 0.75

☐ 0.25

☐ 0.10

☒ 0.5

**Correct**

Via the LLN it should be near .5.



1 / 1  
points

8.

The number of people showing up at a bus stop is assumed to be

Poisson with a mean of 5 people per hour. You watch the bus

stop for 3 hours. About what's the probability of viewing 10 or fewer people?

☐ 0.08

☐ 0.06☐ 0.03☒ 0.12**Correct**

```
1 ppois(10, lambda = 15)
```

```
1 ## [1] 0.1185
```

