PRINTABLE VERSION

Quiz 6

You scored 100 out of 100

Question 1

Your answer is CORRECT.

Suppose that x is normally distributed with a mean of 50 and a standard deviation of 15. What is $P(34.55 \le x \le 72.95)$?

a) 0.348

b) 0.785

c) 0.442

d) 0.353

e) 0.437

f) None of the above

```
> pnorm(72.95,50,15)-pnorm(34.55,50,15)
[1] 0.7854866
```

Question 2

Your answer is CORRECT.

Find a value of c so that $P(Z \ge c) = 0.48$.

a) 0.95

b) -0.05

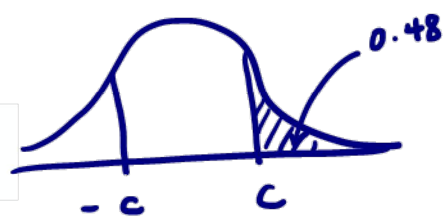
c) 0.15

d) 0.05

e) 0.10

f) None of the above

```
> qnorm(0.48)
[1] -0.05015358
```



Question 3

Your answer is CORRECT.

Suppose that x is normally distributed with a mean of 50 and a standard deviation of 15. What is $P(34.55 \leq x \leq 72.95)$?

```
pnorm(72.95,50,15)-pnorm(34.55,50,15)
[1] 0.7854866
```

a) 0.348

b) 0.785

c) 0.442

d) 0.353

e) 0.437

f) None of the above

Question 4

Your answer is CORRECT.

The length of time needed to complete a certain test is normally distributed with mean 95 minutes and standard deviation 10 minutes. Find the probability that it will take between 93 and 98 minutes to complete the test.

```
pnorm(98,95,10)-pnorm(93,95,10)
[1] 0.1971711
```

a) 0.1972

b) 0.8028

c) 0.5000

d) 0.0986

e) 0.4207

f) None of the above

Question 5

Your answer is CORRECT.

The length of time needed to complete a certain test is normally distributed with mean 24 minutes and standard deviation 11 minutes. Find the probability that it will take more than 22 minutes to complete the test.

$P(x > 22) = 1 - P(x \leq 22)$

a) 0.2861

b) 0.7139

```
1-pnorm(22,24,11)
[1] 0.5721373
```

c) 0.5721

d) 0.4279

e) 0.5000

f) None of the above

Question 6

Your answer is CORRECT.

Which of the following statements is not true?

a) The sampling distribution of sample mean is approximately normal, mound-shaped, and symmetric for n > 30 or n = 30.

b) The expected value of the sample mean, $\overline{X}$, is always the same as the expected value of X, the distribution of the population from which the sample was taken.

c) The sampling distribution of the sample mean, $\overline{X}$, is always reasonably like the distribution of X, the distribution from which the sample is taken.

d) The larger the sample size, the better will be the normal approximation to the sampling distribution of sample mean.

e) The standard deviation of the sampling distribution $\overline{X}$ of sample mean = $\sigma/\sqrt{n}$ where σ is the standard deviation of X.

f) None of the above

Question 7

Your answer is CORRECT.

Suppose a random sample of 70 measurements is selected from a population with a mean of 35 and a variance of 300. Select the pair that is the mean and standard error of $\bar{x}$.

$n = 70$ $\mu = 35$ $Var[x] = 300$

$u_{\bar{x}} = 35$ $s_x = \sqrt{300}$

$\sigma = 10\sqrt{3}$

$\sigma_{\bar{x}} = \dfrac{10\sqrt{3}}{\sqrt{70}} = 2.07$

a) [35, 2.571]

b) [35, 2.371]

c) [35, 2.071]

d) [70, 2.571]

e) [35, 2.271]

f) None of the above

Question 8

Your answer is CORRECT.

A random sample of 1024 12-ounce cans of fruit nectar is drawn from among all cans produced in a run. Prior experience has shown that the distribution of the contents has a mean of 12 ounces and a standard deviation of 0.12 ounce. What is the probability that the mean contents of the 1024 sample cans is less than 11.994 ounces?

$n = 1024 \quad \mu = 12 \quad \sigma = .12$

$P(\bar{x} < 11.994) = \text{pnorm}\left(31.984,\ 12,\ \frac{.12}{\sqrt{1024}}\right)$

a) 0.085

b) 0.095

c) 0.055

```
pnorm(11.994,12,(.12/32))
[1] 0.05479929
```

d) 0.075

e) 0.065

f) None of the above

Question 9

Your answer is CORRECT.

The World Health Organization's (W.H.O.) recommended daily minimum of calories is 2600 per individual. The average number of calories ingested per capita per day for the US is approximately 2460 with a standard deviation of 500. If we take a random sample of 64 individuals from the US, what is the probability that the sample mean exceeds the W.H.O. minimum?

a) 0.013

$\mu = 2460 \quad \sigma = 500 \quad n = 64$

$P(X > 2600) = 1 - P(X \le 2600)$

b) 0.010

$= 1 - \text{pnorm}\left(2600,\ 2460,\ \frac{500}{\sqrt{64}}\right)$

c) 0.017

d) 0.009

e) 0.015

```
1-pnorm(2600,2460,(500/8))
[1] 0.01254546
```

f) None of the above

Question 10

Your answer is CORRECT.

Current research indicates that the distribution of the life expectancies of a certain protozoan is normal with a mean of 42 days and a standard deviation of 10.2 days. Find the probability that a simple random sample of 64 protozoa will have a mean life expectancy of 45 or more days.

$\mu = 42$ days $\sigma = 10.2$ days $n = 64$

$P(x \geq 45) = 1 - P(x < 45)$

$= 1 - \text{pnorm}\left(45, 42, \frac{10.2}{\sqrt{64}}\right)$

```
1-pnorm(45,42,(10.2/8))
[1] 0.00931279
```

a) 0.0186

b) 0.6157

c) 0.2093

d) 0.9907

e) 0.0093

f) None of the above

Question 11

Your answer is CORRECT.

What effect does decreasing the sample size have on a distribution of sample means?

a) It will have less variation

b) It will not make any difference

c) It will have more variation

Question 12

Your answer is CORRECT.

Suppose that a random sample of size 64 is to be selected from a population with mean 42 and standard deviation 9. What is the approximate probability that $\overline{X}$ will be within 0.5 of the population mean?

$n = 64$ $\mu = 42$ $\sigma = 9$

$P(41.5 \leq x \leq 42.5) =$

```
pnorm(42.5,42,(9/8))-pnorm(41.5,42,(9/8))
[1] 0.3432787
```

a) 0.3433

b) 0.0443

c) 0.6567

d) 0.6866

e) 0.5433

f) None of the above

Question 13

Your answer is CORRECT.

Suppose that a random sample of size 64 is to be selected from a population with mean 42 and standard deviation 9. What is the approximate probability that $\overline{X}$ will be more than 0.5 away from the population mean?

a) 0.6567

b) 0.0443

c) 0.3433

d) 0.6866

e) 0.5433

f) None of the above

$= 1 - P(41.5 \leq x \leq 42.5)$

$1 - 0.3433 =$

```
1-0.3433
[1] 0.6567
```

Question 14

Your answer is CORRECT.

Lloyd's Cereal company packages cereal in 1 pound boxes (16 ounces). A sample of 16 boxes is selected at random from the production line every hour, and if the average weight is less than 15 ounces, the machine is adjusted to increase the amount of cereal dispensed. If the mean for 1 hour is 1 pound and the standard deviation is 0.1 pound, what is the probability that the amount dispensed per box will have to be increased?

a) 0.0062

b) 0.9938

c) 0.2062

d) 0.2660

e) 0.0124

f) None of the above

$n = 16$ $\mu = 16$ oz $\sigma = 0.1$ lbs

$\mu = 1$ lb $\sigma_{\bar{x}} = \frac{.1}{\sqrt{16}}$ lbs

$\mu_{\bar{x}} = 1$ lb.

$P(\bar{x} < \frac{15}{16}\text{ lbs}) = \text{pnorm}(\frac{15}{16}, 1, \frac{.1}{\sqrt{16}})$

```
> pnorm((15/16),1,(.1/4))
[1] 0.006209665
```

Question 15

Your answer is CORRECT.

In a large population, 74% of the households have cable tv. A simple random sample of 144 households is to be contacted and the sample proportion computed. What is the mean and standard deviation of the sampling distribution of the sample proportions?

$p = .74$

$n = 144$

a) mean = 106.56, standard deviation = 0.0013

b) mean = 0.74, standard deviation = 0.0013

$\mu_{\hat{p}} = p = .74$

c) mean = 0.74, standard deviation = 1.5466

d) mean = 106.56, standard deviation = 0.0366

$\sigma_{\hat{p}} = \sqrt{\frac{p(1-p)}{n}}$

e) mean = 0.74, standard deviation = 0.0366

$\sigma_{\hat{p}} = \sqrt{\frac{.74(1-.74)}{144}}$

f) None of the above

Question 16

Your answer is CORRECT.

In a large population, 72% of the households have cable tv. A simple random sample of 100 households is to be contacted and the sample proportion computed. What is the probability that the sampling distribution of sample porportions is less than 68%?

a) 0.1865

$p = .$ $n = 100$

b) 0.3187

$P(\hat{p} < .68) = \text{pnorm}(.68, .72, .0449)$

c) 0.0932

d) 0.6813

```
pnorm(.68,.72,.0449)
[1] 0.1864998
```

e) 0.8135

f) None of the above

$\mu_{\hat{p}} = .72$

$\sigma_{\hat{p}} = \sqrt{\frac{(.72)(1-.72)}{100}} = 0.0449$