Score: 31.46/46 Points 68.39 %

1.

Award: **1 out of 1.00 point**

⊗ You did not receive full credit for this question in a previous attempt

A property of continuous distributions is that

○ as with discrete random variables, the probability distribution can be approximated by a smooth curve.

○ probabilities for continuous variables can be approximated using discrete random variables.

○ unlike discrete random variables, probabilities can be found using tables.

✓ ● unlike discrete random variables, the probability that a continuous random variable equals a specific value is zero [$P(X = x) = 0$].

References

Multiple Choice	Learning Objective: 06-01 Define a continuous probability distribution and explain how it is used.

2.

Award: **1 out of 1.00 point**

✓ You received credit for this question in a previous attempt

If the random variable *X* has a mean of *μ* and a standard deviation *σ*, then the mean and standard deviation, respectively, of $(X - \mu)/\sigma$ are

○ *μ* and *σ*.

○ $\overline{x}$ and *s*.

○ 1 and 0.

✓ ● 0 and 1.

References

Multiple Choice	Learning Objective: 06-03 Describe the properties of the normal distribution and use a cumulative normal table.

3.

Award: **1 out of 1.00 point**

✓ You received credit for this question in a previous attempt

The number of standard deviations that a value *x* is from the mean is a(n) _______________.

○ variance

○ exponential value

✓ ● *z* score

○ area

References

Multiple Choice	Learning Objective: 06-03 Describe the properties of the normal distribution and use a cumulative normal table.

4. Award: **1 out of 1.00 point**

✓ You received credit for this question in a previous attempt

The average time an individual reads online national news reports is 49 minutes. Assume the standard deviation is 16 minutes and that the times are normally distributed. For the 10 percent who spend the most time reading national news online, how much time do they spend?

○ > 11.72

○ > 28.52

○ > 86.28

✓ ● > 69.48

$$z_{.90} = 1.28 = \frac{x - 49}{16}$$

$$\mathrm{x} = 20.48 + 49 = 69.48$$

References

Multiple Choice	Learning Objective: 06-05 Find population values that correspond to specified normal distribution probabilities.

5. Award: **0 out of 1.00 point**

⊗ You did not receive full credit for this question in a previous attempt

Suppose that the waiting time for a license plate renewal at a local office of a state motor vehicle department has been found to be *normally distributed* with a mean of 30 minutes and a standard deviation of 8 minutes. What is the probability that a randomly selected individual will have a waiting time between 15 and 45 minutes?

⊗ ● 1.00

○ .9699

○ .5000

→ ○ .9398

$P(15 \le x \le 45) = P(-1.88 \le z \le 1.88) = .9699 - .0301 = .9398$

References

Multiple Choice	Learning Objective: 06-04 Use the normal distribution to compute probabilities.

6. Award: **0 out of 3.00 points**

⊗ You did not receive full credit for this question in a previous attempt

A department store will place a sale item in a special display for a one-day sale. Previous experience suggests that 27 percent of all customers who pass such a special display will purchase the item. If 1,320 customers will pass the display on the day of the sale, and if a one-item-per-customer limit is placed on the sale item, how many units of the sale item should the store stock in order to have at most a 1 percent chance of running short of the item on the day of the sale? Assume here that customers make independent purchase decisions. **(Round your answer to nearest whole number.)**

Number of units **1,358** ⊗

References

Worksheet

Learning Objective: 06-06 Use the normal distribution to approximate binomial probabilities.

A department store will place a sale item in a special display for a one-day sale. Previous experience suggests that 27 percent of all customers who pass such a special display will purchase the item. If 1,320 customers will pass the display on the day of the sale, and if a one-item-per-customer limit is placed on the sale item, how many units of the sale item should the store stock in order to have at most a 1 percent chance of running short of the item on the day of the sale? Assume here that customers make independent purchase decisions. **(Round your answer to nearest whole number.)**

Number of units 394 ± 1

Explanation:

$$\mu = (1{,}320)(.27) = 356,\ \sigma = \sqrt{260.1720} = 16.1298$$

$P(x \geq st) = .99$

$$z = \frac{st - \mu}{\sigma}$$

$$2.33 = \frac{st - 356}{16.1298}$$

$st = 393.6$

394 units

7.

Award: **1 out of 1.00 point**

✓ You received credit for this question in a previous attempt

A standard normal distribution has a mean of ______________ and standard deviation of ______________.

○ zero, zero

✓ ● zero, one

○ one, one

○ one, zero

References

Multiple Choice	Learning Objective: 06-03 Describe the properties of the normal distribution and use a cumulative normal table.

8.

Award: **0 out of 1.00 point**

✗ You did not receive full credit for this question in a previous attempt

The area under the normal curve between $z = 0$ and $z = 1$ is ____________________ the area under the normal curve between $z = 1$ and $z = 2$.

✗ ● less than

→ ○ greater than

○ equal to

○ less than, greater than, or equal to, depending on the value of the mean,

○ less than, greater than, or equal to, depending on the value of the standard deviation,

References

Multiple Choice	Learning Objective: 06-03 Describe the properties of the normal distribution and use a cumulative normal table.

9.

Award: **1 out of 1.00 point**

☒ You did not receive full credit for this question in a previous attempt

An apple juice producer buys all his apples from a conglomerate of apple growers in one northwestern state. The amount of juice obtained from each of these apples is approximately normally distributed with a mean of 2.25 ounces and a standard deviation of 0.15 ounce. What is the probability that a randomly selected apple will contain between 2.00 and 2.50 ounces?

○ .500

✓ ● .905

○ .9525

○ .9544

$$p(2 \le x \le 2.50) = p\left(\frac{2-2.25}{.15} \le z \le \frac{2.50-2.25}{.15}\right) = p(-1.67 \le z \le 1.67) = .9525 - .0475 = .905$$

References

Multiple Choice	Learning Objective: 06-04 Use the normal distribution to compute probabilities.

10.

Award: **1 out of 1.00 point**

✓ You received credit for this question in a previous attempt

Values of the standard normal random variable are measured

- ○ with reference to specific units.
- ○ in the units in which the mean is measured.
- ✓ ● in the number of standard deviations from the mean.
- ○ in squared units in which the mean is measured.
- ○ None of the choices is correct.

References

Multiple Choice	Learning Objective: 06-03 Describe the properties of the normal distribution and use a cumulative normal table.

11.

Award: **1 out of 1.00 point**

✓ You received credit for this question in a previous attempt

The area under the curve of a valid continuous probability distribution must ______________.

- ✓ ● equal 1
- ○ be between 0 and 1
- ○ be infinite
- ○ be less than 1

References

Multiple Choice	Learning Objective: 06-01 Define a continuous probability distribution and explain how it is used.

12.

Award: **1 out of 1.00 point**

✓ You received credit for this question in a previous attempt

Given that *X* is a normal random variable, the probability that a given value of *X* is below its mean is __________________.

○ 1

✓ ● equal to 0.5

○ less than 0.5

○ greater than 0.5

References

Multiple Choice	Learning Objective: 06-03 Describe the properties of the normal distribution and use a cumulative normal table.

13.

Award: **1 out of 1.00 point**

You received credit for this question in a previous attempt

An aptitude test has a mean score of 80 and a standard deviation of 5. The population of scores is normally distributed. What raw score corresponds to the 70th percentile?

○ 77.4

○ 83.5

✓ ● 82.6

○ 76.5

$X = \mu + z\sigma = 80 + (.52)(5) = 82.6$

References

Multiple Choice	Learning Objective: 06-05 Find population values that correspond to specified normal distribution probabilities.

14.

Award: **1 out of 1.00 point**

✓ You received credit for this question in a previous attempt

Find *z* when the area to the left of *z* is .05.

○ 1.645

○ 1.00

✓ ● −1.645

○ −1.96

From z table, z = −1.645.

References

Multiple Choice	Learning Objective: 06-03 Describe the properties of the normal distribution and use a cumulative normal table.

15.

Award: **0 out of 1.00 point**

☒ You did not receive full credit for this question in a previous attempt

An apple juice producer buys all his apples from a conglomerate of apple growers in one northwestern state. The amount of juice obtained from each of these apples is approximately normally distributed with a mean of 2.25 ounces and a standard deviation of 0.15 ounce. 77 percent of the apples will contain at least how many ounces of juice?

- ○ 2.12
- ✗ ● 2.38
- ○ 2.36
- → ○ 2.14

$z_{.23} = -.74 = (x - 2.25)/.15$
$x = 2.14$

References

Multiple Choice	Learning Objective: 06-05 Find population values that correspond to specified normal distribution probabilities.

16.

Award: **1 out of 1.00 point**

✓ You received credit for this question in a previous attempt

Consider a normal population with a mean of 10 and a variance of 4. Find $P(X \geq 10)$.

- ○ 1.00
- ○ 0.00
- ✓ ● 0.50
- ○ −0.50

$z = 0$; $P(z \geq 0) = .5$

References

Multiple Choice	Learning Objective: 06-04 Use the normal distribution to compute probabilities.

17. Award: **1 out of 1.00 point**

⊗ You did not receive full credit for this question in a previous attempt

An apple juice producer buys all his apples from a conglomerate of apple growers in one northwestern state. The amount of juice obtained from each of these apples is approximately normally distributed with a mean of 2.25 ounces and a standard deviation of 0.15 ounce. What is the probability that a randomly selected apple will contain more than 2.50 ounces?

- ○ .9525
- ○ .4525
- ✓ ● .0475
- ○ .5474

$P(x > 2.50) = P(z > 1.67) = 1.000 − .9525 = .0475$

References

Multiple Choice	Learning Objective: 06-04 Use the normal distribution to compute probabilities.

18.

Award: **1 out of 1.00 point**

✗ You did not receive full credit for this question in a previous attempt

During the past six months, 73.2 percent of US households purchased sugar. Assume that these expenditures are approximately normally distributed with a mean of $8.22 and a standard deviation of $1.10. Find the probability that a household spent more than $10.00 on sugar.

- ○ .7320
- ○ .9474
- ✓ ● .0526
- ○ .2680

$$\mathrm{P}(\mathrm{x} > 10) = p(z > \frac{10-8.22}{1.10} = p(z > 1.62) = 1.000 - .9474 = .0526$$

References

Multiple Choice	Learning Objective: 06-04 Use the normal distribution to compute probabilities.

19.

Award: **1 out of 1.00 point**

✓ You received credit for this question in a previous attempt

The average time an individual reads online national news reports is 49 minutes. Assume the standard deviation is 16 minutes and that the times are normally distributed. What is the probability someone will spend no more than 30 minutes reading online national news reports?

✓ ● .1170

○ .0301

○ .8830

○ .9699

$$P(x < 30)$$
$$p\left(z < \frac{30-49}{16}\right)$$
$$P(z < -1.19) = .1170$$

References

Multiple Choice	Learning Objective: 06-04 Use the normal distribution to compute probabilities.

20.

Award: **0 out of 3.00 points**

☒ You did not receive full credit for this question in a previous attempt

A tire company has developed a new type of steel-belted radial tire. Extensive testing indicates the population of mileages obtained by all tires of this new type is normally distributed with a mean of 37,000 miles and a standard deviation of 3,887 miles. The company wishes to offer a guarantee providing a discount on a new set of tires if the original tires purchased do not exceed the mileage stated in the guarantee. What should the guaranteed mileage be if the tire company desires that no more than 2 percent of the tires will fail to meet the guaranteed mileage? **(Use a z-score to 2 decimal places in your intermediate calculations. Round your final answer to the nearest mile.)**

$P(x \leq k) = .02$

k **29,032** ☒

References

Worksheet Learning Objective: 06-05 Find population values that correspond to specified normal distribution probabilities.

A tire company has developed a new type of steel-belted radial tire. Extensive testing indicates the population of mileages obtained by all tires of this new type is normally distributed with a mean of 37,000 miles and a standard deviation of 3,887 miles. The company wishes to offer a guarantee providing a discount on a new set of tires if the original tires purchased do not exceed the mileage stated in the guarantee. What should the guaranteed mileage be if the tire company desires that no more than 2 percent of the tires will fail to meet the guaranteed mileage? **(Use a z-score to 2 decimal places in your intermediate calculations. Round your final answer to the nearest mile.)**

$P(x \leq k) = .02$

k *28,993 ± 0.1%*

Explanation:

$$z = \frac{k - \mu}{\sigma}$$

$$-2.06 = \frac{k - 37{,}000}{3{,}887}$$

The guarantee is for a defect rate of no more than 2% (0.02). If we consult the standardized normal table we find values for 0.0202 with a z of -2.05 and a value of 0.0197 with a z of -2.06. The smaller values should be used so we don’t exceed the 2% threshold.

21.

Award: **1 out of 1.00 point**

✓ You received credit for this question in a previous attempt

In order to approximate the binomial distribution using the normal distribution, the following condition(s) must be met if p is near 1.

- ○ $np > 5$ only
- ✓ ● n must be larger than just meeting the condition of $np > 5$.
- ○ n can be as small as $np > 5$.
- ○ $n > 5$

References

Multiple Choice	Learning Objective: 06-06 Use the normal distribution to approximate binomial probabilities.

22.

Award: **1 out of 1.00 point**

✓ You received credit for this question in a previous attempt

Find z when the area between 0 and z is .4750.

- ○ −1.96
- ✓ ● 1.96
- ○ 0.68
- ○ −0.68

To find z, you need the area to the left of z, which is .4750 + .5 = .9750. From this: z = 1.96.

References

Multiple Choice	Learning Objective: 06-03 Describe the properties of the normal distribution and use a cumulative normal table.

23. Award: **0.33 out of 3.00 points**

✗ You did not receive full credit for this question in a previous attempt

In the book *Advanced Managerial Accounting*, Robert P. Magee discusses monitoring cost variances. A *cost variance* is the difference between a budgeted cost and an actual cost. Magee describes the following situation:

Michael Bitner has responsibility for control of two manufacturing processes. Every week he receives a cost variance report for each of the two processes, broken down by labor costs, materials costs, and so on. One of the two processes, which we'll call process *A* , involves a stable, easily controlled production process with a little fluctuation in variances. Process *B* involves more random events: the equipment is more sensitive and prone to breakdown, the raw material prices fluctuate more, and so on.

"It seems like I'm spending more of my time with process *B* than with process *A*," says Michael Bitner. "Yet I know that the probability of an inefficiency developing and the expected costs of inefficiencies are the same for the two processes. It's just the magnitude of random fluctuations that differs between the two, as you can see in the information below."

"At present, I investigate variances if they exceed $2,673, regardless of whether it was process *A* or *B*. I suspect that such a policy is not the most efficient. I should probably set a higher limit for process *B*."

The means and standard deviations of the cost variances of processes *A* and *B*, when these processes are in control, are as follows: **(Round your z value to 2 decimal places and final answers to 4 decimal places.)**:

	Process *A*	Process *B*
Mean cost variance (in control)	$ 3	$ 0
Standard deviation of cost variance (in control)	$4,579	$10,255

Furthermore, the means and standard deviations of the cost variances of processes *A* and *B*, when these processes are out of control, are as follows:

	Process *A*	Process *B*
Mean cost variance (out of control)	$6,258	$ 7,340
Standard deviation of cost variance (out of control)	$4,579	$10,255

(a) Recall that the current policy is to investigate a cost variance if it exceeds $2,673 for either process. Assume that cost variances are normally distributed and that both Process *A* and Process *B* cost variances are in control. Find the probability that a cost variance for Process *A* will be investigated. Find the probability that a cost variance for Process *B* will be investigated. Which in-control process will be investigated more often.

Process A	**0.5** ✗
Process B	**0.5** ✗

Process A ✗ is investigated more often

(b) Assume that cost variances are normally distributed and that both Process *A* and Process *B* cost variances are out of control. Find the probability that a cost variance for Process *A* will be investigated. Find the probability that a cost variance for Process *B* will be investigated. Which out-of-control process will be investigated more often.

Process A	**0.5** ✗
Process B	**0.5** ✗

Process B ✗ is investigated more often.

(c) If both Processes *A* and *B* are almost always in control, which process will be investigated more often.

Process B ✓ will be investigated more often.

(d) Suppose that we wish to reduce the probability that Process *B* will be investigated (when it is in control) to .2810. What cost variance investigation policy should be used? That is, how large a cost variance should trigger an investigation? Using this new policy, what is the probability that an out-of-control cost variance for Process *B* will be investigated?

k	**1** ✗
$P(x > 5{,}948)$	**0.5** ✗

rev: 10_17_2016_QC_CS-66206, 03_15_2017_QC_CS-82862

References

Worksheet	Learning Objective: 06-04 Use the normal distribution to compute probabilities.

In the book *Advanced Managerial Accounting*, Robert P. Magee discusses monitoring cost variances. A *cost variance* is the difference between a budgeted cost and an actual cost. Magee describes the following situation:

Michael Bitner has responsibility for control of two manufacturing processes. Every week he receives a cost variance report for each of the two processes, broken down by labor costs, materials costs, and so on. One of the two processes, which we'll call process *A* , involves a stable, easily controlled production process with a little fluctuation in variances. Process *B* involves more random events: the equipment is more sensitive and prone to breakdown, the raw material prices fluctuate more, and so on.

"It seems like I'm spending more of my time with process *B* than with process *A*," says Michael Bitner. "Yet I know that the probability of an inefficiency developing and the expected costs of inefficiencies are the same for the two processes. It's just the magnitude of random fluctuations that differs between the two, as you can see in the information below."

"At present, I investigate variances if they exceed $2,673, regardless of whether it was process *A* or *B*. I suspect that such a policy is not the most efficient. I should probably set a higher limit for process *B*."

The means and standard deviations of the cost variances of processes *A* and *B*, when these processes are in control, are as follows: **(Round your z value to 2 decimal places and final answers to 4 decimal places.)**:

	Process *A*	Process *B*
Mean cost variance (in control)	$ 3	$ 0
Standard deviation of cost variance (in control)	$4,579	$10,255

Furthermore, the means and standard deviations of the cost variances of processes *A* and *B*, when these processes are out of control, are as follows:

	Process *A*	Process *B*
Mean cost variance (out of control)	$6,258	$ 7,340
Standard deviation of cost variance (out of control)	$4,579	$10,255

(a) Recall that the current policy is to investigate a cost variance if it exceeds $2,673 for either process. Assume that cost variances are normally distributed and that both Process *A* and Process *B* cost variances are in control. Find the probability that a cost variance for Process *A* will be investigated. Find the probability that a cost variance for Process *B* will be investigated. Which in-control process will be investigated more often.

Process A	*0.281 ± 0.005*
Process B	*0.3974 ± 0.005*

Process B ✓ is investigated more often

(b) Assume that cost variances are normally distributed and that both Process *A* and Process *B* cost variances are out of control. Find the probability that a cost variance for Process *A* will be investigated. Find the probability that a cost variance for Process *B* will be investigated. Which out-of-control process will be investigated more often.

Process A	*0.7823 ± 0.005*
Process B	*0.6772 ± 0.005*

Process A ✓ is investigated more often.

(c) If both Processes *A* and *B* are almost always in control, which process will be investigated more often.

Process B ✓ will be investigated more often.

(d) Suppose that we wish to reduce the probability that Process *B* will be investigated (when it is in control) to .2810. What cost variance investigation policy should be used? That is, how large a cost variance should trigger an investigation? Using this new policy, what is the probability that an out-of-control cost variance for Process *B* will be investigated?

k	*5948 ± 1*
$P(x > 5{,}948)$	*0.5557 ± 0.005*

rev: 10_17_2016_QC_CS-66206, 03_15_2017_QC_CS-82862

Explanation:

(a)

Process A:

$$P(x > 2{,}673) = P\left(z > \frac{2{,}673-3}{4{,}579}\right) = P(z > .58) = 1 - .7190 = .2810$$

Process B:

$$P(x > 2{,}673) = P\left(z > \frac{2{,}673-0}{10{,}255}\right) = P(z > .26) = 1 - .6026 = .3974$$

(b)

Process A:

$$P(x > 2{,}673) = P\left(z > \frac{2{,}673-6{,}258}{4{,}579}\right) = P(z > -.78) = 1 - .2177 = .7823$$

Process B:

$$P(x > 2{,}673) = P\left(z > \frac{2{,}673-7{,}340}{10{,}255}\right) = P(z > -.46) = 1 - .3228 = .6772$$

(d)

$P(x > k) = .2810$ implies that $z = \frac{k-0}{10{,}255} = .58$. Thus $k = 5948$.

Investigate if cost variance exceeds $5,948.

$$P(x > 5{,}948) = P\left(z > \frac{5{,}948-7{,}340}{10{,}255}\right) = P(z > -.14) = 1 - .4443 = .5557$$

24.

Award: **1 out of 1.00 point**

You received credit for this question in a previous attempt

An apple juice producer buys all his apples from a conglomerate of apple growers in one northwestern state. The amount of juice obtained from each of these apples is approximately normally distributed with a mean of 2.25 ounces and a standard deviation of 0.15 ounce. Between what two values (in ounces) symmetrically distributed around the population mean will 80 percent of the apples fall?

- ○ [2.13, 2.37]
- ○ [2.10, 2.40]
- ✓ ● [2.06, 2.44]
- ○ [1.95, 2.55]

$$z_{.90} = 1.28 = (x - 2.25)/.15$$
$$x = 2.44$$
$$z_{.10} = -1.28 = (x - 2.25)/.15$$
$$x = 2.06$$

References

Multiple Choice	Learning Objective: 06-05 Find population values that correspond to specified normal distribution probabilities.

25. Award: **1 out of 1.00 point**

You received credit for this question in a previous attempt

A manufacturer of personal computers tests competing brands and finds that the amount of energy they require is normally distributed with a mean of 285 kwh and a standard deviation of 9.1 kwh. If the lowest 25 percent and the highest 30 percent are not included in a second round of tests, what are the upper and lower limits for the energy amounts of the remaining computers?

○ [269.76, 300.24]

✓ ● [278.86, 289.78]

○ [280.22, 289.78]

○ [280.22, 300.24]

$$z_{.25} = -0.675 = (x - 285)/9.1 = 278.86$$

$$z_{.70} = .525 = (x - 285)/9.1 = 289.78$$

References

Multiple Choice	Learning Objective: 06-05 Find population values that correspond to specified normal distribution probabilities.

26.

Award: **1 out of 1.00 point**

☒ You did not receive full credit for this question in a previous attempt

An apple juice producer buys all his apples from a conglomerate of apple growers in one northwestern state. The amount of juice obtained from each of these apples is approximately normally distributed with a mean of 2.25 ounces and a standard deviation of 0.15 ounce. What is the probability that a randomly selected apple will contain between 2.00 and 3.00 ounces?

- ○ .0475
- ○ .4525
- ✓ ● .9525
- ○ .9554

$$p(2 \le x \le 3) = p\left(\frac{2-2.25}{.15} \le z \le \frac{3-2.25}{.15}\right) = p(-1.67 \le z \le 5) = 1.00 - .0475 = .9525$$

References

Multiple Choice	Learning Objective: 06-04 Use the normal distribution to compute probabilities.

27.

Award: **1 out of 1.00 point**

⊗ You did not receive full credit for this question in a previous attempt

Given that the length an athlete throws a hammer is a normal random variable with mean 50 feet and standard deviation 5 feet, what is the probability he throws it no less than 55 feet?

○ .8413

✓ ● .1587

○ .6826

○ .3174

Z = (55 − 50)/5 = 1
P(X ≥ 55) = 1 − 0.8412 = .1587

References

Multiple Choice	Learning Objective: 06-04 Use the normal distribution to compute probabilities.

28.

Award: **1.50 out of 3.00 points**

⊗ You did not receive full credit for this question in a previous attempt

In order to gain additional information about respondents, some marketing researchers have used ultraviolet ink to precode questionnaires that promise confidentiality to respondents. Of 261 randomly selected marketing researchers who participated in an actual survey, 175 said that they disapprove of this practice. Suppose that, before the survey was taken, a marketing manager claimed that at least 88 percent of all marketing researchers would disapprove of the practice.

(a) Assuming that the manager's claim is correct, calculate the probability that 175 or fewer of 261 randomly selected marketing researchers would disapprove of the practice. Use the normal approximation to the binomial. **(Round z value to 2 decimal places. Round your answer to 5 decimal places.)**

$P(x \leq 175)$ **.78810** ⊗

(b) Based on your result of part *a*, do you believe the marketing manager's claim?

No ✓

References

Worksheet

Learning Objective:
06-06 Use the
normal distribution to
approximate binomial
probabilities.

In order to gain additional information about respondents, some marketing researchers have used ultraviolet ink to precode questionnaires that promise confidentiality to respondents. Of 261 randomly selected marketing researchers who participated in an actual survey, 175 said that they disapprove of this practice. Suppose that, before the survey was taken, a marketing manager claimed that at least 88 percent of all marketing researchers would disapprove of the practice.

(a) Assuming that the manager's claim is correct, calculate the probability that 175 or fewer of 261 randomly selected marketing researchers would disapprove of the practice. Use the normal approximation to the binomial. **(Round z value to 2 decimal places. Round your answer to 5 decimal places.)**

$P(x \leq 175)$ *.00000 ± 0.001*

(b) Based on your result of part *a*, do you believe the marketing manager's claim?

No ✓

Explanation:

(a)

$$\mu = (261)(.88) = 229.68,\ \sigma = \sqrt{27.5616} = 5.2499$$

$$P(x \leq 175) = P\left(z \leq \frac{175.5-229.68}{5.2499}\right) = .00000$$

29.

Award: **1 out of 1.00 point**

✓ You received credit for this question in a previous attempt

If x is a binomial random variable where $n = 100$ and $p = .1$, find the probability that x is less than or equal to 10, using the normal approximation to the binomial.

- ○ .9544
- ○ .0446
- ✓ ● .5675
- ○ .4325

$z = (10.5 - 10)/\sqrt{[(.1)(.9)(100)]} = 0.5/3 = .17$
$P(z \leq 0.17) = .5675$

References

Multiple Choice	Learning Objective: 06-06 Use the normal distribution to approximate binomial probabilities.

30.

Award: **1 out of 1.00 point**

✓ You received credit for this question in a previous attempt

If the random variable of *x* is normally distributed, ______ percent of all possible observed values of *x* will be within two standard deviations of the mean.

○ 99.73

○ 68.26

○ 95.00

✓ ● 95.44

References

Multiple Choice	Learning Objective: 06-04 Use the normal distribution to compute probabilities.

31. Award: **0 out of 1.00 point**

✗ You did not receive full credit for this question in a previous attempt

The mean life of a pair of shoes is 40 months with a standard deviation of 8 months. If the life of the shoes is normally distributed, how many pairs of shoes out of one million will need replacement before 36 months?

- ○ 500,000
- ○ 808,500
- ✗ ● 191,500
- → ○ 308,500

$P(x < 36) = P(z < (36 − 40)/8) = P(z < −.5)$
The area under the curve is .3085 × 1,000,000.

References

Multiple Choice	Learning Objective: 06-04 Use the normal distribution to compute probabilities.

32. Award: **1 out of 1.00 point**

✓ You received credit for this question in a previous attempt

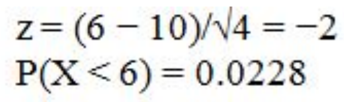
Consider a normal population with a mean of 10 and a variance of 4. Find $P(X < 6)$.

✓ ● .0228

○ .1587

○ .8413

○ .9772



$z = (6 - 10)/\sqrt{4} = -2$

$P(X < 6) = 0.0228$

References

Multiple Choice	Learning Objective: 06-04 Use the normal distribution to compute probabilities.

33. Award: **1 out of 1.00 point**

You received credit for this question in a previous attempt

Given that the length an athlete throws a hammer is a normal random variable with mean 50 feet and standard deviation 5 feet, what is the probability he throws it between 50 feet and 60 feet?

- ○ .9972
- ○ .5000
- ○ .9544
- ✓ ● .4772

z = (60 − 50)/5 = 2
P(50 ≤ X ≤ 60) = .0.9972 − 0.5 = 0.4772

References

Multiple Choice	Learning Objective: 06-04 Use the normal distribution to compute probabilities.

34.

Award: **1 out of 1.00 point**

You did not receive full credit for this question in a previous attempt

The average time an individual reads online national news reports is 49 minutes. Assume the standard deviation is 16 minutes and that the times are normally distributed. What is the probability someone will spend at least one hour reading online national news reports?

○ .9987

○ .7549

✓ ● .2451

○ .0013

$$P(x \geq 60)$$

$$p\left(z \geq \frac{60-49}{16}\right)$$

$$p\left(z > \frac{11}{16}\right)$$

$$P(z > .69)$$

$$1.00 - .7549 = .2451$$

References

Multiple Choice	Learning Objective: 06-04 Use the normal distribution to compute probabilities.

35. Award: **1 out of 1.00 point**

✓ You received credit for this question in a previous attempt

The price-to-earnings ratio for firms in a given industry is distributed according to the normal distribution. In this industry, a firm with a standard normal variable value of $z = 1$

✓ ● has an above average price-to-earnings ratio.

○ has a below average price-to-earnings ratio.

○ has an average price-to-earnings ratio.

○ may have an above average or below average price-to-earnings ratio.

References

Multiple Choice	Learning Objective: 06-03 Describe the properties of the normal distribution and use a cumulative normal table.

36. Award: **2.63 out of 3.00 points**

✗ You did not receive full credit for this question in a previous attempt

Suppose that *x* has a binomial distribution with *n* = 202 and *p* = 0.47. **(Round np and n(1-p) answers to 2 decimal places. Round your answers to 4 decimal places. Round z values to 2 decimal places. Round the intermediate value (σ) to 4 decimal places.)**

(a) Show that the normal approximation to the binomial can appropriately be used to calculate probabilities about *x*.

np	**94.94** ✓
n(1 – *p*)	**107.06** ✓

Both *np* and *n*(1 – *p*) **≥** ✓ 5

(b) Make continuity corrections for each of the following, and then use the normal approximation to the binomial to find each probability:

1. *P* (*x* = 83)	**0.0136** ✓
2. *P* (*x* ≤ 99)	**0.7389** ✓

3. $P(x < 73)$	**0.0008** ✓
4. $P(x \geq 100)$	**0.2389** ✗
5. $P(x > 104)$	**0.0885** ✓

References

Worksheet Learning Objective: 06-05 Find population values that correspond to specified normal distribution probabilities.

Suppose that x has a binomial distribution with $n = 202$ and $p = 0.47$. **(Round np and n(1-p) answers to 2 decimal places. Round your answers to 4 decimal places. Round z values to 2 decimal places. Round the intermediate value (σ) to 4 decimal places.)**

(a) Show that the normal approximation to the binomial can appropriately be used to calculate probabilities about x.

np	94.94
$n(1 - p)$	107.06

Both np and $n(1 - p) \geq$ ✓ 5

(b) Make continuity corrections for each of the following, and then use the normal approximation to the binomial to find each probability:

1. $P(x = 83)$	0.0136 ± 0.0001
2. $P(x \leq 99)$	0.7389 ± 0.0001
3. $P(x < 73)$	0.0008 ± 0.0001
4. $P(x \geq 100)$	0.2611 ± 0.0001
5. $P(x > 104)$	0.0885 ± 0.0001

Explanation:

(a)

$np = (202)(.47) = 94.94$
$n(1 - p) = (202)(.53) = 107.06$
both ≥ 5

(b)

$\mu = np = (202)(.47) = 94.94$, $\sigma = \sqrt{npq} = \sqrt{50.3182} = 7.0935$
(1) $P(x = 83) = P(82.5 \le x \le 83.5) = P(-1.75 \le z \le -1.61) = .0136$
(2) $P(x \le 99) = P(x \le 99.5) = P(z \le .64) = .7389$
(3) $P(x < 73) = P(x \le 72.5) = P(z \le -3.16) = .0008$
(4) $P(x \ge 100) = P(x \ge 99.5) = P(z \ge .64) = .2611$
(5) $P(x > 104) = P(x \ge 104.5) = P(z \ge 1.35) = .0885$