Three groups were asked the question "How many pairs of shoes do you own?" Each set of responses is represented by one of the frequency histograms below.

Cross out 1 if group A has the most variability
Cross out 5 if group B has the most variability
Cross out 6 if group C has the most variability
Cross out 8 if there is not enough info to know which group has the most variability

Inputting the lengths of words in a selection of Shakespeare's plays results in a calculator output of ...

<table>
<thead>
<tr>
<th>Statistic</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>minX</td>
<td>1</td>
</tr>
<tr>
<td>Q₁</td>
<td>3</td>
</tr>
<tr>
<td>Med</td>
<td>4</td>
</tr>
<tr>
<td>Q₃</td>
<td>5</td>
</tr>
<tr>
<td>maxX</td>
<td>12</td>
</tr>
</tbody>
</table>

Which of the following MUST be true?

3: 12 is definitely not an outlier
5: 12 is definitely an outlier
6: It is impossible to tell whether 12 is an outlier
Suppose that taxicab in New York City are driven an average of 75,000 miles per year with a standard deviation of 12,000 miles.

Assuming that the distribution is normal, approximately what percent of NYC taxicabs drive more than 91,000 miles?
Round to the nearest percent.

Suppose the attendance at a movie theater averages 780 with a standard deviation of 40.
On a particular Tuesday, the attendance at the theater was 740.

Find the z-score of the Tuesday attendance. Add 11 to your answer.
To study the relationship between party affiliation and support for a balanced budget amendment, 500 registered voters were surveyed with the following results:

<table>
<thead>
<tr>
<th>Party</th>
<th>For</th>
<th>Against</th>
<th>No opinion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Democrat</td>
<td>50</td>
<td>150</td>
<td>50</td>
</tr>
<tr>
<td>Republican</td>
<td>125</td>
<td>55</td>
<td>25</td>
</tr>
<tr>
<td>Independent</td>
<td>15</td>
<td>5</td>
<td>25</td>
</tr>
</tbody>
</table>

What percentage of those against the amendment were Independent? Round to the nearest percent.

It is estimated that cats, who live in the wild or as indoor pets allowed to roam outdoors, kill an average of 10 birds a year. Assuming a normal distribution with a standard deviation of 3 birds, what is the probability a simple random sample of 25 cats will kill an average between 9 and 12 birds in a year?

Round to the nearest percent. Add the digits of your answer.
Suspects

If 64% of a random sample of 550 people leaving a shopping mall claim to have spent over $25, determine a 99% confidence interval estimate for the proportion of shopping mall customers who spend over $25.

Find the confidence interval and round each number to the nearest percent. Find the difference between the two numbers. Add 3.

Suspects

The graph below is a cumulative relative frequency plot for grade point averages for a large public high school.

What is the median grade point average?

- Cross out 6 if the median is 0.8
- Cross out 7 if the median is 2.0
- Cross out 8 if the median is 2.4
- Cross out 12 if the median is 2.5
- Cross out 13 if the median is 2.6
If the standard deviation of a set of observations is 0, you can conclude...

1: that there is no relationship between the observations
4: that the average value is 0
7: that all observations are the same value
13: that a mistake in arithmetic has been made
15: none of the above

There are many interesting relationships among the various nutrients found in fruits and vegetables. Listed below are the number of grams of carbohydrates and the number of kilocalories for a 100-gram sample of various raw foods.

<table>
<thead>
<tr>
<th>carbs</th>
<th>15.25</th>
<th>16.55</th>
<th>11.10</th>
<th>13.01</th>
<th>14.13</th>
<th>15.11</th>
</tr>
</thead>
<tbody>
<tr>
<td>kcal</td>
<td>59</td>
<td>72</td>
<td>43</td>
<td>55</td>
<td>56</td>
<td>59</td>
</tr>
</tbody>
</table>

Find the line of regression predicting the number of kcals given the number of carbs. Use your line of regression to predict the number of calories in 100 g of a fruit with 12 g of carbs. Find the difference in the hundredths place and tens place.
Sixty-five percent of all divorce cases cite incompatibility as the underlying reason. If four couples file for a divorce, what is the probability that all four couples will state incompatibility as the reason?

Write your answer as a percent. Subtract the hundredths place from the tenths place.

If $P(A) = 0.03$ and $P(B) = 0.01$, what is $P(A \cup B)$ if $A$ and $B$ are independent? Write your answer as a percent.
SUSPECTS

Calculate the number of unique four-person groups that can be formed by selecting from eight eligible candidates.

Add 7. Then divide by 7. Round to the nearest whole number.

SUSPECTS

The speeds at which cars pass through a checkpoint are recorded. Assume the speeds are normally distributed such that \( \mu = 61 \) mph and \( \sigma = 4 \) mph.

Calculate the probability that the next car that passes through the checkpoint will be traveling slower than 65 miles per hour.

Round to the nearest percent. Add the tens place and the ones place. Add 3.
SUSPECTS

At a particular college, 40% of the applications submitted are accepted. Determine the probability that exactly 2 of the next 10 applications will be accepted. Round to the nearest percent.

SUSPECTS

The "random walk" theory of stock prices holds that price movements in disjoint time periods are independent of each other. Suppose that we record only whether the price is up or down each year, and that the probability that our portfolio rises in price in any one year is 0.65. (This probability is approximately correct for a portfolio containing equal dollar amounts of all common stocks listed on the New York Stock Exchange.)

What is the probability that our portfolio goes up for three consecutive years in a row? Round the answer to the nearest percent, add 5, then divide by 2.
LOCATIONS

The first 115 Kentucky Derby winners by color of horse were as follows: roan, 1; gray, 4; chestnut, 36; bay, 53; dark bay, 17; and black, 4.

Find the relative frequency that a dark bay-colored horse won the Kentucky Derby. Round to the nearest percent.

LOCATIONS

Laying fiber-optic cable is expensive. Cable companies want to make sure that if they extend their lines out to less dense suburban or rural areas, there will be sufficient demand and the work will be cost-effective. They decide to conduct a survey to determine the proportion of households in a rural subdivision that would buy the service. They select a random sample of 5 blocks in the subdivision and survey each family that lives on one of those blocks.

What is the name for this type of sampling method?

2: Simple Random Sampling
4: Stratified Random Sampling
6: Systematic Sampling
8: Cluster Sampling
10: Convenience Sampling
LOCATIONS

Suppose that 35% of the registered voters in a state are registered as Republicans, 40% as Democrats, and 25% as Independents. A newspaper wants to select a sample of 1000 registered voters to predict the outcome of the next election. If they randomly select 350 Republicans, randomly select 400 Democrats, and randomly select 250 Independents, what kind of sampling method was used?

1: Simple Random Sampling  
3: Stratified Random Sampling  
5: Systematic Sampling  
7: Cluster Sampling  
9: Convenience Sampling

LOCATIONS

Average home attendance and number of home wins for the 2009-2010 NBA Pacific Division teams were as follows:

<table>
<thead>
<tr>
<th></th>
<th>Lakers</th>
<th>Suns</th>
<th>Clippers</th>
<th>Warriors</th>
<th>Kings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Attendance</td>
<td>18,997</td>
<td>17,648</td>
<td>16,343</td>
<td>18,027</td>
<td>13,254</td>
</tr>
<tr>
<td>Home Wins</td>
<td>34</td>
<td>32</td>
<td>21</td>
<td>18</td>
<td>18</td>
</tr>
</tbody>
</table>

Find the probability that a randomly selected NBA Pacific Division team had at most 21 wins in the 2009-2010 season.

Find the proportion of NBA Pacific Division teams that had an average attendance of at least 14,000.

Find the sum of the two percents. What digit is in the tens place?
LOCATIONS

Which of the following are true statements?

I. The range of the sample data is never greater than the range of the population.

II. The interquartile range is half the distance between the first and the third quartile.

III. While the range is affected by outliers, the interquartile range is not.

Cross out 9 if I is the only true statement.
Cross out 10 if II is the only true statement.
Cross out 11 if III is the only true statement.
Cross out 12 if I and II are the only true statements.
Cross out 13 if II and III are the only true statements.
Cross out 14 if I and III are the only true statements.
Cross out 15 if they are all true statements.
Cross out 1 if they are all false.

LOCATIONS

Given the following five histograms...

To which histogram does the following boxplot correspond?

Cross out 1 for histogram A
Cross out 6 for histogram B
Cross out 7 for histogram C
Cross out 10 for histogram D
Cross out 11 for histogram E
LOCATIONS

One thousand students at a city high school were classified both according to GPA and whether or not they consistently skipped classes.

<table>
<thead>
<tr>
<th>GPA</th>
<th>&lt;2.0</th>
<th>2.0-3.0</th>
<th>&gt;3.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Many skipped classes</td>
<td>80</td>
<td>25</td>
<td>5</td>
</tr>
<tr>
<td>Few skipped classes</td>
<td>175</td>
<td>450</td>
<td>265</td>
</tr>
</tbody>
</table>

What is the probability that a student has a GPA under 2.0 given that he has skipped many classes? Round to the nearest percent. Find the sum of the digits.

LOCATIONS

The life expectancy of a particular brand of lightbulb is normally distributed with a mean of 1500 hours and a standard deviation of 75 hours.

Let the random variable $x$ denote the life expectancy of a lightbulb that is that particular brand. Find $P(x < 1410 \text{ hours})$. Round to the nearest percent.
LOCATIONS

A packing machine is set to fill a cardboard box with a mean of 16.1 oz of cereal. Suppose the amounts per box form a normal distribution with a standard deviation equal to 0.04 oz.

Ten percent of the boxes will contain less than what number of ounces? Round to the nearest ounce. Then subtract 5.

LOCATIONS

Acute renal graft rejection can occur years after the graft. In one study (The Lancet, 1994), 21 patients showed such late acute rejection when the ages of their graft (in years) were ...

9, 2, 7, 1, 4, 9, 6, 2, 3, 7, 6, 2, 3, 1, 2, 3, 1, 2, 7, 7, 1

Construct a 90% confidence interval estimate for the ages of renal grafts that undergo late acute rejection.

[When constructing the CI, round the mean and standard deviation to the nearest hundredth.]

What number is the upper bound of the confidence interval? Round to the nearest whole number.
LOCATIONS

What is the critical t-value for finding a 90% confidence interval from a sample of 15 observations?

What is the difference between the tenths place and the hundredths place?

LOCATIONS

The naked mole rat, a hairless East African rodent that lives underground, has a life expectancy of 21 years with a standard deviation of 3 years. In a random sample of 40 such rats, what is the probability that the mean life expectancy is between 20 and 22 years?

Write your answer as a percent. What digit is in the tens place?
Emergency room visits after drinking energy drinks is skyrocketing. One particular energy drink has an average of 200 mg of caffeine with a standard deviation of 10 mg. A store sells boxes of six bottles each. What is the standard deviation of the average milligrams of caffeine consumers should expect from the six bottles in each box?

Round your answer to the nearest mg. Add 2.

Suppose that 15% of the cars coming out of an assembly plant have some defect. In a delivery of 40 cars what is the probability that at most 3 cars have a defect?

Round your answer to the nearest percent.
LOCATIONS

A coin is flipped and the outcome (heads or tails) is recorded. Next a 6-sided die is rolled and the outcome (1, 2, 3, 4, 5, or 6) is recorded. A win is recorded if a tails or an even number is recorded.

Assuming the coin and die are both fair, what is the probability that the final outcome is a win? Write your answer as a percent. Subtract the ones place from the tens place.

LOCATIONS

A psychology class created a survey to give to a randomly selected group of students. They hoped the survey would give them insight as to what types of risky behavior students in school take part in.

The survey:
"How often do you drink alcohol (circle one)?
Monthly  Weekly  Daily

This is an example of what type of bias?
5: Selection Bias
13: Nonresponse Bias
16: Measurement Bias
A banking corporation advertises that 84% of the loan applications it receives are approved within 24 hours. In a random sample of 50 applications, what is the expected number of loan applications that will be turned down?

A deli offers a sandwich special that has you pick 2 types of meat (turkey, roast beef, ham, or chicken), 1 type of cheese (swiss or provolone), 1 type of bread (wheat, white, or rye), and 3 toppings (avocado, mayo, tomato, arugula, mustard, bacon, or carmelized onion).

How many different types of sandwiches are possible?

Add the digits to your answer. Subtract 4.
The IT Services division at a university is considering installing a new spam filter software product on all campus computers to combat unwanted advertising and spyware. A sample of 60 computers was divided into a control group and treatment group to test whether a spam filter software would affect the number of unwanted spam e-mails received. The back-to-back stemplot below shows the distribution of such e-mails received.

Find the standard deviation of the control group.
What digit is in the tenths place?

<table>
<thead>
<tr>
<th>No software</th>
<th>Software installed</th>
</tr>
</thead>
<tbody>
<tr>
<td>9 8 7 5 0 2 2 3 5 5 6 6 6 7 8 8 9 9 9</td>
<td></td>
</tr>
<tr>
<td>9 8 8 7 5 5 5 4 2 0 1 0 0 1 1 2 2 5 7 9</td>
<td></td>
</tr>
<tr>
<td>8 7 5 4 4 3 2 1 1 0 2 0 2 4 6</td>
<td></td>
</tr>
<tr>
<td>4 3 2 0 0 3 2 5</td>
<td></td>
</tr>
<tr>
<td>4 1</td>
<td>Key: 4</td>
</tr>
</tbody>
</table>

Which best describes a placebo?
0: A method of selection
2: An experimental treatment
6: A control treatment
7: A parameter
5: A statistic

Suppose that a 90% confidence interval estimates that $25 < \mu < 30$.
Which is true?
0: There is a 0.90 probability that $\mu$ is between 25 and 30.
2: 90% of the sample values are between 25 and 30
6: With 90% confidence, we expect $\mu$ to be between 25 and 30
7: There is a 0.90 probability that $\pi$ is between 25 and 30

Add your two answers.
**TREASURES**

It is estimated that 30% of all cars parked in a metered lot outside City Hall receive tickets for meter violations. In a random sample of 5 cars parked in this lot, what is the probability that at least one receives a parking ticket?

Round your answer to the nearest percent. Find the sum of the digits.

---

**TREASURES**

A chemistry professor decides to grade his chemistry exam on a curve - 15% Fs, 15% Ds, 40% Cs, 20% Bs, 10% As. The average grade was 54 with a standard deviation of 11. What grade must a student get to receive a B or better?

Divide the answer by 6. Round to the nearest whole number.
Use a segment to match each term with the description.

- **Blocking** + Keeping extraneous factors constant so they don’t interfere with the experiment.
- **Direct Control** + Choosing samples in a way so that extraneous factors don't interfere with the experiment.
- **Parameter** + Such as population mean, population standard deviation
- **Replication** + Such as sample mean, sample standard deviation
- **Statistic** + Able to repeat an experiment and get similar results

Count the number of intersections.

---

Andrew’s math class took three tests - Test 9, Test 10 and Test 11. The table below summarizes the results on each test.

<table>
<thead>
<tr>
<th>Test</th>
<th>Andrew’s Score</th>
<th>Class Average</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>76</td>
<td>58</td>
<td>5.4</td>
</tr>
<tr>
<td>10</td>
<td>62</td>
<td>53</td>
<td>6.1</td>
</tr>
<tr>
<td>11</td>
<td>81</td>
<td>65</td>
<td>6.8</td>
</tr>
</tbody>
</table>

Relative to the other students, on which test did Andrew perform the best?
If a distribution of test scores is skewed right, which of the following must be true?

7: The median is greater than the mean.
6: The median is less than the mean.
5: The median equals the mean.
4: There is not enough information to know the relationship between the median and mean.

A pair of six-sided dice is rolled, what is the probability that the sum is 5?

Round to the nearest percent. Add 3.
Which of the following is not true?

5: In an experiment some treatment is intentionally forced on one group to note the response.

6: In an observational study information is gathered on an already existing situation.

9: Sample surveys are observational studies, not experiments

12: While observational studies may suggest relationships, it is usually not possible to conclude cause and effect because of possible confounding variables.

13: An experiment that involves a control group and a treatment group is guaranteed to show a cause and effect relationship

In a particular college calculus class of 118 students, 46 students are freshmen, 41 took calculus in high school, and 7 of the freshmen took calculus in high school.

What is $P(\text{calculus} \mid \text{freshman})$? Round to the nearest percent.
A grocery store manager notes that 35% of customers who buy a particular product make use of a store coupon to receive a discount. If seven people purchase the product, what is the probability that fewer than four will use a coupon?

Round to the nearest percent. Subtract 5 from the digit in the tens place.

Suppose that the average height of adult males in a particular locality is 70 inches with a standard deviation of 2.5 inches.

What height marks the 90th percentile? Find the difference between the tens place and ones place.
In a simple random sample of 30 teenagers, the average number of texts handled in a day was 50 with a standard deviation of 15. What is the 95% confidence interval for the average number of texts handled by teens daily?

Find the lower bound of the confidence interval. Add the tens place and the tenths place.

Gus is running a race alongside 6 other runners. The first five runners to cross the finish line will be given a medal (gold, silver, bronze, steel, and paper). How many different outcomes are possible for giving out the five medals?

Add the digits to your answer. Add 7.