MAKE THE BURGER OF YOUR DREAMS

START WITH
1/4 lb. 100% BEEF

MAKE IT CHEESY
Natural sharp white cheddar
American cheese

MAKE A DOUBLE
for an additional charge

CHOOSE YOUR BREAD
Buttered toasted ciabatta roll
Buttered toasted artisan roll

ADD THICK CUT APPLEWOOD SMOKED BACON

TOP IT OFF
Guacamole
Sliced jalapenos
Grilled mushrooms
Caramelized onions
Crisp red onions
Fresh slice ripe tomato
Crisp green leaf lettuce

FEELIN' SAUCY
Big Mac® special sauce
Spicy mayo
Creamy garlic sauce
Ketchup
Mayo
Milkshake

CHOOSE YOUR BREAD
Buttered toasted ciabatta roll
Buttered toasted artisan roll

MAKE A DOUBLE
for an additional charge

ADD THICK CUT APPLEWOOD SMOKED BACON
Build your own custom burger.

1. Let's start cookin'!
   - 1/4 lb* 100% pure beef
     (includes choice of bun, cheese, toppings and sauce)
   - Make your burger a double
     (for an additional charge)
   - Thick cut bacon
     (for an additional charge)

2. Roll with it
   - Buttered toasted ciabatta roll
   - Buttered toasted artisan roll
   - Lettuce wrap

3. Make it cheesy
   - Natural cheddar
   - Natural pepper jack
   - American cheese
   - Natural shaved parmesan

4. Top it off
   - Guacamole
   - Sliced jalapeños
   - Grilled mushrooms
   - Sliced red onions
   - Crispy onions
   - Sliced cucumbers
   - Grilled seasoned tomato slice
   - Caramelized grilled onions
   - Chili lime tortilla strips
   - Fresh sliced ripe tomato
   - Crisp green leaf lettuce
   - Crinkle cut pickles

5. Make it saucy
   - Big Mac® special sauce
   - Sriracha mayo
   - Creamy garlic sauce
   - Sweet onion BBQ
   - Creamy avocado sauce
   - Parmesan peppercorn sauce
   - Mayonnaise
   - Ketchup
   - Mustard

*Weight before cooking. Ingredients may vary by location. Available during select hours. In restaurant only. At participating McDonald's®.

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How Many Different Burgers are There?

This print-out might help you as you work through the “Create Your Own” assignment on Blackboard

1. _______ How many choices are there for step one (“Let’s Start Cookin”)?

2. _______ How many choices are there for Step 2?

3. _______ How many ways can you put cheese on your burger (Step 3)?
   
   HINT: Don’t forget the “no cheese” option or the more than one cheese option. You can think of each decision as a “yes/no”. For example, Pepper Jack: 2 choices (yes or no), American 2 choices (yes or no), Cheddar: 2 choices (yes or no), and Parmesan 2 choices (yes or no).

4. _______ How many ways are there to put toppings on your burger (Step 4)?  
   HINT: This is a similar process for determining the number of ways you can put cheese on the burger.

5. _______ How many ways are there to add sauces (step 5)?

6. _______ How many different burgers can you make from this menu? (multiply your answers from questions 1 – 5)

7. _______ If each burger costs $5, how much would it cost to try each one?

8. (_______ years, _______ months and _______ days) If you tried a new burger each day, how long (years, months, days) would it take you?
Consumer Mathematics Project Option One: Pizza Project  
MTH 161: Quantitative Reasoning  
2018 - 2019

You may also create your own “consumer math” project to use in place of this project. If you choose to create your own project, be sure to consult your instructor to ensure you will qualify for the full points. There are suggested projects at the end of chapter 11 in the textbook.

Introductory Information
If you want to make wise decisions regarding purchases, it is critical that you know how to determine the “best buy”. There are many things a consumer should consider when looking for the “best buy”. For example, sometimes the best price is not the “best buy”. If you purchase a cheap pair of shoes that only lasts you a month, you might have to replace them more often than a good pair of shoes. In some cases, the best buy might be a more expensive option. If you do not consume a lot of peanut butter every month, then a large tub that has a better unit price might not be the best buy for you, because the product might expire before you consume it, so you will have wasted money.

Often, a starting point for evaluating the best buy is to calculate a unit price. Unit price can be used to compare two items, but only if the unit is the same. Some units are standard, such as a pound of fudge or a foot of yarn. Other units are not standard. What is a small bag of popcorn? Is a small bag of popcorn at the Main Street Theater the same as a small bag of popcorn at the zoo? A “piece of pizza” is not a standard unit. Pieces of pizza come in all sizes. A piece of pizza from Costco is very different from a piece of pizza from Imo’s. By the way, did you know that when you order a pizza from most restaurants, you can ask them to cut the pizza in any number of pieces you choose? If Pizza Heaven usually cuts their large pizza in 8 pieces, you can request that they cut it in 12 slices instead! In order to compare unit prices, the units must be standard. Therefore, price per pieces is not a good unit price to use to make a comparison.

Compare the value of pizza options for three sizes of pizzas from four different pizza restaurants (3 x 4 = a total of 12 different pizzas). Be sure to use a consistent number of toppings and special features, and compare similar pizzas.

1. Get the diameters, number of pieces and prices for pizzas from four or more restaurants. You must include at least two of the following restaurants:
   a. Papa Johns
   b. Pizza Hut
   c. Dominos
   At least two of the restaurants must be small businesses (with no more than 3 locations).
2. Find the area of each of the pizzas.
3. Find the cost per square inch for each pizza. Round to the hundredth of a cent (4 decimal places)
4. Find the cost per piece for each pizza. Round to the hundredth of a cent (4 decimal places)

Written Paper
Write a two to three full page paper with four or more paragraphs (typed, double spaced, New Time Roman font 12, 1 inch margins). If you have less than 2 pages of written text (not including a heading, etc.), you will not receive full credit for the project.
The paper should be narrative rather than bullet-pointed and must explain how you completed this project as well as cover each of the following:

1. What would you use (cost per piece or cost per square inch) to find the best value? Why?
2. What does “best value” mean? Which pizza is the best value? (Which restaurant and which size).
3. When would you choose the best-valued pizza? When wouldn’t you? For example, how is shopping for pizza for a party for 100 junior high students different from shopping for pizza for 10 professional adults?
4. What are some common incorrect ways to choose the best-valued pizza?
5. Why would someone choose a pizza that is not the best value? Give more than one example.
6. Which is more significant: cost per square inch or cost per piece? Why?

**Display**

Create a display using a standard science-project board (36” x 48” open and 36” x 24” closed). The display should demonstrate your findings in a creative way. Display the Area Calculations on left flap, the Unit Price Calculations on the right flap, and your Findings in the center panel.
## Math 161 Pizza Project
### Fall 2018 Grade Rubric

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<tr>
<td>Area is calculated accurately and work is shown.</td>
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<td></td>
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<tr>
<td>Cost per square inch is calculated accurately and work is shown.</td>
<td>15</td>
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<td></td>
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<td><strong>Final Grade</strong></td>
<td>(100)</td>
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## Pizza Project Calculations

Provide your final calculations here. For prices, Round to the hundredth of a cent (4 decimal places). Turn the work you have shown to document your answers on a separate paper.

### Location One Name:

<table>
<thead>
<tr>
<th>Diameter</th>
<th>Number of pieces</th>
<th>Price</th>
<th>Area</th>
<th>Price Per Piece</th>
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Size One

Size Two

Size Three

### Location Two Name:

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Size One

Size Two

Size Three

### Location Three Name:

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Size One

Size Two

Size Three

### Location Four Name:

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<tbody>
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</tbody>
</table>

Size One

Size Two

Size Three
Turning in your Project:

What to Turn In

1. **Your Calculations:** Include the calculation sheet (provided), and submit a page that shows all your handwritten work.

2. **Your Paper:** Your written paper must meet the qualifications that are listed. It is suggested that you work with a writing tutor if you need assistance with spelling and grammar.

3. **Your Display:** Your display must meet the qualifications that are listed.

How to Turn Items In

1. **Your Calculations:** You may turn in your written work OR a scan of your written work. Include the calculation sheet (provided) with your work.

2. **Your Paper:** Turn in your written paper in the form of either a PDF or Microsoft Word document.

3. **Your Display:** There are 2 options
   a. Drop off your display in room 211 or 228 at the Wildwood Campus
   b. Turn in the following photos of your display
      1. A photo of your entire display
      2. A photo of the CENTER panel of your display
      3. A photo of the LEFT panel of your display
      4. A photo of the RIGHT panel of your display
A few Things to Think About:

1. Did you know that you can request that a pizza be cut into any number of sizes you wish? For this project, we are using the standard cuts for each restaurant, or in other words, we are using the restaurant’s regular number of pieces for each pizza. But when you think through the question of which unit price gives you the best information (price per piece or price per square inch), you should keep in mind that price per piece can change, while price per square inch is set.

2. Be careful with rounding.
   If you get unit prices of $0.3728 and $0.3725, both will round to 37 cents. However, when you are making a comparison, $0.3725 < $0.3728
The project includes 5 parts:

1. Create a typed survey and administer the survey to 100 or more different people.
2. Calculate a mean, median, and mode from the data.
3. Calculate a standard deviation and variance from the data.
4. Create a poster board with both a histogram and circle graph that demonstrates your data. The graphs must be created by hand, and may not be computer-generated.
5. Write two papers. Each paper is to be two to four pages long (typed, double spaced, New Time Roman font 12, 1 inch margins). Please note that any heading information may not be included in the calculation of the number of pages.

1. Create a survey and administer the survey to 100 or more different people.
   - The survey must be approved before it is administered. The survey will be shared with your classmates on Blackboard.
   - Turn the survey in on Blackboard on or before the survey due date so that you receive useful feedback about the survey questions before you administer the survey.
   - The survey must contain at least two different questions that are related to one another.
     
     One question must have four to six non-number answers to choose from (example: Choose your favorite ice cream flavor from among this list: Vanilla, Cherry Garcia, Chocolate, Strawberry, Blueberry, Spumoni)

     One question must have a number answer. Do not use a range for your answer choices, as this will make some of the calculations difficult. (example: How many times a month do you eat ice cream?). The question should be open-ended.
   - The survey must also collect some type of information about the survey participant such as age, grade level, gender, etc.
   - The survey must be typed, but it can be given electronically or on paper.

2. Calculate a mean, median, and mode from the data
   This will be done with the data that is a number answer. Show all the work and write your final calculations on the “Calculation Sheet”.

3. Calculate the standard deviation from the data.
   This will be done with the data that is a number answer. Show all the work and write your final calculation on the “Calculation Sheet”.

4. Create a poster board with both a histogram and a circle graph that demonstrates your data.
   - This will be done with the data that is not a number answer (not the demographics data – use the survey question data).
   - The poster board should be a standard poster board size (approximately 22 in x 28in).
   - The two graphs must be created by hand and should not be computer generated.
   - The circle and its angles must be accurate: use something to measure the angles and use something to draw a perfect circle. (For example, you can use string and a pin to ensure you have a perfect circle or you can trace an object). You will need to convert the percentages to angles using the fact that a circle has a total of 360 degrees.
• Do you know how to create a histogram? Use online resources to find the specifics. HINT: the bars should be touching one another and should be the same width. Use a straight-edge.
• For full credit, use color and make sure your work looks like college-level work. (Unless you have an artistic purpose to do otherwise, stay away from crayons).
• A quality poster board will make use of most of the space.
• Include neatly written titles and scales.

5. Write a two to four page paper with four or more paragraphs
• Typed, Double spaced, New Time Roman font 12, 1 inch margins
• There should be at least two pages of text not including your heading or other extra information.
• The paper should be narrative rather than bullet-pointed and must cover each of the following:
  a) An explanation/description of the data collection process. For example, what sampling technique did you use and why? How did this affect your data?
  b) Why did you choose this topic?
  c) Who did you survey? Why? Do you feel that the group you surveyed is a good representative group for this question? Why or why not? What was difficult or easy about this data collection?
  d) An explanation of what the mean, median and mode reveal about this particular data
  e) An explanation of what the standard deviation reveals about this particular data
  f) Who would be interested in this data?
  g) If you were to start this project over, what might you change in your survey?

6. Write a two to four page paper with six or more paragraphs titled “Sampling Techniques”

Refer to section 13.1 in the textbook to complete the questions on the sheet.

• Typed, Double spaced, New Time Roman font 12, 1 inch margins
• There should be at least two pages of text not including your heading or other extra information.
• The paper should be narrative rather than bullet-pointed and must cover each of the following:
  a) Write one paragraph for each of the following sampling techniques:
    Random, Systematic, Cluster, Stratified, and Convenience.
    a. For each technique, how could you have carried out the given technique with your survey? Be specific.
    b. For each technique, how would your findings have been more enriched by using the given technique?
    c. For each technique, what would have been the drawbacks and benefits of having used that technique?

  b) Which technique did you actually use for your project?
    a. Describe how you used this technique?
    b. Why did you use this technique?
    c. How did your sampling technique affect your data? For example, is your data skewed by your collection process?
# Math 161 Project: Statistics Collection and Analysis
## Grade Rubric

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Name___________________________________________

Project Calculations

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Checklist of Items to Turn in:
- A printed copy of your survey
- This page
- Your shown work for calculations
- Poster board
- 2 papers
Projects and Mini-projects for Non-stem Pathway Courses

Where these particular projects can fit into college-level math courses:
- Out-of-class homework assignments
- Out-of-class project replaces a test or exam
- In-class collaborative work
- Online classes

Large Projects
- Statistics Survey
- Create a Game of Chance
- Create a Math Lesson Based on a Children's Book
- Best Value Pizza
Mini Projects

• Build your own Burger/ Build your own Pasta
• Open-ended Venn Diagrams
• How Many Subsets?

How to Create Meaningful Projects

1. What are the learning objectives?
2. Where does critical thinking fit in?
3. Where is there a practical application?
How to Create Meaningful Projects

1. What are the learning objectives:
   Students will use unit price to make consumer decisions.

2. Where does critical thinking fit in:
   When is the "best price" not the "best value"?
   When do we make decisions that do not put a priority on "best value"?
   To compare two options, the units must be equivalent.

3. Where is there a practical application:

Projects and Mini-projects for Non-stem Pathway Courses

Pizza Project

- Compare the unit prices of pizza options for three sizes of pizzas from four different pizza restaurants.
- Find the cost per square inch for each pizza.
- Find the cost per piece for each pizza.

Projects and Mini-projects for Non-stem Pathway Courses

Pizza Project

Be Specific.
Over-communicate Expectations.

- Compare the unit prices of pizza options for three sizes of pizzas from four different pizza restaurants. (3 x 4 = a total of 12 different pizzas). Be sure to use a consistent number of toppings and special features, and compare similar pizzas. Get the diameters, number of pieces and prices for pizzas from four or more restaurants. You must include at least two of the following restaurants: Papa John's, Pizza Hut, Dominos. At least two of the restaurants must be small businesses (with no more than 3 locations). Find the area of each of the pizzas.
- Find the cost per square inch for each pizza. Round to the hundredth of a cent (4 decimal places)
- Find the cost per piece for each pizza. Round to the hundredth of a cent (4 decimal places)
Projects and Mini-projects for Non-stem Pathway Courses

Pizza Project

Be Specific.
Over-communicate Expectations.

Written Paper: Write a two to three full page paper with four or more paragraphs (typed, double spaced, New Time Roman font 12, 1 inch margins). If you have less than 2 pages of written text (not including a heading, etc.), you will not receive full credit for the project.

- Which unit price would you use (cost per piece or cost per square inch) to find the best value? Why?
- What does ”best value” mean? Which pizza is the best value? (Which restaurant and which size).
- When would you choose the best-valued pizza? When wouldn’t you? For example, how is shopping for pizza for a party for 100 junior high students different from shopping for pizza for 10 professional adults?
- What are some common incorrect ways to choose the best-valued pizza?
- Why would someone choose a pizza that is not the best value? Give more than one example.
- Which is more significant: cost per square inch or cost per piece? Why?

Display

- Create a display (using a standard science-project board).
- The display should demonstrate your findings in a creative way.
- Display the Area Calculations on left flap, the Unit Price Calculations on the right flap, and your Findings in the center panel.
How to Create Meaningful Projects

1. What are the learning objectives:
   - Students will use compare and contrast the various types of sampling.
   - Students will analyze data from a survey and draw conclusions from the analysis.

2. Where does critical thinking fit in:
   - Who would be interested in this data? Why?
   - If you were to start this project over, what might you change in your survey?

3. Where is there a practical application:
Projects and Mini-projects for Non-stem Pathway Courses

Statistics Project

The project includes 5 parts:
1. Create a typed survey and administer the survey to 100 or more different people.
2. Calculate a mean, median, and mode from the data.
3. Calculate a standard deviation and variance from the data.
4. Create a poster board with both a histogram and circle graph that demonstrates your data. The graphs must be created by hand, and may not be computer-generated.
5. Write two papers. Each paper is to be two to four pages long (typed, double spaced, New Time Roman font 12, 1 inch margins). Please note that any heading information may not be included in the calculation of the number of pages.

Statistics Project

Paper #1
The paper should be narrative rather than bullet-pointed and must cover each of the following:
• An explanation/description of the data collection process. For example, what sampling technique did you use and why? How did this affect your data?
• Why did you choose this topic?
• Who did you survey? Why? Do you feel that the group you surveyed is a good representative group for this question? Why or why not? What was difficult or easy about this data collection?
• An explanation of what the mean, median and mode reveal about this particular data
• An explanation of what the standard deviation reveals about this particular data
• Who would be interested in this data?
• If you were to start this project over, what might you change in your survey?

Statistics Project

Paper #2
The paper should be narrative rather than bullet-pointed and must cover each of the following:
• Write one paragraph for each of the following sampling techniques: Random, Systematic, Cluster, Stratified, and Convenience.
  * For each technique, how could you have carried out the given technique with your survey? Be specific.
  * For each technique, how would your findings have been more enriched by using the given technique?
  * For each technique, what would have been the drawbacks and benefits of having used that technique?
• Which technique did you actually use for your project?
  * Describe how you used this technique?
  * Why did you use this technique?
  * How did your sampling technique affect your data? For example, is your data skewed by your collection process?
Projects and Mini-projects for Non-stem Pathway Courses

How to Create Meaningful Projects

1. What are the learning objectives:
   Students will apply counting principles to find combinations.
   Students will apply counting principles to find the number of combinations.

2. Where does critical thinking fit in:
   • How many different burgers can you make?
   • How much would it cost to try every burger?
   • How long would it take to try every burger if you tried one per day?

3. Where is there a practical application:

Venn Mini-Project

To be successful with Venn Diagrams, you must have a very good understanding of the difference between a Union and an Intersection.

1. In your own words, what is the difference between the **Intersection** and **Union** of sets?
2. Describe the elements of each of the following sets with words. Give your answer in the most simplified, concise wording possible to receive full credit. Don’t forget to answer with a complete sentence, including the question in your answer.

   a. \( W \cup A \)  
   b. \( W \cap A \)  
   c. \( A \cap B \)

3. Draw a Venn Diagram for sets C, D and E. List the elements of each of the following.

   a. \( C \cup D \)  
   b. \( D \cup E \)  
   c. \( C \cap D \)

4. List the elements of each of the following. Don’t forget to include he question in your complete statement answer.

   a. \( D \cap E \)  
   b. \( D \setminus E \)  
   c. \( (C \cup D) \setminus E \)
5. 50 students enrolled have enrolled for classes at STLCC. Suppose 23 students needed to take Developmental English and 34 needed to take Developmental Math. Draw five different Venn Diagrams that can all be used to correctly display this data.

**HINT:** The difference in each Venn Diagram will be how many students are in the intersection! Think about the maximum and minimum number possible in the intersection.

- What is the least number of students that could have needed both?
- What is the greatest number of students that could have needed both?
- What is the greatest number of students that could have needed neither?

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### How Many Different Burgers are There?

- ________How many choices are there for step one ("Let's Start Cookin")?
- ________How many choices are there for Step 2?
- ________How many ways can you put cheese on your burger (Step 3)?

**HINT:** Don't forget the "no cheese" option or the more than one cheese option. You can think of each decision as a "yes/no". For example, Pepper Jack: 2 choices (yes or no), American: 2 choices (yes or no), Cheddar: 2 choices (yes or no), and Parmesan: 2 choices (yes or no).

How many ways are there to put toppings on your burger (Step 4)?

**HINT:** This is a similar process for determining the number of ways you can put cheese on the burger.

- ________How many ways are there to add sauces (step 5)?

### How many different burgers can you make from this menu? (multiply your answers from questions 1 – 5)

If each burger costs $5, how much would it cost to try each one?

- ________years, ________months and ________ days

If you tried a new burger each day, how long (years, months, days) would it take you?
How Many Different Burgers are There?

- How many choices are there for step one ("Let's Start Cookin")?
- How many choices are there for Step 2?
- How many ways can you put cheese on your burger (Step 3)?

*Hint:* Don't forget the "no cheese" option or the more than one cheese option. You can think of each decision as a “yes/no” choice. For example, Pepper Jack: 2 choices (yes or no), American 2 choices (yes or no), Cheddar: 2 choices (yes or no), and Parmesan: 2 choices (yes or no).
How Many Different Burgers are There?

• How many ways are there to put toppings on your burger (Step 4)?
  HINT: This is a similar process for determining the number of ways you can put cheese on the burger.

• How many ways are there to add sauces (step 5)?

How Many Different Burgers are There?

• How many different burgers can you make from this menu? (multiply your answers from questions 1 – 5)

• If each burger costs $5, how much would it cost to try each one? (_____ years, _____ months, _____ days)

• If you tried a new burger each day, how long (years, months, days) would it take you?

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