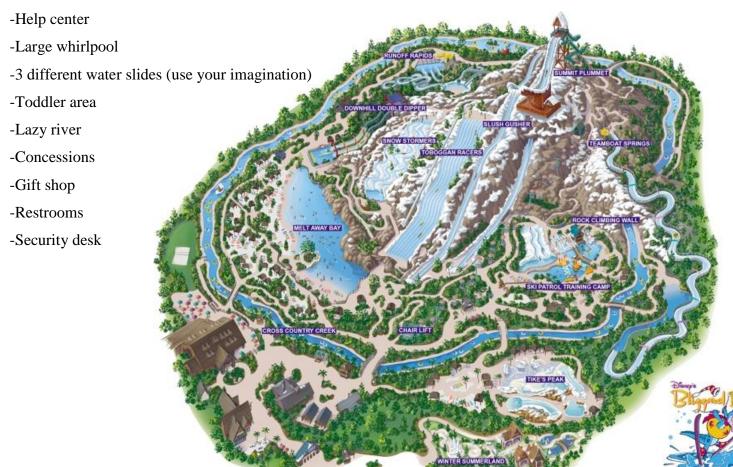## Water Park Project Part 1

TASK 1: Designing your Park

You have recently been hired to create a blueprint for a water park. Your boss, Gelatinous Harrington, is a very controlling person. She wants you to include specific attractions and necessities in your design. Be prepared to answer her questions before you have had enough time to adequately explain what you are doing. First off, she wants it to be done on a large sheet of graph paper so that she can apply her mathematical knowledge to make the park the best it can be. She has issues and will yell at you if you do not do this properly. Before starting your blueprint, identify the center of your paper, and use a ruler to draw in the x and y axes. Then, you need to plot the approximate entrance points (where the line starts!) of each attraction on the graph paper and draw in the remaining part of the attraction around it in a creative fashion. Try to spread them out as much as possible. Use a pencil to draw the items and then go back and color them in with colored pencils.

Items to be included on the design are listed below:

-Help center

-Large whirlpool

-3 different water slides (use your imagination)

-Toddler area

-Lazy river

-Concessions

-Gift shop

-Restrooms

-Security desk

TASK 2: Naming Your Coordinates

After planning out the layout and design of each water park attraction, you must identify it's location by using ordered pairs. Use your "entrance points" as the attractions identifiable location, and fill in the chart below accordingly!

Location:	Ordered Pairs:
Help Center	(_____ , _____)
Large Whirlpool	(_____ , _____)
Water Slide #1	(_____ , _____)
Water Slide #2	(_____ , _____)
Water Slide #3	(_____ , _____)
Toddler Area	(_____ , _____)
Lazy River	(_____ , _____)
Concessions	(_____ , _____)
Gift Shop	(_____ , _____)
Restrooms	(_____ , _____)
Security Desk	(_____ , _____)

TASK 3: Calculating the Slope

After identifying each attraction's location with ordered pairs, you are now ready to calculate the slope between attractions using the slope formula,

$$\frac{Y_2 - Y_1}{X_2 - X_1}$$

Using a RED pencil and a ruler, MARK the direct path to/from the locations mentioned below. Calculate the slope of the line that is formed, and show your work in the space provided.

Help Center to Water Slide #1	Toddler Area to Concessions
Gift Shop to Restrooms	Security Desk to Water Slide #2
Lazy River to Large Whirlpool	Help Center to Gift Shop
Restrooms to Water Slide #3	Concessions to Lazy River
Water Slide #1 to Water Slide #2	Water Slide #2 to Water Slide #3

TASK 4: Calculating the Midpoint

Sally Toodles is meeting her mom at the halfway point between the attractions listed above. They have asked you to calculate their meeting spots, by applying the midpoint formula,

Mark the MIDPOINTS with RED POINTS, and show your work in the space provided!

Help Center to Water Slide #1	Toddler Area to Concessions
Gift Shop to Restrooms	Security Desk to Water Slide #2
Lazy River to Large Whirlpool	Help Center to Gift Shop
Restrooms to Water Slide #3	Concessions to Lazy River
Water Slide #1 to Water Slide #2	Water Slide #2 to Water Slide #3

Water Park Project Part 2

Congratulations! After working hard to design your park on a coordinate system, your supervisor is very pleased with your efforts and the results! Now that the planning stage is finished, your park has been selected for construction. Site development is underway, and you have been hired as a consultant to work with the development team. Your role is to apply your math skills in the following tasks, which will then be submitted for review to your supervisor. Keep your work neat and organized so that they can accurately assess your abilities.

TASK 5: Calculating the Distance

A team of surveyors is trying to determine how large a space they will need to design your park. You have been asked to determine, using the distance formula, how far away certain attractions are from one another. This will provide them with the information they need to expand the park from your scaled blueprint to actual dimensions. Calculate the distance in unit dimensions by applying your selected attraction points (Task 2) and the **distance formula**,

$$D =$$

Show your work in the space provided!

Help Center to Water Slide #1	Toddler Area to Concessions
Gift Shop to Restrooms	Security Desk to Water Slide #2
Lazy River to Large Whirlpool	Help Center to Gift Shop

Restrooms to Water Slide #3	Concessions to Lazy River
Water Slide #1 to Water Slide #2	Water Slide #2 to Water Slide #3

Task 6: Converting to Actual Dimensions

Your water park design has been drawn as a blueprint, but to build it, you will need *actual* dimensions in lieu of the unit dimensions. A large rectangular plot of land has been selected for development, and the city has given approval for construction. Knowing that the *actual* dimensions for the land is 301m x 196 m in size, determine the *scale* of your coordinate system.

1st: count the number of spaces along the length of your paper: _____ spaces.

2nd: set a ratio equal to _____ spaces per 301m.

Now, use this ratio to solve for the actual unknown distances by setting up a proportion and calculating. Show your work!

Show your work in the space provided!

Help Center to Water Slide #1	Toddler Area to Concessions
Gift Shop to Restrooms	Security Desk to Water Slide #2

Lazy River to Large Whirlpool	Help Center to Gift Shop
Restrooms to Water Slide #3	Concessions to Lazy River
Water Slide #1 to Water Slide #2	Water Slide #2 to Water Slide #3

Task 7: Writing Linear Equations.

In task 3 you identified direct paths between various park attractions by drawing them in with red lines. Now, you will show off your skills by writing equations for each of those red lines.

- Use the linear equation, y = mx +b and solve for B (the y-intercept). Use your *slope (m)* from task three and one of the identified endpoints of that line (x, y).

- After solving for b, write each red line's equation using only the value for slope and the y-intercept value, leaving x and y as variables!

Help Center to Water Slide #1	Toddler Area to Concessions
Solve for B:	Solve for B:
Y = _____ X + _____	Y = _____ X + _____
Gift Shop to Restrooms	Security Desk to Water Slide #2
Solve for B:	Solve for B:
Y = _____ X + _____	Y = _____ X + _____

Lazy River to Large Whirlpool	Help Center to Gift Shop
Solve for B: $Y = \_\_\_\_ X + \_\_\_\_$	Solve for B: $Y = \_\_\_\_ X + \_\_\_\_$
Restrooms to Water Slide #3	Concessions to Lazy River
Solve for B: $Y = \_\_\_\_ X + \_\_\_\_$	Solve for B: $Y = \_\_\_\_ X + \_\_\_\_$
Water Slide #1 to Water Slide #2	Water Slide #2 to Water Slide #3
Solve for B: $Y = \_\_\_\_ X + \_\_\_\_$	Solve for B: $Y = \_\_\_\_ X + \_\_\_\_$

Task 8: Solving for Systems of Linear Equations: Determining "intersection" point.

By successfully writing equations to define each red line, you are now to solve for where those lines might meet on your coordinate grid.

- Select two lines, preferably two that cross on your blueprint, and use the substitution method to solve for their intersection point.
- Mark each intersection point using a YELLOW POINT on your blueprint.
- Repeat this for a total of *three* intersecting lines.

Example problem:

$Y = -2X + 14$ and $Y = 3X - 7$ 　　　　　$-2X + 14 = 3X - 7$ 　　　　　$Y = -2(4.2) + 14$

　　　　　　　　　　　　　　　　　　　　　$-2X = 3X - 21$ 　　　　　　　$Y = -8.4 + 14$

　　　　　　　　　　　　　　　　　　　　　$-5X = -21$ 　　　　　　　　　$Y = 5.6$

　　　　　　　　　　　　　　　　　　　　　　$X = 4.2$

Intersection point = (4.2, 5.6)

A.

Equations: _____ *and* _____

Solve for X: **Substitute for Y:**

Intersection point = (_____ , _____)

B.

Equations: _____ *and* _____

Solve for X: **Substitute for Y:**

Intersection point = (_____ , _____)

C.

Equations: _____ *and* _____

Solve for X: **Substitute for Y:**

Intersection point = (_____ , _____)

Water Park Project Part 3
Written Reflection

As you prepare for the review of your work, there is one more task that needs completion. You will be writing an expository paper to explain the process of your work. By communicating your deeds in a written format, you are communicating your understanding of the work that you have successfully completed. If communicated well, you may be promoted within your organization. Lastly, conclude your paper with a personal reflection of the work.

Task 9: Organizing Your Written Component

Look over the work that has been completed throughout the project. Summarize the objective of each task with one to two sentences.

Introduction: What was the main purpose/theme of the project?

Task One:

Task Two:

Task Three:

Task Four:

Task Five:

Task Six:

Task Seven:

Task Eight:

Personal Reflection:
What are your thoughts/feelings in regard to the work that you produced during this project?

 What might you change or include if you were to do this again?

How could the information you learned, the tasks you did, or the skills you developed help you or your community in the future?