

DESIGN AND MARKET AN AMUSEMENT PARK

Theme parks are a very lucrative business, and you have been hired as the architect/designer for a brand new one! You can work alone or hire 1-2 teammates, but groups cannot be bigger than 3 members. As a group, it will be your job to design and market your park, including choosing a central idea/theme which you will carry throughout the entire project. Then you will build a 3-D model of a ride!

PART 1: (160 pts – 153 from report, 7 for creativity)

Your design may be constructed as a scrapbook/paper report or an electronic presentation such as PowerPoint, but should be arranged in the following order and meet the following requirements. Please note that some rides may take only one page, while others take more, and that is fine! It all depends on your creativity and vision!!

A. Advertisement (2 pts)

Create a flyer or billboard to advertise your park. It should contain the name of your park and all team members.

B. Park Flag (3 pts) (1 – theme, 2 – accurate tessellation)

Create a flag to represent your park and its theme using tessellations. (Tessellation: Pattern of shapes which are all closed and completely cover a surface)

C. Market Your Park (7 pts)

- Write an if-then statement telling visitors *why* they should come to your park. (1)
- Identify the hypothesis and the conclusion. (1)
- Write the converse, inverse, and contrapositive of your statement in if-then form AND symbolic notation. (3)
- Tell whether each of your statements is true or false, and decide if your original if-then statement qualifies as a definition. (2 - 1/2 each)

D. Support Your Park (3 pts)

Support your reasoning to attend your park using both inductive and deductive reasoning.

- For inductive reasoning, you should give an example. 2.1 in textbook (1)
- For deductive reasoning, you should use the law of detachment and the law of syllogism. (2)

E. Customer Survey (3 pts)

- Create a Venn diagram with 3 intersecting circles. Each circle should represent a type of advertisement for your park; i.e., internet, commercial, radio, etc.
- Take a “poll” of 200 people, asking how they’ve heard about your park and place the information on your diagram. The following requirements must be met:
 - some people only heard via one method
 - some people heard via 2 methods
 - some people heard via 3 methods} (1)
- at least 1 person heard via none of the 3 specified methods (1)
- calculate and show the total number of people for each of the 3 specified methods (1)

F. Map (10 pts)

- Draw a map of your park. ALL buildings and rides from this project must be represented and assigned a coordinate. "Grid" out your park. The attractions should be arranged as follows:
 - one must be located at the origin (1/2)
 - one must sit on the x-axis (1/2)
 - one must sit on the y-axis (1/2)
 - there must be at least one attraction in each quadrant (1/2)
 - there must be four rides arranged so that the paths between the pairs form two parallel lines that are not vertical or horizontal; the equations must be written for these lines (2)
 - there must be four rides arranged so that the paths between the pairs form two perpendicular lines that are not vertical or horizontal; the equations must be written for these lines (2)
 - the restaurant must be the midpoint between the entrance and the Ferris Wheel; the calculations must be shown (1)
- Calculate the total distance walked if a visitor walks from the Entrance to the Roaring rapids, then to the Haunted house, then the Gift shop. Only one of these distances may be horizontal or vertical. (2)
- Write the position of the visitor as a vector from the entrance to the gift shop. (1)

G. Characters/Mascots (10 pts) (2 pts for each mascot: 1 A + 1 P)

- Create 5 characters/mascots for your park. They should represent different 2-D shapes, at least one of which must be a composite figure.
- Calculate the area and perimeter of each of the 5 shapes. Formulas and work must be shown!

H. Entrance (3 pts)

Draw, create, or print a picture of the entrance to your park.

- On your picture, identify and label one of each of the following:
 - a pair of supplementary angles (1/2)
 - a pair of complementary angles (1/2)
 - an acute angle (1/2)
 - an obtuse angle (1/2)
 - a straight angle (1/2)
 - a right angle (1/2)

I. Gift Shop (7 pts)

Draw a picture of the gift shop for your park.

- On your picture, place and label points so that they meet ALL of the following requirements:
 - points A, B, and D are collinear (1)
 - \overrightarrow{BA} and \overrightarrow{BD} are opposite rays (1)
 - points E, F, G, and H are non-coplanar (1)
 - planes KLM and LMN intersect at \overline{LM} (1)
 - \overline{EF} and \overline{HF} intersect at point F (1)
 - \overline{QP} and \overline{KL} are parallel (1)
 - \overline{LN} and \overline{HF} are skew (1)

J. Haunted House (5 pts)

Draw a haunted house containing one of each of the following constructions. ALL compass markings must be shown!

- a pair of congruent segments (1)
- a pair of congruent angles (1)
- a bisected angle (1)
- parallel lines (1)
- perpendicular lines (through a point on the line or an external point) (1)

K. Ferris Wheel (8 pts)

Draw, create, or print a picture of a Ferris wheel with 12 buckets. Label the buckets as follows:

- one pair of each of the following congruent triangles. Be sure to label with the congruency statement and congruency markings.
 - SSS (1)
 - SAS (1)
 - AAS (1)
 - ASA (1)
 - HL (1)
- one pair as a CPCTC proof:
 - Label one of the buckets with the given and markings and the other with what you're proving. For the proof, you may create a problem on your own or find one from the textbook or internet. Write the proof anywhere on the page. (3)

L. Roaring Rapids (9 pts)

- Draw or create a picture of the rafts for your ride. Each raft should be shaped like one of the following quadrilaterals. Make sure to put the correct markings on the raft to identify the quadrilateral.
 - Parallelogram (1/2)
 - Rectangle (1/2)
 - Rhombus (1/2)
 - Square (1/2)
 - Trapezoid (1/2)
 - Kite (1/2)
- List all of the properties for each of the six quadrilateral rafts. (6 – one for each shape)

M. Restaurant (5 pts)

- Create 3 items for your menu – a drink, entrée, and dessert – shaped as 3 different 3-D geometric shapes. Each item should be offered in 2 sizes. (3)
- Then choose one of your items and show the ratios of the surface areas and volumes for the 2 sizes. (2)

N. Roller Coaster (9 pts)

- Draw or create a Roller Coaster with cars shaped like each of the following **regular** polygons:
 - Triangle (1/2)
 - Quadrilateral (1/2)
 - Pentagon (1/2)
 - Hexagon (1/2)
 - Heptagon (1/2)
 - Octagon (1/2)
- Find the sum of the interior angles, using the formula, and exterior angles for each polygon. (3)
- Find the measure of each interior and exterior angle for each polygon. (3)

O. Bumper Cars (11 pts)

- Draw, create, or print bumper cars. You should have at least one car for each trig function, labeled with what you need to solve for that function. (3)
- Create or find a problem where you are given one side and one angle, and solve that triangle. The triangle should be incorporated into the ride. (2)
- Create 3 word problems involving your bumper cars, one for each trig function, and solve them. At least one of the problems must use an inverse function to find an angle measure. (6 – 2 pts for each)

P. Fun House (6 pts)

Create rooms in your fun house that give an example of each of the following transformations. Be sure to explain how/why it represents that transformation.

- Reflection (1)
- Rotation (1)
- Translation (1)
- Dilation (1)
- Composition of 2 or more transformations (2)

Q. Tea Cups (11 pts)

- Draw or create a circular base for your teacup ride with a separate entrance and exit that are not directly across from one another.
 - Find the minor arc length between the entrance and the exit, and find the area of that sector. (2)
 - Write the equation for your circle. (1)
- Draw or create 8 teacups for your ride. Each should be assigned a problem covering a topic from the following list. Each problem must be solved and can be created or found from the textbook or internet.
 - congruent chords (1)
 - quadrilateral inscribed in a circle (1)
 - angles inside a circle (1)
 - angles outside a circle (1)
 - segments of chords (1)
 - segments of secants (1)
 - segments of tangents (1)
 - segments of secants and tangents (1)

R. Parking Lot (6 pts)

- Draw a section of your parking lot as a set of parallel lines cut by a single transversal. The transversal must cut at an angle other than 90° . (1/2)
- Label and identify one set of each of the following angle pairs:
 - consecutive interior angles (1/2)
 - alternate interior angles (1/2)
 - alternate exterior angles (1/2)
 - vertical angles (1/2)
 - corresponding angles (1/2)
- Give 2 examples, one proof and one algebraic, which prove your parking spaces are parallel. The examples can be created or found from the textbook or internet. (3 – 1 for algebraic and 2 for proof)

S. -Free Pick- (5 pts)

Create one more attraction. It can be a repeat of something already represented in this project or something different. It should represent at least one of the following topics:

- segment addition postulate
- angle addition postulate
- triangle sum theorem
- base angles theorem
- perpendicular bisectors
- angle bisectors
- similar triangles
- triangle inequality theorem
- geometric mean
- special right triangles
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T. -Daily Work Ethic- (30 pts)

Each day of work will be worth 3 points toward the final grade. You will receive all three points for strong work ethic, focused productivity, and your ability to collaborate well with your peers. Points will be taken away for things such as, but not limited to, the following:

- Talking that is off task
- Playing/Texting on your cell phone or device
- Distracting others

****PART 1 must be completed and turned in before you can start PART 2!****

PART 2: (70 pts – 60 from the ride and calculations, 10 for creativity)

Build a 3-D model of a ride. You may choose one of the rides already represented in this project or a new one, but the following requirements must be met: (14)

- Some materials will be provided but not everything you might need.
- You must have one of each of these six 3-D figures as part of the ride (or decoration), and they must be made by hand (except the sphere):
 - rectangular prism (2)
 - sphere (2)
 - cone (2)
 - cylinder (2)
 - cube (2)
 - pyramid (2)
- One idea on how to make your shapes is to find a net, then fold and seal the paper. Other items can be pre-manufactured. **NO FOOD!**
- The ride must be built upon a board, piece of Styrofoam, or card board.
- The ride must be able to move! (10)
- Write the formulas for the surface area and volume of each of the six required shapes, then measure the shapes and calculate the surface area and volume for each. ALL work must be shown to receive credit! This can be done on a separate piece of paper turned in with your report or included in your PowerPoint. (24 – 4 pts for each shape: 2 SA + 2 V)

**Any other ideas and suggestions are welcome!! However, they must be approved by your teacher before they are applied to your project. Have fun and be creative!!!! ☺

Note: We *are* a BYOT school. If you have a laptop or other device to bring in that may help you on this project, please do! Unfortunately RBMS laptops will not be available to you in class due to SOL testing.

AMUSEMENT PARK PROJECT

Name of your park _____

Architects/Designers _____

Part 1:

- A. Advertisement _____ / 2
- B. Park Flag _____ / 3
- C. Market Your Park _____ / 7
- D. Support Your Park _____ / 3
- E. Customer Survey _____ / 3
- F. Map _____ / 10
- G. Characters/Mascots _____ / 10
- H. Entrance _____ / 3
- I. Gift Shop _____ / 7
- J. Haunted House _____ / 5
- K. Ferris Wheel _____ / 8
- L. Roaring Rapids _____ / 9
- M. Restaurant _____ / 5
- N. Roller Coaster _____ / 9
- O. Bumper Cars _____ / 11
- P. Fun House _____ / 6
- Q. Tea Cups _____ / 11
- R. Parking Lot _____ / 6
- S. Free Pick _____ / 5
- T. Daily Work _____ / 30
- *Creativity _____ / 7

Total for Part 1 _____ / 160

Part 2:

- *3-D Model _____ / 60
- *Creativity _____ / 10

Total for Part 2 _____ / 70

Total for the Project _____ / 200