GREEN SPACE

Design Requirements

1. Start by dividing the park into smaller triangular sections using the following steps.

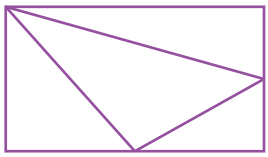
Step 1: Connect one corner of the park with the middle point of the long side.

Step 2: Connect the same corner to the middle point of the short side.

Step 3: Connect the middle points from the long and short sides.

These lines will form the paths that cut through the park.

Sample Diagram



2. Using a protractor, measure each interior angle of the triangle in the middle of the park. Label the angles on your diagram.

3. Each of the triangles that contains one of the park's corners has an angle of 90°. Measure one other angle in each of these triangles using a protractor. Label the 90° angles and the angles you measured on your diagram.

4. Using what you know about the sum of the interior angles of a triangle, determine the remaining angle measure for each of the corner triangles and complete the following table.

	Measure of Angle #1	**Measure of Angle #2**	**How Did You Determine the Measure of the Missing Angle?**	**Sum of Angle Measures**
Corner Triangle #1	90°	40°	180 – (90 + 40) = 50	180°
Corner Triangle #2	90°	60°	180 – (90 + 60) = 30	180°
Corner Triangle #3	90°	73°	180 – (90 + 73) = 17	180°

5. Using what you know about complementary and supplementary angles, determine the measure for each angle of the triangle in the center of the park. Show your work in the following table.

	Did you use the concept of Complimentary or Supplementary Angles?	**How did you determine the measure of the missing angle?**
Measure of Angle #1	Supplementary	180 – (50 + 30) = 100
Measure of Angle #2	Supplementary	180 – (90 + 73) = 17
Measure of Angle #3	Complementary	90 – (40 + 17) = 33

6. Label each of the remaining triangles on your diagram.

7. Record the area for each of the triangles that contain a corner of the park in the following table.

	Base and Height	**Area (in m^2)**
Triangle #1	120 m and 100 m	6,000 m^2
Use this space to show your calculations for determining the area of triangle #1: $A = 1/2$ (100 m x 120 m) = 6,000 m^2		

	Base and Height	**Area (in m^2)**
Triangle #2	200 m and 60 m	6,000 m^2
Use this space to show your calculations for determining the area of triangle #2: $A = 1/2$ (200 m x 60 m) = 6,000 m^2		

	Base and Height	Area (in m^2)
Triangle #3	100 m and 60 m	3,000 m^2
Use this space to show your calculations for determining the area of triangle #3: $A = 1/2$ (100 m x 60 m) = 3,000 m^2		

8. Add the following features to your park. They can overlap the pathways in the park, but should follow the size guidelines. Make each feature a different one of the following shapes:

- square
- circle
- rectangle
- parallelogram that is not a rectangle
- trapezoid

Each feature should be drawn to scale and labeled on your diagram.

Feature	Area
a grassy field area	no more than 8,500 m^2
a playground	no more than 6,000 m^2
a picnic area with a covered structure	no more than 5,000 m^2
an area where dogs can be off leash	no more than 3,000 m^2
a fountain or pond	no more than 500 m^2

NOTE TO TEACHER: Student answers will vary.

Feature Required by the City	Shape	Actual Dimensions	Area (in m^2)
Grassy Field Area	rectangle	length is 400 m and width is 20 m	8,000 m^2
Use this space to show your calculations for determining the area of your grassy field: $A = 400$ m x 20 m = 8,000 m^2			

Feature Required by the City	Shape	Actual Dimensions	Area (in m^2)
Off-Leash Area for Dogs	parallelo-gram	base is 100 m and height is 30 m	3,000 m^2
Use this space to show your calculations for determining the area of the off-leash area: $A = 100 \text{ m} \times 30 \text{ m} = 3{,}000 \text{ m}^2$			

Feature Required by the City	Shape	Actual Dimensions	Area (in m^2)
Picnic Area	square	50 m by 50 m	2,500 m^2
Use this space to show your calculations for determining the area of your picnic area: $A = 50 \text{ m} \times 50 \text{ m} = 2{,}500 \text{ m}^2$			

Feature Required by the City	Shape	Actual Dimensions	Area (in m^2)
Fountain or Pond	circle	r is 10 m	about 314 m^2
Use this space to show your calculations for determining the area of your fountain or pond: $A \approx 3.14 \times (10 \text{ m})^2 = 314 \text{ m}^2$			

Feature Required by the City	Shape	Actual Dimensions	Area (in m^2)
Playground Area	trapezoid	bases are 100 m and 75 m; height is 40 m	3,500 m^2
Use this space to show your calculations for determining the area of the playground area: $A = 1/2 (40 \text{ m})(100 \text{ m} + 75 \text{ m}) = 3{,}500 \text{ m}^2$			

You may also add additional features to the park in order to make your design unique.

Additional Feature	Shape	Actual Dimensions	Area (in m^2)
Use this space to show your calculations for determining the area of your additional feature:			

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Use this space to show your calculations for determining the area of your additional feature:			

9. There will be two life-size statues in the park of people who played an important role in establishing the city. You will need to design two bases for the statues. Each base should be a different three-dimensional shape chosen from the following possibilities.

- right cylinder
- right cone
- right prism
- right pyramid

Show the location for each of the statues on your diagram.

NOTE TO TEACHER: Student answers will vary.

Statue 1

Three-Dimensional Shape	Dimensions	Surface Area (in m^2)	Volume (in m^3)
Right Cylinder	base has a radius of 2 m; height is 3 m	About 62.8 m^2	About 37.68 m^3
Use this space to show your calculations for determining the surface area of base #1: $SA = 2\pi r^2 + 2\pi rh \approx 2(3.14)(2\text{ m})^2 + 2(3.14)(2\text{ m})(3\text{ m}) = 62.8\text{ m}^2$			
Use this space to show your calculations for determining the volume of base #1: $V = \pi r^2 h \approx (3.14)(2\text{ m})^2(3\text{ m}) = 37.68\text{ m}^3$			

Statue 2

Three-Dimensional Shape	Dimensions	Surface Area (in m^2)	Volume (in m^3)
Right Prism	length is 4 m width is 2 m height is 2 m	40 m^2	16 m^3
Use this space to show your calculations for determining the surface area of base #2: $SA = 2(lw + lh + wh) = 2(4\text{ m} \times 2\text{ m} + 4\text{ m} \times 2\text{ m} + 2\text{ m} \times 2\text{ m}) = 40\text{ m}^2$			
Use this space to show your calculations for determining the volume of base #2: $V = lwh = (4\text{ m})(2\text{ m})(2\text{ m}) = 16\text{ m}^3$			