

# Geometer's Skethchpad 5th Grade Guide to Learning Geometry



This Guide Belongs to:

\_\_\_\_\_

Date: \_\_\_\_\_

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-

## Wanted: "A Few Good Students"

*"Hello! My name is Agent Geometry, and I am here to invite you on a trip. Your class has been chosen for a secret mission in Washington D.C. The president is looking for a few good students to form a secret task force. The president is calling for all of the professional 5<sup>th</sup> grade Geometers to come to the nation's capital and complete the missions that they are assigned. If you complete all the missions that you are assigned, you will be inducted into the United Geometer's Federation, and assigned a special task."*



*"In order to efficiently complete our missions, the President has enlisted the help of a special computer program entitled The Geometer's Sketchpad. Before we leave for Washington, there are some preliminary activities to introduce you to Sketchpad. You will work with a partner to complete each activity. You and your partner will share unique jobs throughout these activities. For each activity you will be either a **Mouse Operator** or an **Activity Recorder**. At the end of each activity you will change jobs with your partner. You must complete these activities before you can receive your Federation Badge. This badge will grant you clearance to some classified information that is only seen by the eyes of a Federation Geometer."*

**IMPORTANT:** Before beginning, turn on Auto Show Labels for points and circles. To do this, click on the Display menu and select preferences. Click on the boxes beside Points and Circles if they are not already selected. Also, while in the Preferences dialog box, change the Distance Unit preference to centimeters (cm) and set the precisions to tenths.

## Using Sketchpad

In this section, you will learn some of the basics of using Sketchpad. You will find other information about using Sketchpad in other sections of this booklet. All the information about Sketchpad you need to do the activities can be found in this booklet.

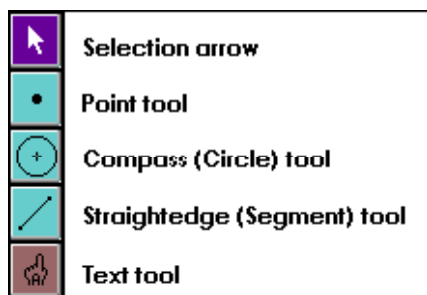
### Creating a new sketch

Create a new sketch by clicking on the File menu and selecting New Sketch. A blank sketchpad will appear.

### Saving a sketch

During these activities, you may want to save your work to a disk. To save a sketch, click on the File menu and select Save. You will be asked to type in a name for your file. (The name must be 8 characters or less.)

## The toolbar



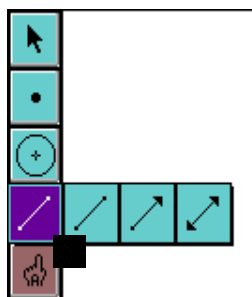
• **Selection arrow**—use this tool to click on objects to move them or resize them. Also use this tool to select (or highlight) objects.

**Important:** To select one or more objects at the same time, hold down the Shift key and click on all of the objects you want selected.

• **Point tool**—use to place points on your sketch.

• **Compass tool**—use to draw circles.

• **Straightedge tool**—use to draw segments, rays, and lines (you will learn more about these in Activity 1). Click and hold down the Straightedge tool to see the options for segments, rays, or lines.



• **Text tool**—use to change object labels. Click on an object to display or hide its label. Double click on a label to change it.

## Clicking and dragging

Something you will be doing a lot in Sketchpad is “clicking and dragging” objects. **Click** means to position the pointer over an object and press the mouse button (and not let go) to select it. **Drag** means to then move the mouse to move the object on the sketchpad.

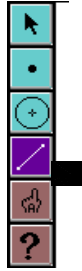
# Investigating Points & Lines

## How to draw a point

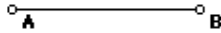
1. Select the Point tool by clicking on it in the toolbar.
2. Position the cursor where you want to place the point. Click. The point appears on your sketchpad.

## How to draw a line segment

1. Select the Segment tool by clicking on it in the toolbar.



2. Click and drag the mouse across the page to draw a line segment.

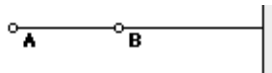


## How to draw a ray

1. Click and hold the Segment tool on the toolbar. Select the Ray tool.



2. Click and drag the mouse across the page to draw a ray.



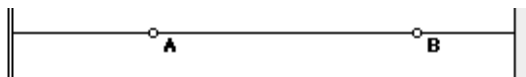
Notice how the ray starts at point A, passes through point B and extends off the sketchpad on one side.

## How to draw a line

1. Click and hold the Segment tool on the toolbar. Select the Line tool.



2. Click and drag the mouse across the page to draw a line.



Notice that the line extends off the page on both sides.

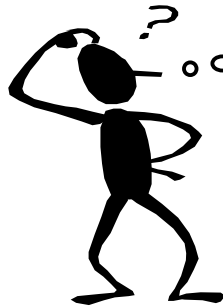


*“Before we start the mission, you will need to know a few things about points and lines. Let’s do a little practice activity.”*

### ACTIVITY 1

Determine who will be the mouse operator and who will be the recorder for this activity. Remember, you will rotate jobs.

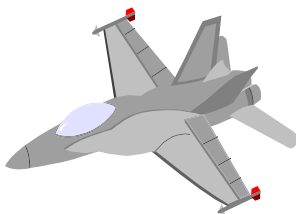
1. Create a new sketch. To do this, click on the File menu and select New Sketch.
2. Place three points on the sketchpad. (Look back to page 3 if you need a reminder.) How many points do you think you could draw on a sketch if you tried? Explain your answer.



*“We will travel to Washington DC via US Air Shuttle from Newport News to Washington National. The airports will serve as the **endpoints** of your course.”*

Check out your book for more information on points and endpoints.

3. Let’s plot your flight course. You need to begin by drawing the two airports that will serve as your **endpoints**. Open a new sketch and place two points wherever you want.



Now let’s name the points. Click on the arrow tool, then double click on the letter A (next to point A). Type in “Washington National” in the place of A. Then change point B to “Newport News” the same way.

Now that you have your points, chose the line segment tool and connect these lines together. This line **segment** represents the path that your plane will fly on when going from Newport News to Washington, D.C.

Now that you have drawn the segment, how many **endpoints** does it have?

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How would you describe a line **segment** to someone that may not know what one is?

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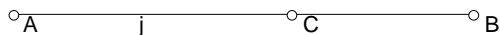
How many **points** are on this segment that you drew? Explain.

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4. Using the same sketch, place a point anywhere on the segment. Your sketch should look similar to this one:\*



\*The labels on your sketch may be different.

Now, how many segments do you see? What are the labels (names) of the segments? Explain your answer.

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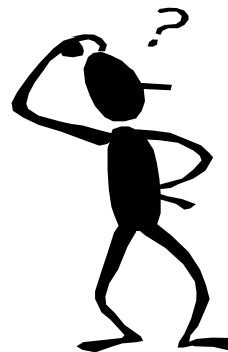
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*“When we reach Washington National, we will take the metro from Washington National to the Metro Center stop. In order for you to be prepared when you reach the metro, I’ve drawn you a portion of the Metro Map.”*

Go to the File Menu and Open the file named “**Activ1.gsp**” If the train tracks represent segments, what do you think the **stations** indicate?

---

*“Now that you are prepared for the Metro, there are a few more geometry facts you need to learn. After completing these few activities, you will be boarding the plane.”*





To learn more about rays,  
look in your textbook!

5. Now, draw a **ray** anywhere on your sketchpad. (Look back to page 3 if you need a reminder.)

How many endpoints are on this ray? Explain your answer.

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How many points are on this ray? Explain your answer.

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Do you see a segment on this ray? Explain.

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*“You know, we see examples of rays in real life everyday! Think of a flashlight. The bulb, where the light comes from is like an endpoint. Suppose we shine our flashlights into the night sky. What would the shining light be like?”*

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To learn more about **lines**  
check out you textbook again.

6. Draw a **line** anywhere on your sketchpad.

How many endpoints are on this line?

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How many points are on this line? Explain your answer.

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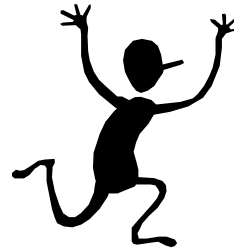
Do you see a segment on the line? Explain.

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**Save this sketch as “sketch1.gsp”**

*“You are doing an excellent job so far. Keep up the good work! You’re flight has just taken off, but during the flight, you need to keep yourself alert and ready for action. I suggest that you use this time to complete two more activities before reaching Washinton, D.C. Good Luck!”*



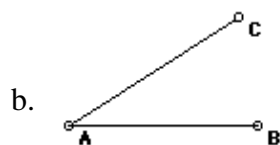
## **Investigating Angles**

### **How to draw an angle**

1. Select the Segment Tool by clicking on it in the toolbar.
2. Click and drag the mouse across the page to draw a line segment.

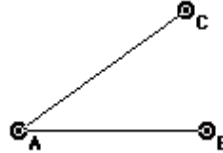


3. While the segment tool is still selected, move the mouse cursor over point A, then click the mouse button and drag to make a new line segment above the first line segment (like Figure b. below).



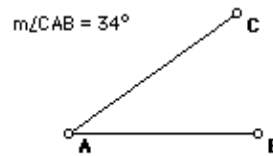
## How to measure an angle

1. Click the selection arrow in the toolbar. Click on one of the endpoints (for example C or B below), then hold the Shift key down and click on the **vertex** and then the other endpoint. (You must select the vertex second.)

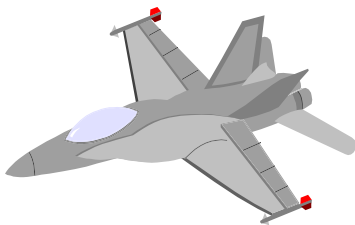


2. Click on the Measure menu and select Angle.

You should now see the measure of the angle in the upper left-hand corner of your sketch. Notice the way the angle is labeled. The letters should be in the same order as you selected them.



*Meets SOL 5.13*



### Activity 2

Swap jobs with your partner. Since there is still some time left before landing in Washington, D.C., it is strongly advised that you study your angles!

1. Construct a  $45^\circ$  angle. Make sure to measure the angle as described above.
  2. Click on the endpoint of the top line segment and drag it to the right. What happens to the angle measure?
-

3. Now, click on the same endpoint and drag it back to the left, but do not make the angle larger than  $89^\circ$ .

All of the angles you just looked at (unless you went past  $89^\circ$ ) are called **acute angles**.

Check out cool stuff about **acute angles** in your textbook.

What do you think would be a good definition of an **acute angle**?

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4. Change the angle measure to exactly  $90^\circ$ .

This is an example of a **right angle**.

Look up more about **right angles** in your textbook.

5. Click on the endpoint of the segment you used before and drag it to the left.

What happens to the angle measure?

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6. Drag the endpoint to look at other angle sizes, but do not go back past  $90^\circ$  or beyond  $179^\circ$ .

All of the angles you just drew are called **obtuse angles**.

What do you think would be a good definition of an **obtuse angle**?

Find out more about **obtuse angles** in your book!

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7. Drag the endpoint until the measure of the angle is exactly  $180^\circ$ .

What does this figure look like?

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Does it look like an angle? Why or why not?

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Check out your textbook for more about **straight angles**.

This looks like a line segment--and it is a segment--but it is also an angle!! This type of angle is called a **straight angle**. What do you think would be a good definition of a **straight angle**?

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\*If you're having trouble, think of something you may have fun with, like your bicycle! There are tons of angles (spokes of wheels, handle bars, frame, etc.)!!

8. There are many angles in your environment. Yep, that's right- in your home, school, and even outdoors. The trick is to pay attention to your surroundings and start noticing. There's never a better time than the present, so start thinking! What are some angles that you see everyday? Write here what you come up with\*:

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### Activity 3

Once again, swap partners for this last activity before landing in Washington, D.C.

1. Thinking back to the previous activity, write down the definition of each of these angles:

Acute:

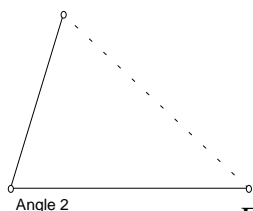
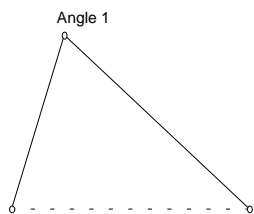
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Right:

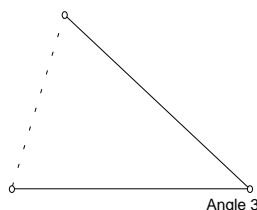
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Obtuse:

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Example 1



2. As we know, a triangle has 3 angles as illustrated in Example 1:

- You can measure the angles of triangles just as you did previously. You are now going to look at a sketch of three triangles. Go to the File menu and select Open. Click the file named "**Activ3\_1.gsp.**"
- Look at Figure 1. Measure the angles of this triangle one at a time and record the measurements below.

Angle 1 = \_\_\_\_\_

Angle 2 = \_\_\_\_\_

Angle 3 = \_\_\_\_\_

This is an **acute triangle**. Why do you think it is called an acute triangle?

\_\_\_\_\_

\_\_\_\_\_

To learn about **acute triangles** look it up in your textbook.

- Look at Figure 2. Measure the angles of this triangle one at a time and record the measurements below.

Angle 1 = \_\_\_\_\_

Angle 2 = \_\_\_\_\_

Angle 3 = \_\_\_\_\_

This is a **right triangle**. Why do you think it is called a right triangle?

\_\_\_\_\_

\_\_\_\_\_

Find out more about **right triangles** in your textbook.

- Look at Figure 3. Measure the angles of this triangle one at a time and record the Measurements below.

Angle 1 = \_\_\_\_\_

Angle 2 = \_\_\_\_\_

Angle 3 = \_\_\_\_\_

Explore **obtuse triangles** in your textbook.

This is an **obtuse triangle**. Why do you think it is called an obtuse triangle?

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7. Open sketch "**Activ3\_2.gsp**" You now have a chance to put your definitions of acute, right, and obtuse triangles to a good use by identifying the triangles on the sketch as obtuse, right or acute. (hint: You may want to use the measuring tool to be sure of the size of your angles!)

Figure 1 is \_\_\_\_\_

Figure 2 is \_\_\_\_\_

Figure 3 is \_\_\_\_\_

Figure 4 is \_\_\_\_\_

Figure 5 is \_\_\_\_\_



*"Well, it's about time to land the plane! Fasten your seat belts and be sure your tray tables are safely secured."*

*"Welcome to Washington, D.C.! We can easily find our way to the Federation building using the map of the Metro. We will be escorted into the conference room, where we can await the arrival of Agent Anderson. He will brief us on the next activity."*

*Meets SOL 5.8*



○ **Agent Anderson:** *"Welcome team. The head of the National Geometer's Federation wants to check your knowledge of polygons. In order to do this, please sketch the following polygons."*

**\*\*Open a new sketch and draw all of these polygons using the line segment tool. When finished, save the sketch as "**Sketch2.gsp**"**

- Triangle
- Quadrilateral
- Pentagon
- Hexagon
- Septagon
- Octagon

Learn more about these polygons in your textbook.

**Agent Anderson:** "Good job! There is only one more step to receive your 'Field Agent Badge.' Open "**Activ3\_3.gsp**" and look at the pictures of the Washington D.C. area. Can you identify examples of the above polygons? If you can identify them and name how many sides they have, you will become 'Federation Field Agents!' Please record the names of the polygons and number of sides below."



NAME: \_\_\_\_\_ # of sides: \_\_\_\_\_

- A) \_\_\_\_\_
- B) \_\_\_\_\_
- C) \_\_\_\_\_
- D) \_\_\_\_\_
- E) \_\_\_\_\_
- F) \_\_\_\_\_

**"Congratulations!! You are now certified Field Geometers! Are you ready for your first classified mission?"**



**Mission 1**

*Meets SOL 5.8*

Don't forget to swap jobs with your partner.

*"Our first mission brings us to the reflecting pool between the Lincoln Memorial and the Washington Monument. Open "**Mission1.gsp**". This sketch will be used to solve the following questions. Once you have done the questions, give me the answers. I will have the information we will need for our next mission."*



1. Measure the length of each side of the rectangle (representing the reflecting pool) and record your answers below. (Look back to page 3 if you need a reminder.)

w = \_\_\_\_\_  
 x = \_\_\_\_\_  
 y = \_\_\_\_\_  
 z = \_\_\_\_\_



Look in your book to find out more on **perimeter**.

2. What is the **perimeter** of this figure?

\_\_\_\_\_

3. Drag point B to resize the figure. Write your new lengths for the sides.

w = \_\_\_\_\_

x = \_\_\_\_\_

y = \_\_\_\_\_

z = \_\_\_\_\_

4. What is the new **perimeter**?

\_\_\_\_\_

5. Check your answers by using the measure menu to measure the perimeter. Select all four points of the figure (hold down the Shift key and click on all four). Click on the Construct menu and select Polygon Interior. Click on the Measure menu and select Perimeter. Does Sketchpad give you the same answers you came up with? If not, list the answers Sketchpad gave you.

\_\_\_\_\_

6. What do you think would be a good definition of **perimeter**? Record your answer below.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

7. Think of a situation in your home, school, or community, where you would use **perimeter** to solve a problem. Record your thoughts below:

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Save the sketch as "sketch3.gsp"

*“Your second mission is about the Washington D.C. area. In order to find the area of the city you must look at a map of D.C. and the surrounding area. Open the sketch named “Mission2.gsp.”*

## Mission 2



*Meets SOL 5.8*

Swap jobs with your partner.

1. In **Mission2.gsp** you see a map of Virginia and Maryland. Located between the two is Washington DC. What do you notice about the shape of DC? Is it similar to any polygons you know?

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2. What is the approximate **area** of the Washington D.C., given that each side of the polygon is 6 miles?

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If you didn't know the length of **one** of the sides of the square, could you still solve the problem? (\*hint)

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Open up “**Mission2\_2.gsp**” and you will once again see the reflecting pool. The area of the reflecting pool is needed in order to be prepared for emergency situations.

What is the **area** of the rectangle?

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If you didn't know the length of one of the sides of the rectangle could you still solve the problem? (\*Hint)

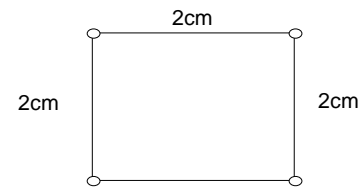
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To find out more about **area** look in your textbook.

**\*HINT:** Information given--



Open up “**Mission2\_2.gsp**” and you will once again see the reflecting pool. The area of the reflecting pool is needed in order to be prepared for emergency situations.

What is the **area** of the rectangle?

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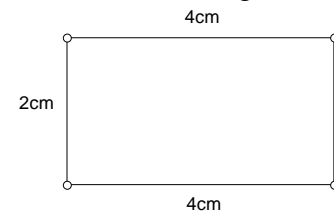
If you didn't know the length of one of the sides of the rectangle could you still solve the problem? (\*Hint)

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**\*Hint:** information given:



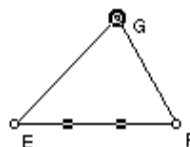
***Congratulations! You completed your second mission. It's time for a break...or so you think!***



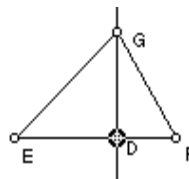
*“After completing your second mission, you decide that it is time for lunch. Your team remembers seeing a street vendor near the Metro Station and you all agree to head over there. As you approach the vendor you see someone who looks very familiar. It is Agent Protractor! He signals for you to come over. You approach him, and he whispers “I have been expecting you. Go to Federal Triangle for your next mission.” You turn to tell your teammates what he said, and when you turn back around, he is gone. You order lunch to go, and hop on the Metro. Next stop, Federal Triangle.”*

## How to measure the height of a triangle

1. Select the base of the angle and the vertex opposite the base.

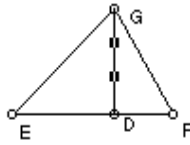


2. Construct a perpendicular line by clicking on the construct menu and choosing perpendicular line.
3. Place a point at the intersection of the base and the perpendicular line.

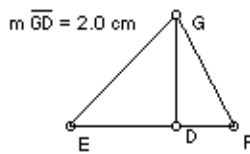


4. Click on the perpendicular line and choose Hide Line from the Display menu.
5. Select the new point on the base and the vertex opposite the base. (Remember to hold down the shift key and click on both points.)

6. Click on the Construct menu and select Segment.



7. While the new line segment is still selected (as shown above) click on the Measure menu and select Length. The length of that segment is also the height of the triangle.



### Mission 3

Meets SOL 5.8

Swap jobs with your partner.

“Here we are at the Federal Triangle!” (Open the sketch named “Mission3\_1.gsp” and check out the triangles.)

2. Measure the base and height of the Triangle in Figure 1 and record it below:

Base = \_\_\_\_\_

Height = \_\_\_\_\_

3. What is the **area** of the Triangle?

\_\_\_\_\_

What unit of measure did you use to state your answer? Why?

\_\_\_\_\_

\_\_\_\_\_



4. Measure the base and height of the triangle in Figure 2.

Base = \_\_\_\_\_

Height = \_\_\_\_\_

5. What is the area of the triangle?

\_\_\_\_\_

**\*\*Take the following steps to check your answers using the Measure Menu:**

6. Select all 4 of the vertices of the triangle in Figure 1. Click on the Construct Menu and select Polygon Interior.

7. Click on the Measure Menu and select Area.

What is the measure?

\_\_\_\_\_

8. Select the 3 vertices of the triangle in Figure 2. Click on the Construct menu and select Polygon Interior.

9. Click on the Measure menu and select Area.

What is the measure?

\_\_\_\_\_

10. What is your definition of the area of a triangle?

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

*“While waiting to find out what is next in store for us, it is advised that we practice our skills. If we don’t use them, you lose them! Don’t forget to swap jobs with your partner!”*



1. Open the sketch called **“Mission3\_2.gsp”**
2. Measure the **area** of the green triangle using the Measure Menu. Remember to construct the Polygon Interior first.

What is the area?

---

3. Drag point I back and forth.

Does the area of the triangle change?

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4. Measure the area of the rectangle using the Measure Menu.

What is the area?

---

5. Drag the H point back and forth ?

Does the area of the rectangle change?

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6. What do you notice about the relationship between the area of the green triangle and the area of the rectangle?

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What do you think the area of the yellow triangle would be?  
 What about the area of the yellow triangle and the area of the blue triangle combined?

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7. Measure the other triangle using the Measure menu to test your theory.

Did you get the results you expected? Why or why not?

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8. Why do you think the formula for finding the area of a triangle is  $A = \frac{1}{2}bh$ ?

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9. The following list contains real-life situations in which either **area** or **perimeter** would be used to solve the problem. Next to each of the examples write either **P** for perimeter or **A** for area.

\_\_\_\_\_ Susie Sailor wants to carpet her living room with groovy green shag carpet.

\_\_\_\_\_ George Jungle just planted a garden for his mother. In order to keep the rabbits from eating the carrots he needs to build a fence.

\_\_\_\_\_ Bo Beavers is buying a cover for his pool. He needs to find out what size is needed.

\_\_\_\_\_ Kennedy Swoper is chalking the outside lines for the football field. He needs to know the distance around the field.

\_\_\_\_\_ Cole Riple is waxing the basketball court and needs to know how much wax to use.

*“Now that we have completed our practice session, we decide to take a walk. As we are walking through Federal Triangle, your partner spots what looks like a Federation Agent. As you are discussing this, Agent Compass approaches. She is a high ranking official in the Federation. She tells you that our next mission will bring us to the Smithsonian castle. There we will be evaluated on our performance to see if we are ready for the next step. We hurry to the Metro and head to the Smithsonian Castle.”*



## Investigating Circles

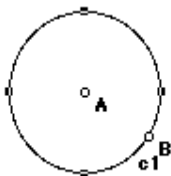
### How to draw a circle

1. Click the circle tool on the toolbar.



2. Click anywhere on the sketchpad and drag the mouse. You will see a circle expand around the circle tool.

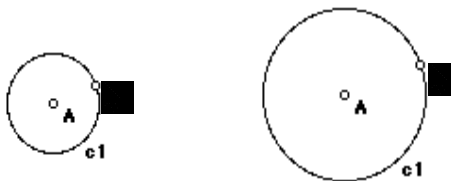
Let go of the mouse when the circle is the size you want.



Notice the two points that you can see when you draw a circle. The point in the middle, point A above, is called the **center**.

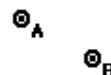


Point B, in Sketchpad, is called the **control point**. Click and drag the control point to resize a circle.

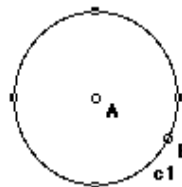


### Using the Construct menu to draw a circle

1. Select two points. The first point you highlight will be the center of your circle. The second point will be your control point.

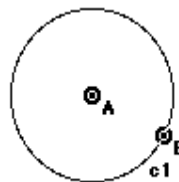


2. Choose Circle by Center + Point from the Construct menu. A circle will be constructed.



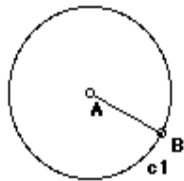
### Constructing a circle's radius

1. Select the circle's center point and the control point.



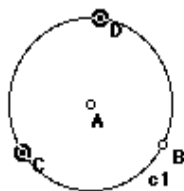
- Click on the Construct menu and select Segment.

The new line segment is the **radius** of the circle.

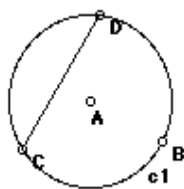


## Constructing a chord of a circle

- Place two points anywhere on the circle (not inside) and select them.



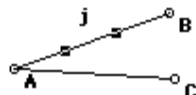
- Click on the Construct menu and select Segment.



The new line segment is one **chord** of the circle.

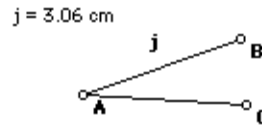
## Measuring the length of a line segment

- Click on the line segment you want to measure.



Line segment **j** is selected in the example above.

2. Click on the Measure menu and select Length. The length will appear on the sketchpad.



*Meets SOL 5.9*

**Mission 4**

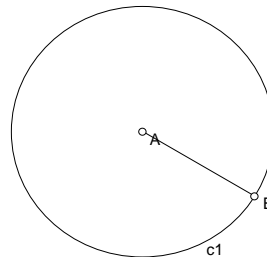
*“In order to continue with our assignment, the team must have TOP SECRET clearance. To obtain this level of clearance, you must complete two missions:”*



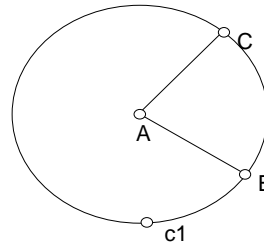
To learn more about Radius look in your text book.

Activity 1: Swap jobs with your partner and create a new sketch.

1. Construct a small circle.
2. Construct the circle's **radius** by drawing a segment from the center point to the control point. Your sketch should look like this:



3. Add another point on the circle, away from the control point.
4. Construct another segment to connect this new point with the center point. Your sketch should look similar to this:



Try to drag the new point. What happens?

In Sketchpad, you can only drag the center point or control point to change the size of a circle.

5. Measure the length of each segment.

What do you notice about the measures?

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6. Drag the control point to change the size of the circle.

What happened to the measures?

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Is the second segment you created also a radius? Why or why not?

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Give your definition of a **radius** of a circle.

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7. Construct a **chord** on your circle (but do not use the control point as one of the endpoints).
8. Click on one endpoint of the chord and drag it. Move the point to different places along the circle.

To learn more about cool chords look in your textbook.
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What happens when you drag the point of the chord?

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When you move the endpoint, does the segment remain a chord? Why or why not?

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**Leave your sketch open for the next mission..**

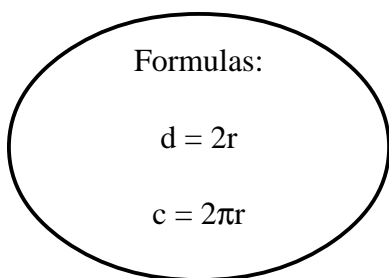
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Meets SOL 5.9

### Mission 5

To find out more about **diameter and circumference** look in your textbook.

To learn the formulas for each, look in your textbook.



*“We all know that the radius is an important part of a circle. When you know the radius of a circle, you can also determine its **diameter and circumference**. Next you will measure a circle’s radius and then use formulas to find the circle’s diameter and circumference.”*

Swap jobs with your partner. Make sure you have the sketch from mission 4 open.

1. Click and drag the central point so that the radius of your circle is 2 cm. Using the measure of the radius in your circle and the appropriate formulas, find the following:

Radius = \_\_\_\_\_

Diameter = \_\_\_\_\_

Circumference = \_\_\_\_\_

2. Click and drag the control point to change the radius of your circle to 3 cm. Determine the following:

Radius = \_\_\_\_\_

Diameter = \_\_\_\_\_

Circumference = \_\_\_\_\_

Use the Measure menu to check your answers.

1. Click anywhere along the circle except on a point.
2. Click on the Construct menu and select Circle Interior.
3. While the interior of the circle is highlighted, click on the Measure menu and select Radius.
4. Click the Measure menu again and select Circumference.

5. To double-check the diameter, just multiply the radius measure by 2.
6. What measures did Sketchpad come up with?

Radius = \_\_\_\_\_

Diameter = \_\_\_\_\_

Circumference = \_\_\_\_\_

***“CONGRATULATIONS!! You have received TOP SECRET clearance! We are almost done with our missions! One more and we will find out what your assignment is!”***



*“The agent hands us a map. Open “Mission6.gsp.” This sketch is of a coordinate plane. In order for us to complete this mission and receive our final Top Secret Assignment, we must learn about Coordinate Planes.”*

1. A coordinate plane has 4 Quadrants. We need to be able to identify the First Quadrant. Follow these steps to find the First Quadrant:
  - Looking at the sketch, find the center of the coordinate plane. To do this, find the center point labeled M. Point M is formed where the vertical line (x-axis) and the horizontal line (y-axis) cross.
  - On this sketch, you can go up 5 spaces on the vertical axis and 5 spaces to the right on the horizontal axis. Trace those lines with your finger.
  - The area boxed-in by the space to the right of the vertical line you just traced and the area above the horizontal line you just traced forms the First Quadrant.

2. Now that you can identify the first quadrant, you need to know how to find a point. This requires you to count the spaces on the coordinate plane. Recall from above that this sketch contains 5 spaces on the vertical axis and 5 spaces on the horizontal axis. The large cross-marks on the vertical and horizontal lines represent one space. Count the cross-marks on the horizontal axis now until you get to five spaces. Do the same thing for the vertical.

*“In the first quadrant of the map we are to find point (3,4). That is the location where the team will find out their final top secret task.”*

3. You are going to plot the point (3,4). The first number in the parentheses represents the number of spaces you count to the right on the horizontal line. Using your finger, count over 3 spaces on the horizontal line and hold it there.
4. The second number in the parentheses represents the number of spaces you count up on the vertical line. Your finger should still be on the 3<sup>rd</sup> space over on the horizontal line, so start counting up from that point. After you've counted up 4 spaces, make a point on that spot. Congratulations, you just plotted a point!
5. Plot the following points on your coordinate plane:
  - (2,1)
  - (5,4)
  - (3,3)
  - (4,2)



*“Point (3,4) turns out to be the grounds of the new Geometer’s Museum for children. You have proven yourself a promising Geometer, just what we need to design our new Smithsonian Museum. You are presented with your own Compass and Protractor, the symbols of the Geometer’s Federation TOP SECRET Agent. It’s finally time to complete your Top Secret Mission. The President is counting on you to make a cool museum where kids will love to go to learn all about geometry! Good luck and take care. I hope to see you on future Geometer Missions!”*