For this project, you will explore the use of a compass and a straight edge to create accurate designs. Please follow the directions below in creating your project:

**EXPECTATIONS:**

- Choose **three** of the designs from the sheets attached to this one. Figure out what must be done to make a design that is similar to the design on the paper.
- Use a pencil, compass and a straight edge to **create** on plain white paper the **four designs** that you have chosen.
- When finished, erase unnecessary marks, and color the designs you have constructed with pens, pencils, crayons, or markers.
- **Create one original design** using the compass and straight edge only.
- Mount the three designs and your original design on a construction paper, mat board, or poster board and submit all together as your **Geometry Construction Project**.

Attached to this document is a packet of materials that will help you to see how the constructions are to be done. Please let Mr. León know if you are experiencing any difficulties in the completion of the project. We will not be working in class on this project.

**ASSESSMENT OF THE PROJECT:**

Your completed project will be evaluated on the following criteria.

- **Accuracy**—All lines must be carefully drawn with a pencil using only a compass and a straight edge. There should be no freehand drawing.
- **Neatness**—Attention to the look and neatness of the designs is important.
- **Creativity**—The original design and the coloring of the 3 duplicated designs should be unique and show some planning and effort.
- **Effort**—The more detailed, planned, colored, etc. the better!
- **Meeting Deadlines / Following Directions**—The project must satisfy the above expectations and be completed on time.
- **Presentation**—The 4 designs should be carefully presented together on your chosen background. remember the better it looks, the better your grade. Wow factor is big here!
### Geometry Construction Project Grading Rubric

**Total Possible Points = 70**

#### Accuracy

<table>
<thead>
<tr>
<th>Score</th>
<th>Description</th>
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</table>
| 8-10  | • Angles, circles, polygons, etc. are correctly constructed when used.  
       | • All line segments are straight.  
       | • All line segments end at the appropriate endpoints. |
| 5-7   | • Most angles, circles, polygons, etc. are correctly constructed when used.  
       | • Most line segments are straight.  
       | • Most line segments end at the appropriate endpoints. |
| 3-4   | • Some angles, circles, polygons, etc. are correctly constructed when used.  
       | • Some line segments are straight.  
       | • Some line segments end at the appropriate endpoints. |
| 0-2   | • Few angles, circles, polygons, etc. are correctly constructed when used.  
       | • Few line segments are straight.  
       | • Few line segments end at the appropriate endpoints. |

#### Neatness

<table>
<thead>
<tr>
<th>Score</th>
<th>Description</th>
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</table>
| 16-20 | • Erasures are well made..there is little to no evidence of original construction marks.  
       | • There are no smudges.  
       | • Coloring is neatly done and is pleasing to the eye.  
       | • Care is taken in terms of the presentation of the design (e.g., it is centered; backgrounds are used; name, title, date, etc. are displayed; design is of a large size and takes up most of the posterboard) |
| 10-15 | • Erasures are mostly well made..there is little evidence of original construction marks.  
       | • There are few smudges (1-3, but no more).  
       | • Coloring is neatly done in most instances and is mostly pleasing to the eye.  
       | • A good degree of care is taken in terms of the presentation of the design (e.g., it is centered; name, title, date, etc. are displayed, design is of a large size, but there is a little too much whitespace around the design) |
| 5-9   | • Erasures are sometimes well made..there is some evidence of original construction marks.  
       | • There are smudges (4-5, but no more).  
       | • Coloring is neatly done in some instances but only partially pleasing to the eye.  
       | • Some care is taken in terms of the presentation of the design (e.g., name, title, date, etc. are displayed, design is of a medium size and there is a little too much whitespace around the design). |
| 0-4   | • Erasures are not well made.. there is much evidence of original construction marks.  
       | • There are many smudges (more than 5).  
       | • Coloring is not neatly done and/or is not pleasing to the eye. No coloring is done.  
       | • Little care is taken in terms of the presentation of the design (e.g., design is not centered; name, title, date, etc. are not displayed, design is of a small size and there is too much whitespace around the design). |
## Geometry Construction Project Grading Rubric

### Creativity

<table>
<thead>
<tr>
<th>Score</th>
<th>Description</th>
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</table>
| 16-20 | • Original design is very clever; creatively designed  
• Original design is either completely original or combines non-original designs in an original way.  
• Coloring, etc. on all designs is creative and shows care and creativity. |
| 10-15 | • Original design displays creative thinking  
• Some portion of the original design is copied from another source, but most is original.  
• Coloring, etc. on most designs is creative and shows care and creativity. |
| 5-9   | • Original design shows some creative thinking  
• Most of the original design is copied from another source, but some portions are original in nature.  
• Coloring, etc. on designs is somewhat creative and shows some care and creativity. |
| 0-4   | • Original design lacks creativity  
• “Original” design is fully copied from another source.  
• Designs are not colored and little care is shown. |

### Effort

<table>
<thead>
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</table>
| 8-10  | • The project clearly shows that much effort was put into producing an excellent design.  
• The project looks complete – nothing was left undone.  
• Risks were taken in terms of design (design is complex, materials used are unique, etc.) |
| 5-7   | • The project shows that good effort was put into producing the design.  
• The project looks mostly complete – some touch up is still required.  
• Some risks were taken in terms of design (design is relatively complex, materials used are mostly unique, etc.) |
| 3-4   | • The project looks like parts of it were thrown together at the last minute.  
• The project does not look complete – a lot of work is still required.  
• Few risks were taken in terms of design (design is relatively simple; materials used are predictable, etc.) |
| 0-2   | • The project looks as if it were put together in a hurry.  
• The project is not complete.  
• No risks were taken in terms of design (design is very simple) |

### Meeting deadlines / Following directions

<table>
<thead>
<tr>
<th>Score</th>
<th>Description</th>
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</table>
| 8-10  | • The project is handed in on time.  
• The project goes beyond the requirements as presented. |
| 5-7   | • The project is handed in on time.  
• The project meets all the requirements as presented. |
| 3-4   | • The project is handed in no more than one day late.  
• The project meets some of the requirements as presented. |
| 0-2   | • The project is handed in more than one day late.  
• The project meets few of the requirements as presented. |
### To Copy A Line Segment

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
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</table>
| **1.** | **Objective:** Copy \( \overline{AB} \)  
  - Draw a segment longer than \( \overline{AB} \). |
| **2.** | Establish point \( C \) on the longer line that correspond with \( A \) on \( \overline{AB} \). |
| **3.** | Find the hole \# on your compass that allows you to construct an arc through \( B \) centered at \( A \). |
| **4.** | Draw an arc centered at point \( C \) using the same hole \# and intersecting the longer line. The point of intersection of this arc and the line will be point \( D \). \( \overline{CD} \cong \overline{AB} \). |

### To Bisect a Line Segment

<table>
<thead>
<tr>
<th>Step</th>
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</table>
| **1.** | **Objective:** Bisect \( \overline{AB} \)  
  - Center your compass at \( A \) and pick a hole that is more than half way to \( B \). Now draw arcs above and below \( \overline{AB} \). |
| **2.** | Using the same hole as for Step 1, center your compass at \( B \) and draw arcs which intercept the first two arcs, creating points \( C \) and \( D \). |
| **3.** | Draw \( \overline{CD} \). \( \overline{AM} \cong \overline{MB} \) and \( \overline{CD} \perp \overline{AB} \). \( M \) is the midpoint of \( \overline{AB} \). |
To Bisect an Angle

Objective: Bisect $\angle ABC$

1. Center your compass at $B$ and draw an arc which intersects $BA$ and $BC$ at $E$ and $F$.

2. Using $E$ and $F$ as centers, draw two arcs with equal radii intersecting at point $D$.

3. Draw $BD$. $BD$ bisects $\angle ABC$.

To Copy an Angle

1. Objective: Copy $\angle ABC$

2. Draw an arc centered at $B$ which intersects $BA$ and $BC$ at $F$ and $G$.

3. Draw an arc centered at $B$ which intersects $BA$ and $BC$ at $F$ and $G$.

4. Draw an arc with the same radius as in Step 2 centered at $D$.

5. Draw an arc of length $GF$ centered at $H$. It should intersect the previous arc at $J$.

6. Draw $DJ$. $\angle JDH \equiv \angle ABC$.
Inscribing Regular Polygons

Inscribe an equilateral triangle:

1. In the given \( \odot O \), draw a diameter \( \overline{AB} \).
2. Using \( A \) as a center and \( AO \) as a radius, draw an arc intersecting the circle at \( C \) and \( D \).
3. Connect \( B, C, \) and \( D \) to form a triangle.

Inscribe a regular hexagon:

1. Draw \( \odot O \), remember the radius!
2. Pick a point on the circle (\( B \) in this case) and with the same radius, draw an arc that intersects with the circle (to the left of \( B \) in this case).
3. Using the new point (created where the arc meets the circle) as the center and with the same radius, make another arc on the circle. Continue making arcs around the circle until you have six points. These are the vertices of the regular hexagon.
Technical Tips:

1. Use a sharp pencil and a high quality, accurate compass.

2. Use a pencil or pen that doesn’t smear. A straight edge with an elevated edge helps prevent smearing. Drafting or masking take on the bottom of the straight edge can be used to lift the edge off the paper.

3. Make sure the paper is not on or in a binder when you’re doing your constructions. The compass does not work as well if the writing surface is not totally flat.

4. Larger constructions usually prove to be easier and more accurate.

5. When making ink drawings, you may wish to complete the drawing in pencil before using ink.

6. Each of these constructions starts with a regular hexagon or triangle. From there, it’s all about using diagonals to find different points of intersection from which to center arcs.
Dear Parent or Guardian

Your child has been assigned the project Geometry Construction. This is meant to be a fun, engaging educational experience.

Students will need to use what they have learned in Geometry and their skills as a student to plan and carry out various construction methods.

This project will count as 4 test grades. For students who do not complete this project, a 0% for a test grade can have a serious effect on their grade for the class, dropping them as much as one to two letter grades. However, for students who complete the project it nearly always improves their grade.

It is due TBD1. I will accept late projects on Monday TBD2 for 15% off. No late projects will be accepted after Monday TBD2.

Students who turn in others’ work will receive a 0 on all assignments and be referred for disciplinary action.

I will be happy to help any student demonstrating how to use the compass and straight edge construction tools.

Please sign below to indicate an awareness of this project, the deadlines and policies relating to this project. Returning this signed form counts as a homework grade.

Thank you,

Mr. León

Name of Student ___________________________________________ Student ID ________________

Student signature ____________________________________________

Parent name (please print) ____________________________________________

Parent signature ___________________________________________ Date ________________