Class Generated Review Sheet for Math 213 Final

Key Ideas

9.1

- A line segment consists of two points on a plane and all the points in between them.
- Complementary: The sum of the two angles is 90 degrees (ex. Angle 4 and Angle 5)
- Supplementary: The sum of two angles is 180 degrees (ex. Angle 3 and Angle 4)

![Diagram of angles and lines](image)

- Alternate interior angles – if two lines are intersected by a transversal, the lines are parallel if and only if the alternate interior angles created by the transversal have the same measure (ex. Angle 4 and Angle 6)
- Know the different triangles (see Example I on page 576)

9.2

- Congruence
- Regular polygons
- Tessellations

9.3

- Planes
  - half space
  - parallel
  - intersecting
• convex
• concave/nonconvex
• Regular Polyhedron
  o faces
  o edges
  o vertices
  o (Euler’s formula)
• Semiregular polyhedron
  o faces are 2 or more regular polygons with the same arrangement of faces around each vertex

9.4
• Symmetry
  o reflection
  o rotation
• A regular polygon with n sides has n reflections and n rotations.

10.1
• Metric and English Systems of Measurement
  o volume
  o length
  o weight (English)
  o mass (metric)
• converting between metric and English

10.2
• Standard units of area
  o English vs. Metric units
• Area of polygons
  o rectangles
  o parallelograms (A = bh)
- Triangle \( A = \frac{1}{2} \times b \times h \)
- Trapezoid \( A = \frac{1}{2} \times (b+u) \times h \)

- Perimeter – length of a region’s boundary
- Circumference and Area of a Circle
  - \( C = \pi d = 2\pi r \)
  - \( A = \pi r^2 \)

10.3

- Formulas for volume and surface area
- units of measure for volume and surface area
- cone, sphere, pyramid, cylinder, prism
- Example formulas
  - Rectangular prism: \( V = l \times w \times h \)
  - Triangular prism: \( V = B \times h \)
  - Cylinders: \( V = B \times h \); \( SA = 2\pi h + 2\pi r^2 \)

11.1

- Mappings
  - one point on a polygon corresponds to a point on a congruent polygon
- Congruent angles – two angles are congruent if they have the same measure.
- Congruence properties of triangles
  - SAS
  - SSS
  - ASA
- Constructions you need to know
  - angles
  - triangles
  - line segments
- squares
- angle bisectors
- perpendicular lines

**Triangle inequality**
- The sum of the lengths of any two sides of a triangle is greater than the third.
11.2

- Translation mapping
- Reflection mapping
- Rotation mapping
- Glide Reflection mapping

11.3

- Similarity mappings
- Define similar polygons: two polygons are similar if and only if there is a mapping from one to the other such that
  - their corresponding angles are congruent
  - the lengths of their corresponding sides have the same ratio
Review Problems

1. Give an example of all three types of curves: simple curve, simple closed curve, closed curve.
2. Assume m and n are parallel lines.

   a. Give 2 examples of supplementary angles.
   b. Give a pair of angles with the same measure.
   c. List the vertical angles.

3. Will this shape tessellate?

4. What is the measure of a central, vertex, and exterior angle of a regular hexagon?
5. Name the 5 regular polyhedra and state the number of faces, edges, and vertices for each.
6. Sketch the top, front, and side view of the figure (dark square means top view).
7. How many lines of symmetry does the following shape have? What type of symmetry does it have?

![Shape Image]

8. Finish the following figure so it has rotational and reflectional symmetry.

![Figure Image]

9. Fill in the following
   a. 92 kiloliters = ________ milliliters
   b. 500 yards = ________ inches
   c. 38 ounces = ________ pounds
   d. 73°F = _____ C

10. What is the area of the shaded region?

![Example Image]

11. Find the area and perimeter of the trapezoid.

![Trapezoid Image]
12. Find the volume of the square pyramid. (assume 4 is the height)

13. Find the surface area of a sphere with diameter 6 inches.

14. A cubic block of cement was dropped into a cylindrical tank of water with a diameter of 4 ft causing the water to rise 3 inches. What is the volume of the cube to the nearest cubic inch? What is the length of the edge of the cube to the nearest 0.1 in?

15. ΔABC ≅ ΔDEF. List the corresponding sides and angles of the triangles.

16. Construct an angle bisector. (Draw an angle and bisect it.)

17. Is ΔABC congruent to ΔDEF? If so, state the congruence property.

18. Reflect triangle ABC over the line.

19. Reduce this triangle by a scale factor of 1/2
20. Are these triangles similar? Why?

![Triangles](image)

True/False

1. A scale triangle has only 2 sides with different lengths.
2. This is an example of a concave figure.

![Concave Figure](image)

3. Congruent angles have the same measure.
4. All regular polygons tessellate.
5. A polyhedron is concave if the line segment connecting any two of its points is contained inside the polyhedron or on its surface.
6. This figure is a triangular prism.

![Triangular Prism](image)

7. The following shape has only 3 lines of symmetry (regular hexagon).

![Hexagon](image)

8. The following shape has rotational symmetry.

![Rotational Symmetry](image)

9. There are 16 ounces in one pound.
10. There are 5380 feet in one mile.
11. If you take a piece of 8 1/2 in. by 11 in. paper and fold it into a cylinder (“hot dog” style) and then take the same piece of paper and fold it into a cylinder (“hamburger” style) then their volumes will be the same.

12. If the radius of a sphere doubles, the volume doubles.

13. For the property ASA, the side must be included between the angles.

14. A triangle can be made that has the following side lengths: 10cm, 15cm, 20cm.

15. If two sides of a triangle are proportional to each other then the triangles are similar.

16. If a shape has been scaled by a factor of 1/2 it has been enlarged.

17. Any quadrilateral can have its sides modified by a translation to get a shape that tessellates.

18. For reflection mappings, the only fixed points are on the line of reflection.

Answers.

1. Answers will vary. Here is one possible set of answers:

<table>
<thead>
<tr>
<th>Simple</th>
<th>Simple</th>
<th>Closed</th>
<th>Closed</th>
</tr>
</thead>
</table>

   b. The following sets of angles have the same measure: A&C&E&G, D&B&F&H
   c. A&C, D&B, E&G, F&H

3. NO, the shape will not tessellate.

4. Central: 60°; Vertex: 120°, Exterior: 60°

5. | Polyhedron    | Vertices | Faces | Edges |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Tetrahedron</td>
<td>4</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>Cube</td>
<td>8</td>
<td>6</td>
<td>12</td>
</tr>
<tr>
<td>Octahedron</td>
<td>6</td>
<td>8</td>
<td>12</td>
</tr>
<tr>
<td>Dodecahedron</td>
<td>20</td>
<td>12</td>
<td>30</td>
</tr>
<tr>
<td>Icosahedron</td>
<td>12</td>
<td>20</td>
<td>30</td>
</tr>
</tbody>
</table>
7. 0 lines of symmetry. It has rotational symmetry (180 and 360).

8.

9. ;

   a. 92,000,000 mL
   b. 18,000 inches
   c. 2,375 lbs
   d. 22.8° C

10. 22.3 cm

11. A=65.2 in²; P=31.3 in.

12. 12 in.

13. 36π in².

14. Volume of cube is 38 in³; Length of edge is 3.4 in.

15. ∠A≅∠D; ∠B≅∠E; ∠C≅∠F; AB≅DE, BC≅EF, AC≅DF

16. The bisector should cut the angle in half. Make sure you compass markings are clear.

17. Yes, by SAS

18. 

19. 

20. Yes, SSS
True/False Answers
1. False
2. True
3. True
4. False
5. False
6. False
7. False
8. True (360 rotation)
9. True
10. False
11. False
12. False
13. True
14. True
15. False
16. False
17. False
18. True