**Geometry – 2nd Semester Study Guide**

* The exam will cover material from chapter 5 & 6, and chapters 8, 10 & 11 in our textbook.
* The exam will be similar in make-up to the chapter tests/quizzes

(multiple choice, completion, short answer)

Please study!

**Chapter 5**

Mid-segment of a triangle

Mid-segment Theorem

Perpendicular bisector

Theorems 5.2 & 5.3

Concurrent lines

Point of concurrency

Theorem 5.4, 5.5, 5.6, & 5.7

Incenter

Median

Centroid

Theorem 5.8

Altitude

Theorem 5.9

Orthocenter

Theorem 5.10 & 5.11

Triangle Inequality

5.12 – Triangle Inequality Theorem

**Chapter 6**

Similar Polygons

Scale factor

Statement of proportionality

Theorem 6.1 (Perimeter)

Angle-Angle Similarity Postulate\*

Theorem 6.2 – SSS Similarity

Theorem 6.3 – SAS Similarity

Theorem 6.4 – Triangle Proportionality

Theorem 6.5 – Converse of 6.4

Theorems 6.6 & 6.7

**Chapter 8**

Diagonal

Theorem 8.1 – Polygon Interior Angles

Corollary to 8.1\*

Theorem 8.2 – Polygon Exterior Angles

Theorems 8.3 & 8.4

Parallelogram

Theorem 8.5 & 8.6

Theorems 8.7 & 8.8

Theorems 8.9 & 8.10

Rhombus

Rectangle

Square

Corollaries on p. 527\*

Theorems 8.11, 8.12, & 8.13

Trapezoid

Kite

Theorems 8.14, 8.15, & 8.16

Theorem 8.17 – Midsegment of Trapezoids

Theorems 8.18 & 8.19

**Chapter 10**

Circle

Center

Radius

Chord

Diameter

Secant

Tangent

Theorems 10.1 & 10.2

Central angle

Minor arc

Major arc

Arc addition postulate\*

Theorem 10.3, 10.4, & 10.5

Inscribed angle

Intercepted arc

Theorems 10.7 & 10.8

Theorems 10.9, 10.10, & 10.13

Segments of the chord

Theorem 10.14, 10.15, & 10.16

**Chapter 11**

Circumference

Arc length

Sector of a circle

Apothem of a polygon

Platonic solids

Volume

Sphere

**AREAS OF FOCUS**

**Chapter 5**

* **Using Properties of Special Segments in Triangles**

|  |  |
| --- | --- |
| **Special Segment** | **Properties to Remember** |
| **Midsegment** | * Parallel to side opposite it and half the length of side opposite it
 |
| **Perpendicular bisector** | Concurrent at the circumcenter, which is:* Equidistant from 3 vertices of triangle
* Center of circumscribed circle that passes through 3 vertices
 |
| **Angle bisector** | Concurrent at the incenter, which is:* Equidistant from 3 sides of triangle
* Center of insciribed circle that just touches each side of triangle
 |
| **Median (connects vertex to midpoint of opposite side)** | Concurrent at centroid, which is:* Located two thirds of the way form vertex to midpoint of opposite side
* Balancing point of triangle (center of mass)
 |
| **Altitude (perpendicular to side of triangle through opposite vertex)** | * Concurrent at orthocenter
* Used in finding area of triangle
 |

* **Using Triangle Inequalities to Determine what Triangles are Possible**
	+ *Sum of lengths of any two sides of a triangle is greater than length of the third side*
	+ *In a triangle, longest side is opposite largest angles and shortest side is opposite smallest angle*
	+ *If two sides of a triangle are congruent to two sides of another triangle, then the triangle with longer third side also has larger included angle*

**Chapter 6**

* **Using Ratios and Proportions to Solve Geometry Problems**
	+ *You can use properties of proportions to solve a variety of algebraic and geometric problems*

For example, in the diagram below, suppose you know that $\frac{AB}{BC}=\frac{ED}{DC}$.

You can then write any of these relationships:

$\frac{5}{x}=\frac{6}{18}$ $5\*18=6x$ $\frac{x}{5}=\frac{18}{6}$ $\frac{5}{6}=\frac{x}{18}$ $\frac{x+5}{x}=\frac{6+18}{18}$

* **Showing that Triangles are Similar**
	+ *You have learned three ways to prove two triangles are similar:*
		1. *AA Similarity Postulate*
		2. *SSS Similarity Theorem*
		3. *SAS Similarity Theorem*
* **Using Indirect Measurement and Similarity**
	+ *You can use triangle similarity theorems to apply indirect measurement in order to find length that would be inconvenient or impossible to measure directly. (like the height of a tree or flag pole based on the lengths of shadows)*

**Chapter 8**

* **Using Angle Relationships in Polygons**
	+ *You can use theorems about the interior and exterior angles of convex polygons*

|  |  |
| --- | --- |
| **Polygon Interior Angles Theorem*** *The sum of the interior angle measure of a convex n-gon is (n – 2)\*180o*
 | **Polygon Exterior Angles Theorem*** *The sum of the exterior angle measures of a convex polygon is 360o*
 |

* **Using Properties of Parallelograms**
	+ *Parallelogram – quadrilateral with both pair of opposite sides parallel*
		- *Other properties:*
			* Opposite sides are congruent
			* Opposite angles are congruent
			* Diagonals bisect each other
			* Consecutive angles are supplementary
* **Classifying Quadrilaterals by Their Properties**
	+ *List of special quadrilaterals*
		- *Trapezoids*
		- *Isosceles trapezoids*
		- *Kites*
* *Special parallelograms*
	+ *Rectangles*
	+ *Squares*
	+ *Rhombuses*

**Chapter 10**

* **Using Properties of Segments that Intersect Circles**
	+ *Several relationships exist between tangents, secants, and chords*
	+ *Some help to determine that two chords or tangents are congruent*
	+ *Some help finding the length of a secant or chord if the length of related segments is known*
* **Applying Angle Relationships in Circles**
	+ *Find the measures of angles formed inside, outside, and on circles*

|  |  |  |
| --- | --- | --- |
| **Angles formed on circles** |  | $$m∠ADB=\frac{1}{2}mAB$$ |
| **Angles formed inside circles** |  | $$m∠1=\frac{1}{2}(mAB+mCD)$$$$m∠2=\frac{1}{2}(mAD+mBC)$$ |
| **Angles formed outside circles** |  | $$m∠3=\frac{1}{2}(mXY-mWZ)$$ |

**Chapter 11**

* **Comparing Measures for Parts of Circles and the Whole Circle**
	+ **Arc Length:** $\frac{length of arc AB}{2πr}=\frac{degree measure of arc AB}{360 degrees}$
	+ **Area of Sector:** $\frac{Area of sector APB}{πr^{2}}=\frac{degree measure of arc AB}{360 degrees}$
* **Solving Problems Using Surface Area and Volume**

|  |  |  |
| --- | --- | --- |
| **Figure** | **Surface Area** | **Volume** |
| **Right Prism** | **S = 2B + Ph** | **V = Bh** |
| **Right Cylinder** | **S = 2B + Ch** | **V = Bh** |
| **Regular Pyramid** | $$S=B+\frac{1}{2}Pl$$ | $$V=\frac{1}{3}Bh$$ |
| **Right Cone** | $$S=B+\frac{1}{2}Cl$$ | $$V=\frac{1}{3}Bh$$ |
| **Sphere** | $$S=4πr^{2}$$ | $$V=\frac{4}{3}πr^{3}$$ |