NAME:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Monica

Geometry Period:\_\_\_\_\_\_

**Geometry Regents (and Outcomes) Review**

|  |  |
| --- | --- |
| **OUTCOME** | **PAGE** |
| 01: Argues with different types of reasoning in order to prove or disprove a statement | 3 |
| 02: Discerns information about points, lines, and planes including parallel, perpendicular, intersecting or skew and uses appropriate notation and terminology | 5 |
| 03: Uses a straightedge and a compass to make precise constructions and can argue the validity of the construction. | 6 - 7 |
| 04: Be precise in calculating and applying the length and midpoint of a segment | 2 |
| 05: Concludes the conditions under which a compound statement is true and can write the inverse, converse, and contrapositive of a given statement. | 2 |
| 06: Graphically and algebraically discerns if lines are parallel or perpendicular on a coordinate plane and can identify the point of intersection of intersecting lines | 4 |
| 07: Identifies polygons precisely and can determine angle sums and missing angle measures | 4 |
| 08: Concludes if two triangles are congruent and identifies corresponding parts | 8 |
| 09: Discerns and applies theorems and relationships within triangles and communicates those relationships | 9 |
| 10: Discerns and applies theorems and relationships about quadrilaterals and communicates those relationships | 10 |
| 11: Discerns and applies concepts of similarity in two triangles or polygons | 11 |
| 12: Discerns and applies concepts of perimeter, area, surface area, and volume for two and three dimensional figures | 8 |
| 13: Applies the Pythagorean Theorem and investigates relationships in special right triangles | 12 |
| 14: Applies and argues properties of transformations and concepts of symmetry | 14 |
| 15: Identifies parts and properties of circles and precisely determines measurements of area, circumference, arc length, angles, tangents and secants | 13, 16 |
| 16: Writes, graphs, and communicates equations of circles | 16 |
| 17: Graphs, solves and communicates problems using compound loci, including on a coordinate plane | 15 |

Date of Regents:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Time:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Midpoint and Distance Formulas

Given two distinct endpoints of a segment on coordinate plane,  and , the midpoint of the segment can be determined by using:



Given two distinct endpoints of a segment on coordinate plane,  and , the length of the segment, or distance between the two points, can be determined by using:



Compound Statements

***TRUTH VALUE***

|  |  |  |
| --- | --- | --- |
| **Type of Compound Statement** | **Definition** | **Properties** |
| Disjunction |  |  |
| Conjunction |  |  |
| Conditional |  |  |
| Biconditional |  |  |

|  |  |
| --- | --- |
| ***NEGATION*** |  |
| ***CONVERSE*** |  |
| ***INVERSE*** |  |
| ***CONTRAPOSITIVE*** |  |

***Remember: A conditional and its contrapositive are always LOGICALLY EQUIVALENT! (They have the same truth value!)***

A PROOF is a logical argument that establishes the truth of a statement.

|  |  |
| --- | --- |
| *A* ***proof should have the following components*** | ***Example*** |
| Statement of the **original problem** |  |
| Diagram, marked with the “**given**” information |  |
| **Re-statement** of the “given” information |  |
| Complete **supporting reasons** for each step in the proof |  |
| The “**prove**” statement as the last statement |  |

**COMMONLY USED REASONS FOR PROOFS**

|  |  |  |  |
| --- | --- | --- | --- |
| **Possible Statement** | ***Possible Reason*** | **Possible Statement** | ***Possible Reason*** |
|  | Definition of a bisector |  | Definition of perpendicular |
|  | Definition of a bisector |  | Segment Addition Postulate |
|  | Reflexive Property |  | Definition of Complementary Angles |
|  | Reflexive Property |  | Definition of Supplementary Angles |
|  | Angle Addition Postulate |  | Definition of a Midpoint |
|  | Angle Addition Postulate |  | Substitution |

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

Equations of Parallel and Perpendicular Lines

**All linear equations can be expressed as ,**

**where m =\_\_\_\_\_\_\_\_ and b = \_\_\_\_\_\_\_\_\_\_\_\_.**

|  |  |
| --- | --- |
| Parallel lines have \_\_\_\_\_\_\_\_\_\_\_\_\_ slopes. | Perpendicular lines have \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ slopes. |
|  |  |

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Classifying Polygons and their angles

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| The sum of the \_\_\_\_\_\_\_\_\_\_\_\_\_angles of a polygon with *n* sides is = | | | | | |
| The sum of the \_\_\_\_\_\_\_\_\_\_\_\_\_ angles of a polygon with *n* sides is = | | | | | |
| The measure of one \_\_\_\_\_\_\_\_\_\_\_\_\_angle of a regular polygon with n sides is = | | | | The measure of one \_\_\_\_\_\_\_\_\_\_\_\_angle of a regular polygon with *n* sides is = | |
| ***n*** | **Name of Polygon** | **Sum of Interior Angles** | **Measure of one interior angle in a regular *n-*gon** | | **Measure of one exterior angle in a regular *n-*gon** |
| 3 |  |  |  | |  |
| 4 |  |  |  | |  |
| 5 |  |  |  | |  |
| 6 |  |  |  | |  |
| 7 |  |  |  | |  |
| 8 |  |  |  | |  |
| 9 |  |  |  | |  |
| 10 |  |  |  | |  |
| 12 |  |  |  | |  |

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Lines and Planes

|  |  |  |  |
| --- | --- | --- | --- |
| *Two Parallel Lines Cut by a Transversal* | *Type of Angle* | *Angle Pair(s)* | *Relationship* |
|  | Corresponding |  |  |
| Alternate Interior |  |  |
| Alternate Exterior |  |  |
| Same-side Interior |  |  |
| Same-side Exterior |  |  |
| Vertical Angles |  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Angle Addition Postulate | | Segment Addition Postulate | | |
| Adjacent Supplementary Angles | | Adjacent Complementary Angles | | |
|  | Undefined Terms | | Important Terms |
|  | |  |
|  | |
|  | |
|  | |

Constructions

|  |  |
| --- | --- |
| Copy a Segment |  |
| Copy an Angle |  |
| Perpendicular Bisector |  |
| Angle Bisector |  |
| Perpendicular through a point on a line |  |
| Perpendicular through a point off a line |  |
| Parallel Line through a point off a line |  |
| Equilateral Triangle |  |

Congruent Triangles

|  |  |  |
| --- | --- | --- |
| POSTULATE/  THEOREM | PICTURE | \*\*We NEVER use \_\_\_\_\_\_\_\_ or \_\_\_\_\_\_\_\_.  (No bad words in math!)\*\* |
|  |  |
|  |  |
|  |  | If we know two triangles are congruent, then we can prove all of their corresponding parts are congruent. For short, we use\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.  (**C**orresponding **P**arts of **C**ongruent **T**riangles are **C**ongruent) |
|  |  |
|  |  |

Area, Surface Area, and Volume

|  |  |
| --- | --- |
| **Provided Formulas** | **Formulas we need to know!** |
| Volume Cylinder =  = | Area Circle = |
| Volume Pyramid = = | Circumference Circle = |
| Volume Cone = = | Area Rectangle = |
| Volume Sphere = | Volume Rectangular Prism = |
| Lateral Area Cylinder = | Surface Area Rectangular Prism = |
| Lateral Area Cone = | Surface Area Cylinder = |
| Surface Area Sphere = |  |

Properties of Triangles

|  |  |
| --- | --- |
| **Theorem/ Property** | **Description** |
| Exterior Angle Theorem |  |
| Properties of Isosceles Triangles | 1.  2.  3. |
| Equilateral Triangles |  |
| Inequalities in Triangles | 1.  2.  3. |
| Triangle Midsegment Theorem |  |
| Triangle Angle-Bisector Theorem |  |
| Side-Splitter Theorem |  |
| Points of Concurrency | Perpendicular Bisectors =  Angle Bisectors =  Medians =  Altitudes = |

Properties of Quadrilaterals

|  |  |  |
| --- | --- | --- |
| **QUADRILATERAL** | http://www.regentsprep.org/regents/math/geometry/GP9/quadeyes.gif | A quadrilateral is any four sided figure.  Do not assume any additional properties for a quadrilateral unless you are given additional information. |
| **TRAPEZOID** | http://www.regentsprep.org/regents/math/geometry/GP9/Dptrap.gif | A trapezoid has ONLY ONE set of parallel sides.  When proving a figure is a trapezoid, it is necessary to prove that two sides are parallel and two sides are not parallel. |
| **ISOSCELES TRAPEZOID** | http://www.regentsprep.org/regents/math/geometry/GP9/trapeyes.gif | Never assume that a trapezoid is isosceles unless you are given (or can prove) that information. |
| **PARALLELOGRAM** | http://www.regentsprep.org/regents/math/geometry/GP9/parallel.gif | Notice how the properties of a parallelogram come in sets of twos:  two properties about the sides; two properties about the angles; two properties about the diagonals.  Use this fact to help you remember the properties. |
| **RECTANGLE** | http://www.regentsprep.org/regents/math/geometry/GP9/recteyes.gif | If you know the properties of a parallelogram, you only need to add 2 additional properties to describe a rectangle. |
| **RHOMBUS** | http://www.regentsprep.org/regents/math/geometry/GP9/Drhom.gif | A rhombus is a slanted square.  It has all of the properties of a parallelogram plus three additional properties. |
| **SQUARE** | http://www.regentsprep.org/regents/math/geometry/GP9/sqeyes.gif | The square is the most specific member of the quadrilateral family.  It has the largest number of properties. |

SIMILARITY

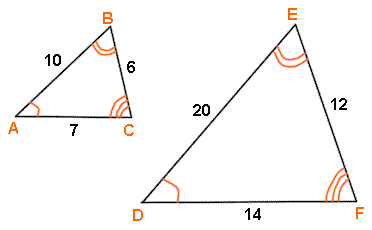


**SIMILARITY SYMBOL**

The cat on the right is an enlargement of the cat on the left.  They are exactly the same shape, but they are **NOT** the same size.

These cats are **similar** figures.

SIMILAR =



**FACTS ABOUT SIMILAR TRIANGLES**

**PROVING TRIANGLES ARE SIMILAR**

**The SIMILARITY RATIO is the ratio of the corresponding sides of two similar figures or solids. If the similarity ratio is a:b, then…**

**REMEMBER! In similar figures, the ratio of the angle measures is always \_\_\_\_\_\_\_\_\_\_\_\_!**

Pythagorean Theorem

|  |  |  |
| --- | --- | --- |
| **Acute Triangles** | **Right Triangles** | **Obtuse Triangles** |
|  |  |  |

COMMON PYTHAGOREAN TRIPLES

h

x

d

c

y

a

h

x

d

c

y

a

h

x

d

c

y

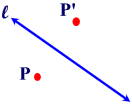
a

Similarity in Right Triangles

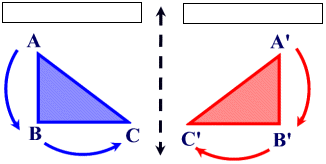
Special Right Triangles

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| ***Parts and Properties of a Circle***  Circles | | | | | | | |
| **Diameter** | **Radius** | | **Chord** | | **Tangent** | | **Secant** |
|  |  | |  | |  | |  |
| **Angle and Arc Relationships** ***(There are 360° in a circle!)*** | | | | | | | |
|  | |  | |  | |  | |
|  | |  | |  | |  | |
| **Length Relationships** | | | | | | | |
|  | |  | |  | |  | |
|  | |  | |  | |  | |

Transformations

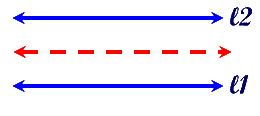


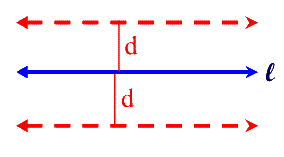
**ISOMETRY**

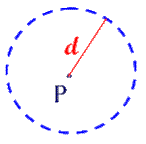


|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name of Transformations** | **Properties** | **Example** | **What is preserved?** | **Is it an isometry? (Direct/Opposite)** |
| Translation |  |  |  |  |
| Reflection |  |  |  |  |
| Rotation |  |  |  |  |
| Dilation |  |  |  |  |

LOCUS

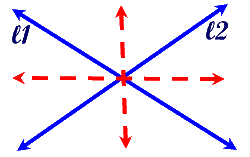


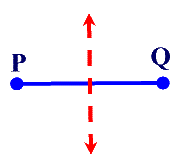




The locus of points equidistant from two points,***P*** and ***Q***, is the perpendicular bisector of the line segment determined by the two points.

The locus of points at a fixed distance, ***d***, from a line, ***l***, is a pair of parallel lines ***d***distance from ***l*** and on either side of ***l***.





The locus of points at a fixed distance, ***d***, from point ***P***is a circle with the given point ***P***as its center and ***d*** as its radius.

The locus of points equidistant from two intersecting lines, ***l****1* and ***l****2*, is a pair of bisectors that bisect the angles formed by ***l****1* and ***l****2* .

The locus of points equidistant from two parallel lines, ***l****1* and ***l****2* , is a line parallel to both ***l****1* and  ***l****2*and midway between them.

|  |
| --- |
| Steps for Solving Locus Problems  1.  2.  3.  4.  5.  6. |

Equations of Circles

|  |  |
| --- | --- |
| **Circle with Center at Origin (0,0)**  where the center is (0,0) and the radius is ***r***.  http://www.regentsprep.org/regents/math/geometry/GCG6/circle1.gif | **Circle with Center at Point (*h,k*)**  where the center is***(h,k)*** and the radius is ***r***  http://www.regentsprep.org/regents/math/geometry/GCG6/circle2.gif |

Common Tangents

|  |
| --- |
| Common tangents are lines or segments that are tangent to more than one circle at the same time. |

|  |  |  |
| --- | --- | --- |
| **4 Common Tangents** (2 completely separate circles) http://www.regentsprep.org/regents/math/geometry/GP14/CommonTan4.gif 2 external tangents  2 internal tangents | **3 Common Tangents** (2 externally tangent circles) http://www.regentsprep.org/regents/math/geometry/GP14/CommonTan3.gif 2 external tangents 1 internal tangent | **2 Common Tangents** (2 overlapping circles) http://www.regentsprep.org/regents/math/geometry/GP14/CommonTan2.gif  2 external tangents 0 internal tangents |
| **1 Common Tangent** (2 internally tangent circles) http://www.regentsprep.org/regents/math/geometry/GP14/CommonTan1.gif 1 external tangent  0 internal tangents | **0 Common Tangents**   |  |  | | --- | --- | | (2 concentric circles) Concentric circles are circles with the same center. http://www.regentsprep.org/regents/math/geometry/GP14/CommonTan0a.gif 0 external tangents 0 internal tangents | (one circle floating inside the other, without touching) http://www.regentsprep.org/regents/math/geometry/GP14/CommonTan0b.gif  0 external tangents 0 internal tangents | | |