NAME: INFORMATION TO COPY

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Geometry Period:_____

Geometry Regents (and Outcomes) Review

Date of Regents: Friday, June 20th, 2014 Time: 12:00 pm

Midpoint and Distance Formulas

Given two distinct endpoints of a segment on coordinate plane, (x_1, y_1) and (x_2, y_2), the midpoint of the segment can be determined by using:

$$\text{Midpoint} = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$$

Given two distinct endpoints of a segment on coordinate plane, (x_1, y_1) and (x_2, y_2), the length of the segment, or distance between the two points, can be determined by using:

$$\text{Distance or Length} = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

Compound Statements

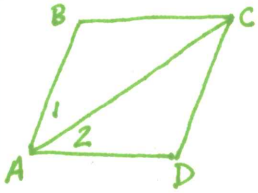
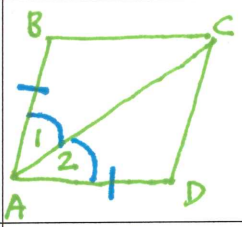
TRUE ← TRUTH VALUE → FALSE

Type of Compound Statement	Definition	Properties
Disjunction	A compound statement using the word "or"	True when either or both statements are true
Conjunction	A compound statement using the word "and"	True only when both statements are true
Conditional	A compound statement using "if... then"	False ONLY when the hypothesis is true and the conclusion is false.
Biconditional	Compound statement combining 2 conditionals using "if and only if"	Only true when a conditional and its converse are true

NEGATION	the opposite truth value of a statement - "not"
CONVERSE	switch the hypothesis and conclusion
INVERSE	negate the hypothesis and negate the conclusion
CONTRAPOSITIVE	switch and negate both the hypothesis and conclusion

Remember: A conditional and its contrapositive are always <u>LOGICALLY EQUIVALENT</u>! (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**	 Given: Quadrilateral ABCD $\overline{AD} \cong \overline{AB}$ $\angle 1 \cong \angle 2$ Prove: $\overline{CD} \cong \overline{CB}$ } what we need to prove
Diagram, marked with the "**given**" information	 * Very important step!
Re-statement of the "given" information	STATEMENTS / REASONS 1. $\overline{AD} \cong \overline{AB}$ — 1. Given 2. $\angle 1 \cong \angle 2$ — 2. Given
Complete **supporting reasons** for each step in the proof	3. $\overline{AC} \cong \overline{AC}$ — 3. Reflexive Property 4. $\triangle ABC \cong \triangle ADC$ — 4. SAS 5. — 5.
The "**prove**" statement as the last statement	5. $\overline{CD} \cong \overline{CB}$ — 5. CPCTC

COMMONLY USED REASONS FOR PROOFS

Possible Statement	*Possible Reason*	Possible Statement	*Possible Reason*
$\angle BAC \cong \angle DAC$	Definition of a bisector	$\overline{AB} \perp \overline{CD}$	Definition of perpendicular
$\overline{AM} \cong \overline{BM}$	Definition of a bisector	$\overline{AM} + \overline{BM} = AB$	Segment Addition Postulate
$\angle A \cong \angle A$	Reflexive Property	$\angle 1 + \angle 2 = 90$	Definition of Complementary Angles
$\overline{AB} \cong \overline{AB}$	Reflexive Property	$\angle 1 + \angle 2 = 180$	Definition of Supplementary Angles
$\angle ACB + \angle ACD = \angle BCD$	Angle Addition Postulate	$\overline{AM} \cong \overline{BM}$	Definition of a Midpoint
$\angle 1 + \angle 2 = \angle BAD$	Angle Addition Postulate	$\angle 1 \cong \angle 3$	Substitution

Equations of Parallel and Perpendicular Lines

All linear equations can be expressed as $y = mx + b$,

where m = slope and b = y-intercept.

Parallel lines have the same slopes.	Perpendicular lines have negative reciprocal slopes.
$y = 5x + 2$ $y = 5x - 3$ same slope	$y = 5x + 2$ $y = -\frac{1}{5}x - 3$ negative reciprocals

Classifying Polygons and their angles

The sum of the interior angles of a polygon with *n* sides is = $(n-2) \times 180$

The sum of the exterior angles of a polygon with *n* sides is = 360°

The measure of one interior angle of a regular polygon with n sides is = $\frac{(n-2)\times 180}{n}$

The measure of one exterior angle of a regular polygon with *n* sides is = $\frac{360}{n}$

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	triangle	180°	60°	120°
4	quadrilateral	360°	90°	90°
5	pentagon	540°	108°	72°
6	hexagon	720°	120°	60°
7	septagon/haptagon	900°	$\approx 128.6^\circ$	$\approx 51.4^\circ$
8	octagon	1080°	135°	45°
9	nonagon	1260°	140°	40°
10	decagon	1440°	144°	36°
12	dodecagon	1800°	150°	30°