

Key

Geometry Unit 3 Review

1. Write the following sentences as conditionals:

a. A rectangle has four right angles

If a figure is a rectangle, then it has 4 sides.

b. An integer that ends with 0 is divisible by 5

If an integer ends in 0, then it is divisible by 5.

2. Show that each conditional is false by finding a counterexample

a. If it is not a weekday, then it is Saturday

Sunday is not a weekday
is not Saturday

b. Odd integers less than 10 are prime

9 is an odd integer < 10
but not prime.

c. If you live in a country that borders the United States, then you live in Canada

Mexico country borders the US
not Canada.

3. Write the converse of each conditional statement. Then determine if the original statement and its converse are true. If BOTH are true, combine them as a biconditional.

a. If you are in Indiana, then you are in Indianapolis. F

If you are in Indianapolis, then you are in Indiana T

b. If two angles have ^{a sum of} ~~measure~~ 90, then the angles are ~~congruent~~ ^{complementary} T

If the angles are complementary, then they have a sum of 90° T

biconditional: two angles have a sum of 90° if and only if, the angles are complementary

4. Name the property that justifies each statement.

a. $AB = AB$ Reflexive

b. If $m\angle 1 = m\angle 2$, and $m\angle 2 = m\angle 4$, then $m\angle 1 = m\angle 4$. Transitive

c. If $x = y$, then $y = x$. Symmetric

d. If $\frac{x}{2} = 7$, then $x = 14$ Multiplication Prop. of Equality

e. If $HJ + 5 = 20$, then $HJ = 15$. Subtraction Prop. of Equality.

5. Write the two conditional statements that make up the biconditional I wear a dress if and only if it is Sunday.

If I wear a dress then it's Sunday

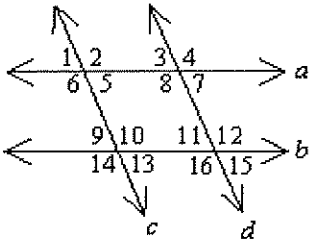
If it is Sunday, then I wear a dress

6. Write the converse, inverse and contrapositive of the conditional.

If two angles are complementary, then the sum of their measures is 90 degrees.

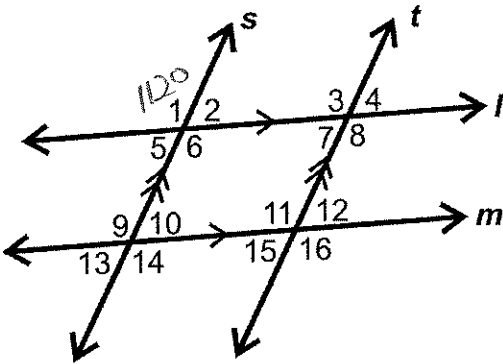
converse: If the sum of their measures is 90°, then two angles are complementary.
 inverse: If two angles are not complementary, then the sum of their measures is NOT 90°.
 contrapositive: If the sum of their measures is not 90° then two angles are NOT complementary.

7. Use the picture to name the relationship for each pair of angles.



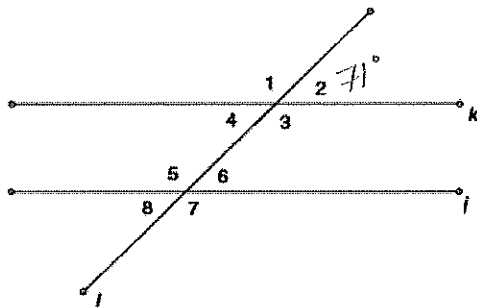
- a. Angle 3 and angle 5 alt. int.
- b. angle 5 and angle 7 corresponding
- c. angle 6 and angle 4 alt. ext.
- d. angle 5 and angle 8 same side int
- e. angle 6 and angle 7 same side ext.

8. The measure of angle 1 is 112 degrees. Find each angle.



- a. $m\angle 2$ 68°
- b. $m\angle 9$ 112°
- c. $m\angle 14$ 112°
- d. Find the sum of $\angle 7$ and $\angle 12$ 136°

9. The measure of angle 2 is 71 degrees. Find the measure of each angle. Explain your reasoning.



- a. measure of angle 4 71° vertical to $\angle 2$
- b. measure of angle 7 109° same side ext to $\angle 2$
- c. measure of angle 8 71° alt ext to $\angle 2$.

10. Write a two column proof.

Given: $4(x - 1) + 2 = 2x + 10$

Prove: $x = 6$

Statements	Reasons
1. $4(x-1) + 2 = 2x + 10$	1.) given
2. $4x - 4 + 2 = 2x + 10$	2.) distributive
3. $4x - 2 = 2x + 10$	3.) combine like terms
4. $2x - 2 = 10$	4.) subtraction P of E
5. $2x = 12$	5.) addition P of E
6. $x = 6$	6.) division P of E

11. Define

- a. conditional statement *if then statement*
- b. hypothesis *the clause after the if*
- c. conclusion *the clause after the then*
- d. inductive reasoning *reasoning based on patterns or observations*
- e. deductive reasoning *reasoning based on facts or rules*

12. Write a two column proof.

Given $a \parallel b$ and $c \parallel d$

Prove $\angle 3 \cong \angle 9$

Statements	Reasons
1.) $a \parallel b$ and $c \parallel d$	1.) given
2.) $\angle 3 \cong \angle 11$	2.) corresponding \angle s postulated
3.) $\angle 11 \cong \angle 9$	3.) corresponding \angle s postulated
4.) $\angle 3 \cong \angle 9$	4.) transitive

13. Identify the hypothesis and conclusion.

If three points lie on the same line then they are collinear.

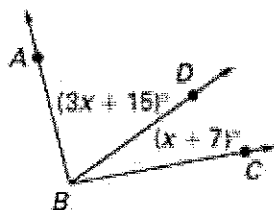
hypothesis *conclusion*

14. Based on the pattern, identify the next two terms. Is this inductive or deductive reasoning? 2, 5, 8, 11, ... *14, 17*

15. State the property that can be used to justify each step of the proof.

Given $m\angle ABC = 94$

Prove $x = 18$



- a. $m\angle ABC + m\angle DBC = m\angle ABC$
 - b. $3x + 15 + x + 7 = 94$
 - c. $4x + 22 = 94$
 - d. $4x = 72$
 - e. $x = 18$
- a.) angle addition postulate*
b.) substitution
c.) combine like terms
d.) subtraction P of E
e.) division P of E

Summarize each property, postulate, or vocabulary word.

Properties of Equality

Addition Property $a + b = c + b$

add the same thing on both sides

Subtraction Property $a - b = c - b$

subtract the same thing on both sides

Multiplication Property $a \times b = c \times b$

multiply by the same thing on both sides

Division Property $\frac{a}{b} = \frac{c}{b}$

divide by the same thing on both sides

Substitution Property

if $x = 3$, then replace x with 3 in any expression

Properties of Congruence

Reflexive Property

$a \cong a$

Symmetric Property

if $a \cong b$ then $b \cong a$

Transitive Property

if $a \cong b$ and $b \cong c$ then $a \cong c$

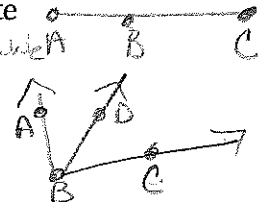
Other

Distributive Property

$a(b+c) = ab+ac$

Segment Addition Postulate

$AB + BC = AC$ point B is between A and C



Angle Addition Postulate

$\angle ABD + \angle DBC = \angle ABC$

Conditional

if then statement $p \rightarrow q$

Hypothesis

the if clause

Conclusion

the then clause

Converse

$q \rightarrow p$

Inverse

$\text{not } p \rightarrow \text{not } q$

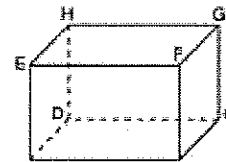
contrapositive

$\text{not } q \rightarrow \text{not } p$

biconditional

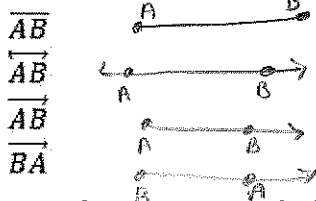
$p \text{ iff } q$

Review Questions



1. What lines are skew to AD? (There are four) $\overline{FB}, \overline{GC}, \overline{EF}, \overline{HG}$

2. Draw each of the following.



3. Write the equation of a line parallel to $y = 3x + 1$ through the point $(2, -6)$.

$m = 3$
 $y + 6 = 3(x - 2)$
 $y + 6 = 3x - 6$
 $y = 3x - 12$