Identify the hypothesis and conclusion of each conditional statement.

1. If x-5 = 7, then x = 12.

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

Write a conditional statement from each sentence.

3. A square has four congruent sides.

   If a fig. is a square, then it has 4 ≅ sides.

4. A plant releases oxygen.

   If something is a plant, then it releases Oxygen.

Consider the true statement below. Write its converse. If the converse is also true, combine the statements as a biconditional. If the converse is false, give a counterexample.

5. If a figure is a square, then it has four congruent angles and four congruent sides.

If a fig. has 4 ≅ ∠'s & sides, then it's a square.

A figure is a sq. Iff it has 4 ≅ ∠'s and sides.

6. If a triangle has three equal sides, then it is an equilateral triangle.

If a triangle is an eq. triangle, then it has three ≅ sides.

A triangle has three = sides Iff it is an eq. △.

Write the two conditional statements that make up each biconditional.

7. Lines are parallel if and only if they do not intersect and are coplanar.

If lines are ∥, then they do not intersect & are coplanar.
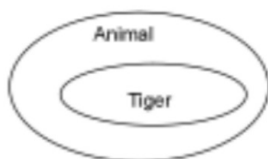
If lines don't intersect, and are coplanar, then they are ∥.

1. a. Hypothesis: $2x - 8 = 40$ Conclusion: $x = 24$
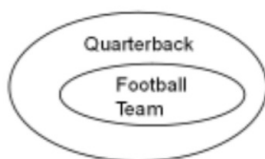   b. Hypothesis: you see lightening Conclusion: you'll hear thunder.

2. a. If an animal is an eagle, then it is a bird.
   b. If a figure is a rhombus, then it has four sides

3. a. True   b. False, it could be a Monday of vaction or a snow day   c. True

4. a.   b

Animal
Tiger

Quarterback
Football
Team

5. a. If you have a sunburn, then there was no clouds   b. If it rains, then the grass will be green.

6. a. Converse: If a point has a positive x-coordinate, then it is in the first quadrant.
             False, the point could be in the fourth quadrant.
   b. Converse: If $x > 10$, then $x^2 > 100$ True

7. a. Converse: If an angle has a measure of $90°$, then it is a right angle.
   b. True
   c. An angle is a right angle if and only if its measure is equal to $90°$

8. a. Convers: If an integer is a multiple of 10, then it ends in a zero.
   b. True
   c. An integer ends in a zero if and only if it is a multiple of 10.

9. If a whole number is a multiple of 5, then its last digit is either a 0 or a 5
   If a whole number's last digit is either a 0 or a 5, then it is a multiple of 5

10. a. True, both conditionals are true.
    b. False, the conditional: If two figures have the same shape, then they are congruent; is false, they could be similar.

11. a.

Step	Reason
$10x + 19 - 2x = 43$	Given
$8x + 19 = 43$	Combine like terms
$8x + 19 - 19 = 43 - 19$	Subtr Prop Eq
$8x = 24$	Simplify
$\dfrac{8x}{8} = \dfrac{24}{8}$	Div Prop Eq
$x = 3$	Simplify

b.

Step	Reason
$9x + 3(x - 4) + 2 = 74$	Given
$9x + 3x - 12 + 2 = 74$	Distrib Prop
$12x - 10 = 74$	Combine like terms
$12x - 10 + 10 = 74 + 10$	Add Prop Eq
$12x = 84$	Simplify
$\dfrac{12x}{12} = \dfrac{84}{12}$	Div Prop Eq
$x = 7$	Simplify

12.

Step	Reason
$m\angle ABR = 110°$	Given
$m\angle ABQ + m\angle QBR = m\angle ABR$	Angle Add Post
$m\angle ABQ + 50° = 110°$	Substitution
$m\angle ABQ + 50° - 50° = 110° - 50°$	Subtr Prop Eq
$m\angle ABQ = 60°$	Simplify

13.

Step	Reason
R is the midpoint of $\overline{AB}$	Given
$AR = RB$	Def of Midpoint
$3x + 24 = 5x$	Substitution
$3x + 24 - 3x = 5x - 3x$	Subtr Prop of Eq
$24 = 2x$	Simplify
$\dfrac{24}{2} = \dfrac{2x}{2}$	Div Prop of Eq
$12 = x$	Simplify
$x = 12$	Symmetric Prop

14.

Step	Reason
$MR + RK = MK$	Seg Add Post
$7x + 1 + 3x - 8 = 123$	Substitution
$10x - 7 = 123$	Combine like terms
$10x - 7 + 7 = 123 + 7$	Add Prop of Eq
$10x = 130$	Simplify
$\dfrac{10x}{10} = \dfrac{130}{10}$	Div Prop of Eq
$x = 13$	Simplify

15. a. If $9x - 12 = 42$, $\boxed{\text{then } 9x = 54}$

  b. $\angle ABC \cong \boxed{\angle ABC}$

  c. If $AB = 12$ and $AB + BC = 120$, then $\boxed{12 + BC = 120}$

  d. If $\overline{AB} \cong \overline{CD}$ and $\overline{CD} \cong \overline{KJ}$ and $\overline{KJ} \cong \overline{XY}$ then $\boxed{\overline{AB} \cong \overline{XY}}$

16. a. Symmetric Property of Congruence
 b. Division Property of Equality
  c. Distributive Property

Objective: Theorems about angles

In this section, we are going to look at theorems about angles and how can use them to find missing angle measures in diagrams. Recall from chapter 1 that _**vert. ∠'s**_ are formed _____ each other when two lines _**cross/intersect**_. We also learned that vertical angles are _**≅**_. This idea is a theorem, which takes a series of steps to prove is true. Postulates, on the other hand, are very basic statements of fact that we can assume are true. This is not the case with theorems. Often in our book, they will show you the proof of a theorem—the steps that were taken to show the theorem is always true.
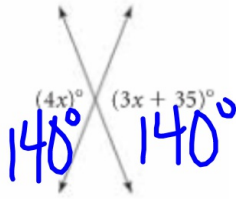

Theorem 2-1: Vertical Angles Theorem

Vertical angles _**≅**_

$\angle 1 \cong \angle 2$

$\angle 3 \cong \angle 4$
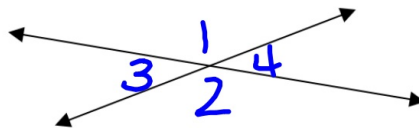
Example 1: Using the Vertical Angles Theorem, we can solve for variables and find the measures of angles. Find the value of x. Find the measure of each angle and the measures of the other pair of vertical angles.
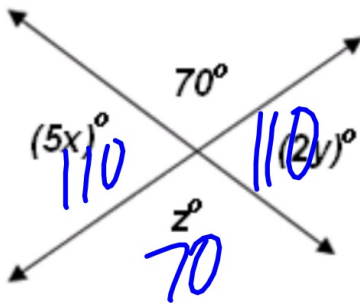

$(4x)°$ $(3x + 35)°$

$140°$ $140°$

$$4x = 3x + 35$$
$$x = 35$$

*What is true about any two adjacent angles in the diagram above?

They are suppl.

QC 1: Find the value of each variable and the measure of each labeled angle.

$70°$

$(5x)°$ 110

$(2y)°$ 110

$z°$ 70

$$2y + 70 = 180$$
$$2y = 110$$
$$y = 55$$

Let's look at some more theorems about angles that help us find missing angles in diagrams.

Theorem 2-2: Congruent Supplements Theorem

If two ∠'s are supplements of the same ∠ (or of ≅ ∠'s), then the two ∠'s are ≅.

Theorem 2-3: Congruent Complements Theorem

If two ∠'s are complements of the same ∠ (or of ≅ ∠'s) then the two ∠'s are ≅.

Theorem 2-4:
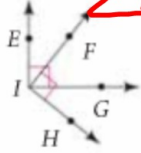
All right ∠'s are ≅.

Theorem 2-5:

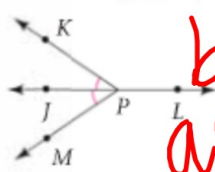If two ∠'s are ≅ & suppl. then each is a rt. ∠.

Example 2: Name two pairs of congruent angles in each figure. Justify your answer with one of the theorems learned in today's notes.

A)

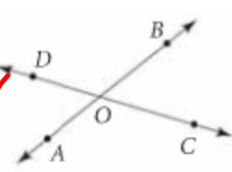$\angle EIG \cong \angle FIH$

$\angle EIF \cong \angle HIG$

b.c. they are compl. to the same $\angle$.

B)

$\angle KPJ \cong \angle MPJ$

b.c. they are linear pairs.

C)

$\angle DOA \cong \angle BOC$

b.c. of vert. $\angle$s.

Hwk #11 - due tomorrow

Sec. 2-5

Pages: 112 - 115

Problems: 1, 2, 7, 8, 10, 16, 17, 22, 24, 25, 30

IXL #5 - I.2 & I.3 due Friday, Oct. 5th!