Unit A Review

1. Let p = "Larry has pizza" and q = "Larry carries in the groceries." Write $p \Leftrightarrow q$ in words.

    if & only if

    <u>Larry has pizza if & only if he carries in groceries.</u>

2. Write this definition of a scalene triangle as two conditionals:

    if...then...

    A scalene triangle is a triangle with no sides of the same length.

    ① If a △ is scalene, then no sides are the same length.
    ② If no sides are the same length, then a △ is scalene.

3. Consider the statement, *"All octagons are quadrilaterals."*

    if...then...
    a. Rewrite as a conditional statement.

        <u>If its an octagon, then its a quadrilateral.</u>

    b. Write the proposition. *if*

        <u>If its an octagon</u> _____

    c. Write the implication. *then*

        <u>then its a quadrilateral</u> _____

4. Consider the conditional, *"If x ≤ 30, then x < 29."*

    if is T, then is T
    a. Give an instance of the conditional.

        <u>example: x = 15</u> _____

    if is T, then is F
    b. Give a counterexample of the conditional.

        <u>example: x = 29.5</u> _____

5. (True)/False. If a statement is false, then the converse can be either true or false.

    Statements & their converses
    are <u>not</u> logically equivalent

6. Consider the statement, "*A figure is a Polygon if it has many sides*".

   If...then...
   a. Rewrite as a conditional statement.

   If it has many sides, then a figure is a polygon.

   ✓ if
   b. Write the proposition.

   If it has many sides

   ✓ then
   c. Write the implication.

   then a figure is a polygon

7. Consider the conditional, "If a figure is a Quadrilateral, then it has four sides," $p \to q$

   $q \to p$
   a. Write the <u>converse</u> of the conditional.

   If it has 4 sides, then its a quadrilateral.

   b. Is the converse true or false?

   True

8. Given *p = It is 4 pm* and *q = I take the dog for a walk*, write the following:

   $p \to q$ a. Conditional: If it is 4pm, then I walk the dog.

   $q \to p$ b. Converse: If I walk the dog, then its 4pm.

   $\sim p \to \sim q$ c. Inverse: If its not 4pm, then I do not walk the dog.

   $\sim q \to \sim p$ d. Contrapositive: If I do not walk the dog, then its not 4pm.

   $p \leftrightarrow q$ e. Bi-conditional: It is 4pm if & only if I walk the dog.

   f. If the conditional is true, which other statement is also true? Explain.

   Contrapositive, since they are logically equivalent.

In numbers 9-12, use the Law of Detachment, Transitivity, and Contrapositive to make a conclusion.

9. $\quad$ P $\qquad$ Q

  If early chem. lab, then M. drives to school.

  (1) ~~Marty drives to school whenever he has an early Chemistry lab.~~

  (2) Marty has an early Chemistry lab every Wednesday.

  P

  <u>Marty drives to school on Wednesdays.</u>

10. P $\qquad$ Q

  If early chem. lab, then M. drives to school.

  (1) ~~Marty drives to school whenever he has an early Chemistry lab.~~

  (2) Marty drives to school.

  Q

  <u>No conclusion.</u>

11. $\quad$ P $\qquad$ Q

  (1) If ABCD is a square, then it is also a rectangle.

  (2) If ABCD is a rectangle, then it is also a parallelogram.

  Q $\qquad$ R

  <u>If ABCD is a square, then its also a parallelogram</u>

12. $\quad$ P $\qquad$ Q

  If its a square, then its a kite.

  (1) ~~Every square is a kite.~~

  (2) Quadrilateral MNOP is not a kite.

  ~Q

  <u>Quadrilateral MNOP is not a square.</u>

13. Using the grid below, determine who participates in what sport. Ajay, Maxine, Kenny, Lindsey, and Susan each play a different sport. The sports are basketball, soccer, tennis, baseball, and swimming.

    (1) Maxine does not play soccer.
    (2) Susan plays either tennis or she swims.
    (3) Ajay plays either basketball or tennis, or he swims.
    (4) Kenny does not play a sport with a ball.

	Basketball	Soccer	Tennis	Baseball	Swimming
Ajay	✓	X	X	X	X
Maxine	X	X	X	✓	X
Kenny	X	X	X	X	✓
Lindsey	X	✓	X	X	X
Susan	X	X	✓	X	X