Geometry, Ch 2-2, Exercises, pg 74, #1-5, 7-18, 22-24, 37

1. Vocab: "The <u>converse</u> of a conditional statement is found by switching the hypothesis and conclusion.

2. Write a definition for Colinear Points. Show how the definition can be interpreted as a bi-conditional.
Points are colinear if they all lie in the same line, or if a single line contains them.

Bi-conditional: Points are colinear if and only if one line contains them.

Because:
If points are colinear, then one line contains them.
And:
If one line contains a set of points, then they are colinear.

Re-write the conditional statement in if-then form.

3. When $x = 6$, $x^2 = 36$. If $x = 6$, then $x^2 = 36$

4. The measure of a straight angle is 180°. If an angle is a straight angle, then its measure is 180°.

5. Only people who are registered are allowed to vote.
If a person is allowed to vote, then the person is registered

For the given statement write in a) If-Then form, b) the Converse, c) the Inverse, d) the Contra-Positive.

7. The complement angles add up to 90°.

a) If angles are complementary, then they add to 90°.

b) If two angles add to 90°, then they are complementary.

c) If two angles are not comp., then they dont add to 90°

d) If two angles do not add up to 90°, then they are not complementary.

8 Ants are insects.

a) If its an ant, then its an insect

b) If its an insect, then its an ant.

c) If its not an ant, then its not an insect.

d) If its not an insect, then its not an ant.

9. $3x + 10 = 16$, because $x = 2$

a) If $x = 2$, then $3x + 10 = 16$

b) If $3x + 10 = 16$, then $x = 2$

c) If $x \neq 2$, then $3x + 10 \neq 16$

d) If $3x + 10 \neq 16$, then $x \neq 2$

10. A midpoint bisects a segment.

a) If point is a midpoint on a segment, then point bisects segmt.

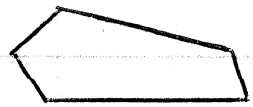
b) If a point bisects a segment, then the point is segment's midpt.

c) If point isn't midpt on a segment, then point doesn't bisect segmt.

d) If a point doesnt bisect a segment, then the point is not a midpoint to the segment.

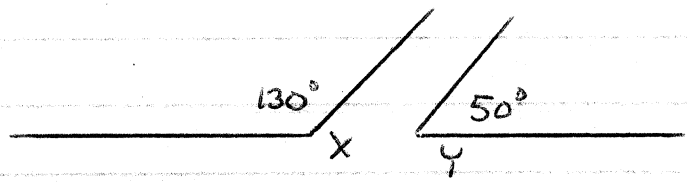
Decide whether the statement is TRUE or FALSE.
If FALSE, provide a counterexample.

11. If a polygon has 5 sides, then it is a regular pentagon. FALSE



12. If $m\angle A$ is $85°$, then the measure of its complement is $5°$. TRUE

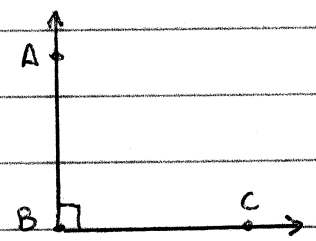
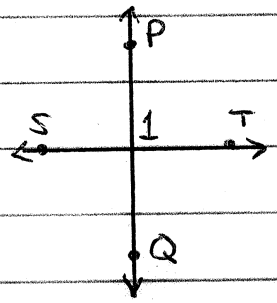
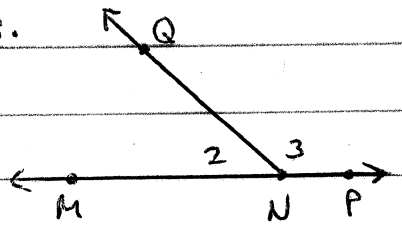
13. Supplementary angles are always Linear Pairs. FALSE, they may not be adjacent. For example, $\angle X$ and $\angle Y$ are supplementary, but not a Linear Pair.



14. If a number is an integer, then it is rational. TRUE

15 If a number is a real number, then it is irrational. FALSE, Five is real, but not irrational.

Decide whether each statement about the diagram is true. Explain you answer with definitions we have learned.

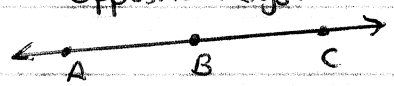
	Diagram	Statement	Truth/Reason
16.		$m\angle ABC = 90°$	TRUE. The symbol at B shows a right angle. By definition, right angles equal 90°
17.		$\overleftrightarrow{PQ} \perp \overleftrightarrow{ST}$	FALSE. The two lines may Look perpendiculer. But without a symbol in the diagram, or a measure for $\angle 1$, we cannot make an affirmative statement of perpendelty.
18.		$m\angle 2 + m\angle 3 = 180°$	* TRUE. $\angle 2$ and $\angle 3$ form a Linear Pair, and by definition, all Linear Pairs must sum to 180°

Determine whether the statement is valid.

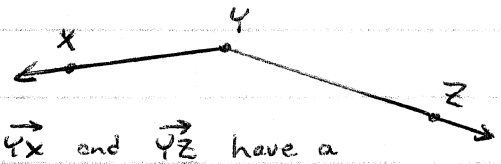
22. Two rays are opposite rays if they have a common end-point.

$\boxed{\text{Not valid.}}$ A common endpoint is a criteria for opposite rays. However, these rays must also be colinear.

Opposite Rays:



$\overrightarrow{BA}$ and $\overrightarrow{BC}$ are opposite rays



$\overrightarrow{YX}$ and $\overrightarrow{YZ}$ have a common endpoint, but are not opposite rays.

23. If the sides of a triangle are all the same length, then the triangle is equilateral. $\boxed{\text{VALID}}$

24. If an angle is a right angle, then its measure is greater than that of an acute angle. $\boxed{\text{NOT VALID}}$

While measuring greater than an acute angle is part of the criteria, this definition erroneously includes obtuse angles.

37. ALGEBRA: Can the statement "If $x^2 - 10 = x + 2$, then $x = 4$" be writen/combined with its converse to form a true biconditional. No.

The biconditional would state, "$x^2 - 10 = x + 2$ iff $x = 4$"

Note that $x^2 - 10 = x + 2$ is also true when $x = -3$

$$x^2 - 10 = x + 2$$
$$x^2 - x - 12 = 0$$
$$(x - 4)(x + 3) = 0$$
$$x = 4 \text{ and } x = -3$$