Geometry Test – Unit 2
Logic, Reasoning and Proof

☺ Name: _____☺
Date: _____ Pd: _____

Definitions (1 - 4)

1) Conditional Statement

2) Inductive Reasoning

3) Contrapositive

4) Logically equivalent statements

5) State the hypothesis and conclusion of the conditional statement:
"If tomorrow is Friday, then today is Thursday."

Hypothesis: _____

Conclusion: _____

6) Rewrite the statement in 'if-then' form:
"Sixteen year olds are eligible to drive."

7) Write the definition of congruent segments as a true biconditional.

8) Write the converse, inverse and contrapositive of the true conditional statement. Determine the truth of each new statement:

"*If an animal is spotted, then it is a Dalmatian.*"

Converse: _____T / F

Inverse: _____T / F

Contrapostive: _____ T / F

9) Provide a counterexample to show that the statement is false.

"*All odd numbers are divisible by 3.*"

10) Draw a counterexample to show that the statement is false.

"*If three points are coplanar, then they are collinear.*"

11) Use inductive reasoning to predict the next two numbers in the patterns:

a) 3, 6, 9, 12, ...   _____, _____

b) 2, 22, 222, 2222, ...   _____, _____

c) 1, $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$, ...   _____, _____

12) Holly notices that every Saturday, her neighbor mows his lawn. Today is Saturday. Holly concludes her neighbor will mow his lawn. This is an example of _____ reasoning.

13) At Carla's school if you are late five times, you will receive a detention. Carla is late to school five times; therefore she will receive a detention. This is an example of _____ reasoning.

14) State the logical conclusion that follows from the statements and the law used to reach that conclusion. If no conclusion can be made, state "no conclusion/no law":

a) If Mike goes to the beach, he wears sunscreen. Mike is wearing sunscreen.

Conclusion: _____

Law: _____

b) If a car is out of gas, it will not start. Sara's car is out gas.

Conclusion: _____

Law: _____

c) If a number ends in 0, then it is divisible by 10. If a number is divisible by 10, then it is divisible by 5.

Conclusion: _____

Law: _____

15) Justify each statement with a property from Algebra.

a) If $\dfrac{x}{3} = -15$, then $x = -45$.

a) _____

b) If $(1+2)+3=6$, then $1+(2+3)=6$.

b) _____

c) If $12 = 2x$, then $6 = x$

c) _____

d) If $3 = x$, then $x = 3$

d) _____

16) Justify each statement with a property, definition or postulate from Geometry.

a) Line AB can be drawn through points A and B.

a) _____

b) If $\angle A$ and $\angle B$ are complementary, then $m\angle A + m\angle B = 90°$.

b) _____

c) $XY = XY$.

c) _____

d) If $\angle R$ and $\angle S$ are congruent, then $m\angle R = m\angle S$.

d) _____
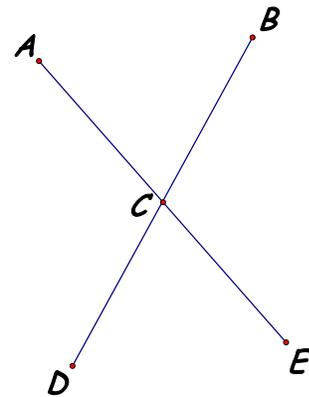
17) Write an algebraic proof. Justify each statement.

Given: $\dfrac{y+2}{3}=3$

Prove: $y=7$

18) Complete the proof:

Given: C is the midpoint of $\overline{AE}$,

$\quad\quad$ C is the midpoint of $\overline{BD}$,

$\quad\quad$ $\overline{AE}\cong\overline{BD}$.

Prove: $\overline{AC}\cong\overline{CD}$

1) _____	1) Given
2) $AC=CE$, $BC=CD$	2) _____
3) $AE=BD$	3) _____
4) _____	4) Segment Addition Postulate
5) $AC+CE=BC+CD$	5) _____
6) $AC+AC=CD+CD$	6) _____
7) _____	7) Substitution
8) _____	8) Division Property
9) $\overline{AC}\cong\overline{CD}$	9) _____

19) **(LTMR)** Given the points: $X(-6, 3)$ and $Y(1, 0)$.

   a) Find the midpoint of $\overline{XY}$.   a) _____
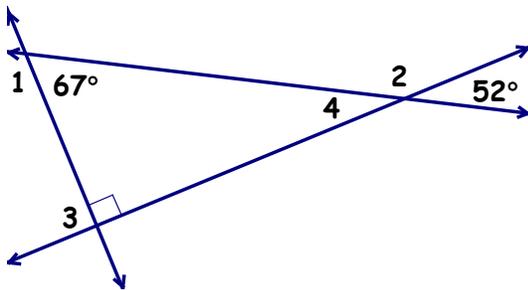
   b) Find W such that X is the midpoint of $\overline{WY}$.   b) _____

   c) Find XY.   c) _____

20) **(LTMR)** Use the diagram to find each angle measure:
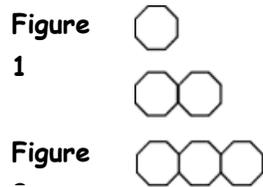

   a) $m\angle 1 = $ _____

   b) $m\angle 2 = $ _____

   c) $m\angle 3 = $ _____

   d) $m\angle 4 = $ _____

21. In the pattern, the sides of each regular octagon have a length of 1 unit.

Figure 1

Figure 2

What is the perimeter of the 10th figure?

A. 26

B. 56

C. 62

D. 71

22. Maria made a conjecture about her next test score based on the pattern of her previous test scores. What type of reasoning did she use?

A. conclusive

B. deductive

C. hypothetical

D. inductive

23. Jessica made the statement, "If I get a job, then I can pay for a car." Her friend commented, "If you do not get a job, then you cannot pay for a car." What type of statement did her friend conclude?

A. biconditional

B. contrapositive

C. converse

D. inverse

24. What is the contrapositive of the statement?

If x = 5, then x > 3.

A. If $x = 5$, then $x \leq 3$.

B. If $x \neq 5$, then $x \leq 3$.

C. If $x \leq 3$, then $x \neq 5$.

D. If $x > 3$, then $x = 5$.

25. What is the converse of the statement?

If Sandra passes Geometry, then her father will buy her a new car.

A. If Sandra's father buys her a new car, then she passed Geometry.

B. If Sandra does not pass Geometry, then she will not get a new car.

C. If Sandra's father does not buy her a new car, then she did not pass Geometry.

D. If Sandra gets a new car, then she passed Geometry.

26. Which is a counterexample to the statement?

The product of two fractions is never an integer.

A. $\dfrac{1}{3}\left(\dfrac{1}{2}\right)$

B. $\dfrac{2}{5}\left(\dfrac{5}{4}\right)$

C. $\dfrac{6}{2}\left(\dfrac{2}{3}\right)$

D. $\dfrac{3}{1}\left(\dfrac{1}{6}\right)$

27. Use the table.

1	2	3	4		n
1	5	9	13		?

What is the nth term of the sequence?

A. $n + 4$

B. $3n - 2$

C. $4n$

D. $4n - 3$

28. Tina has a peanut butter sandwich for lunch on Monday. She has a peanut butter sandwich for lunch on Tuesday, and the same on Wednesday. Using inductive reasoning, predict the type of sandwich she will have on Thursday.

A. roast beef

B. peanut butter

C. ham and cheese

D. She will not have a sandwich on Thursday.

29. Given: $x(x-2) = (x+4)(x+6)$

Prove: $x = -2$

Justify each step.

30. The first five terms of a sequence are shown below.

   -2, 2, 14, 50, 158

   The sequence continues. What is the sixth term of the sequence?