Key Block _____ Date _____

Chapter 2 ~ Review

1. Conditionals are known as if-then statements.
2. A conditional statement, symbolized by $p \rightarrow q$, can be written as an "if-then" statement in which p is the hypothesis.
3. A conditional statement, symbolized by $p \rightarrow q$, can be written as an "if-then" statement in which q is the conclusion.
4. A conditional statement of "If p, then q" is expressed symbolically as $p \rightarrow q$.
5. A conditional statement that is expressed as "If q, then p" is called the converse.
6. A biconditional statement is a statement that contains the phrase "if and only if."
7. If both p and q of the converse ($q \rightarrow p$) are negated, it is called a contrapositive statement.
8. What is a conjecture? educated guess
9. Inductive reasoning is based on patterns and deductive reasoning is rules, definitions, facts.
10. A counterexample invalidates a statement. **TRUE** *FALSE*
11. Write the negation of: ***Points on the same plane are coplanar.***
Points not on the same plane are noncoplanar
12. When a conditional and its converse are true you can combine them as a biconditional statement.
13. A proof uses facts, definitions, accepted properties, and the laws of logic to form a logical argument.

Use this statement. "If you are a vegan, then you eat vegetables" to answer the questions.

14. What part is the hypothesis? you are a vegan
15. Which part is the conclusion? you eat vegetables.

Give counter-example to show that each statement is not always true.

16. Odd integers less than 10 are prime.
Counterexample: the number 9 is odd, but not prime.
17. If you live in a country that borders the United States, then you live in Canada.
Counterexample: Mexico also borders the United States.

Write a conditional statement for the situation described, and then write its converse, inverse, and contrapositive.

Two angles that have a sum of 180° are supplementary.

18. Conditional: ***(circle the hypothesis, and underline the conclusion)***

p→q

If two angles have a sum of 180°, then they are supplementary.

(T)

19. Converse:

q→p

If two angles are supplementary, then they have a sum of 180°.

(T)

20. Inverse:

~p→~q

If two angles do not have a sum of 180°, then they are not supplementary.

21. Contrapositive:

~q→~p

If two angles are not supplementary, then they do not have a sum of 180°.

22. If possible, write the biconditional statement, if not tell why.

p↔q

Two angles have a sum of 180° if and only if they are supplementary.

★ biconditional statement: the conditional and the converse must both be true!

Decide whether inductive or deductive reasoning is used to reach the conclusion. Explain your reasoning.

23. For the past three Wednesdays, the cafeteria has served macaroni and cheese for lunch. Dana concludes that the cafeteria will serve macaroni and cheese for lunch this Wednesday.

Inductive Reasoning (patterns)

24. If you live in Nevada and are between the ages of 16 and 18, then you must take driver's education to get your license. Anthony lives in Nevada, is 16 years old, and has his driver's license. Therefore, Anthony took driver's education.

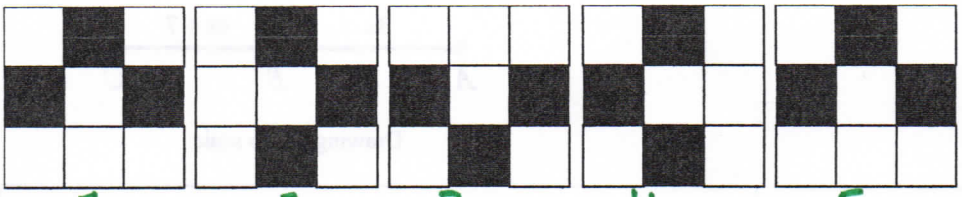
Deductive Reasoning (rules, laws)

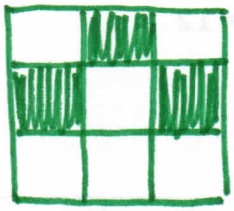
25. **Find the missing elements in the sequence below.** Correction!

2, 4, 8, 14, 22, 32, 44, 58, 74, 92, 112, . . .

2 4 6 8 10 12 14 16 18

26. The first through fifth figures in a pattern are shown below. Draw the **ninth** figure in this pattern.





Name the property that justifies the statement: ★Be able to identify ALL properties!

27. If $\angle R \cong \angle S$, then $\angle S \cong \angle R$. — Symmetric POC

28. If $\angle D \cong \angle E$, and $\angle E \cong \angle F$, then $\angle D \cong \angle F$. — Transitive POC

29. If $3(x - 2) = 6$, then $3x - 6 = 6$ — Distributive prop

30. $m\angle 1 = m\angle 1$ — Reflexive POE

31. If $AB + XY = CD + XY$, then $AB = CD$ — Subtraction POE

32. If $JK = KL$, then $2JK = 2KL$ — Multiplication POE

33. If $2PR = PS$, then $PR = (1/2)PS$ — Division POE

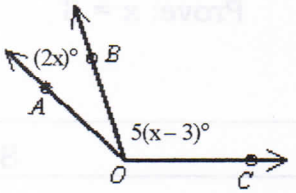
34. If $AB + BC = AC$ and $BC = 7$, then $AB + 7 = AC$ — Substitution

★Because I am substituting into ADDition, it is clearly substitution

WATCH WHAT YOU ARE ASKED TO PROVE!!!!!

35. **Given:** $m\angle AOB = 2x$, $m\angle BOC = 5(x-3)$, $m\angle AOC = 139$.

Prove: $x = 22$

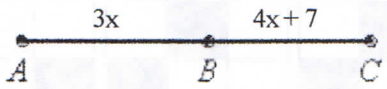


Drawing not to scale

Statements	Reasons
$m\angle AOB = 2x$, $m\angle BOC = 5(x-3)$, $m\angle AOC = 139$.	Given
$m\angle AOB + m\angle BOC = m\angle AOC$	Angle Addition Postulate
$2x + 5(x-3) = 139$	Substitution
$2x + 5x - 15 = 139$	Distribution
$7x - 15 = 139$	C.L.T.
$7x = 154$	Addition POE
$x = 22$	Division POE

36. **Given:** B is between A and C. And AC = 35.

Prove AB = 12

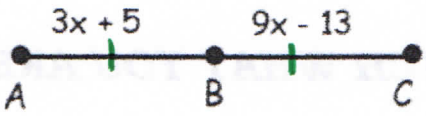


Drawing not to scale

Statements	Reasons
B is between A and C. And AC = 35.	Given
AB + BC = AC	Segment Addition Postulate
3x + 4x + 7 = 35	Substitution
7x + 7 = 35	C.L.T.
7x = 28	Subtraction POE
x = 4	Division POE
AB = 3x	Given
AB = 3(4)	Substitution
AB = 12	Simplify / C.L.T.

37. Given: B is the midpoint of AC.

Prove: x = 3



Statements	Reasons
B is the midpoint of AC	Given
$\overline{AB} \cong \overline{BC}$	Def of Midpoint
AB = BC	Def of congruence
3x + 5 = 9x - 13	Substitution
5 = 6x - 13	Subtraction POE
18 = 6x	Addition POE
3 = x	Division POE
x = 3	Symmetric POE

38. Write the next equation in the sequence below. Look for a pattern, and make a conjecture.

$1 + 3 = 4$

$1 + 3 + 5 = 9$

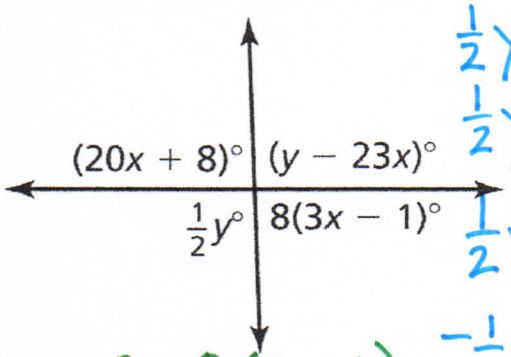
$1 + 3 + 5 + 7 = 16$

Pattern: If you add the next odd number the answer is the next perfect square!

$\boxed{1+3+5+7+9=25}$

Vertical ∠'s are ≅

39. Solve for x and y.



$20x+8=8(3x-1)$

$20x+8=24x-8$

$16=4x$

$\boxed{4=x}$

$\frac{1}{2}y=y-23x$

$\frac{1}{2}y=y-23(4)$

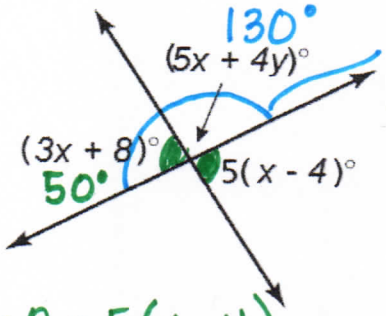
$\frac{1}{2}y=y-92$

$-\frac{1}{2}y=-92$

$\boxed{y=184}$

Vertical ∠'s are ≅

40. Solve for x and y.



$3x+8=5(x-4)$

$3x+8=5x-20$

$28=2x$

$\boxed{14=x}$ so..... $3(14)+8=50°$

Linear pair = 180

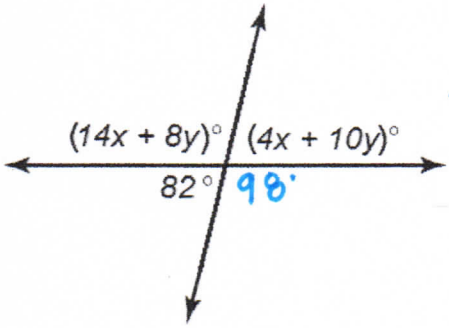
$5(14)+4y=130$

$70+4y=130$

$4y=60$

$\boxed{y=15}$

41. Set up a system of equations and solve for x and y.



Vertical ∠'s are ≅

$-2\,[14x+8y=98]$

$7\,[4x+10y=82]$

Elimination Method!

$-28x-16y=-196$

$+\;28x+70y=574$

$54y=378$

$\boxed{y=7}$

$4x+10(7)=82$

$4x+70=82$

$4x=12$

$\boxed{x=3}$