Chapter 2 Group Review

Write the next two items in the pattern:
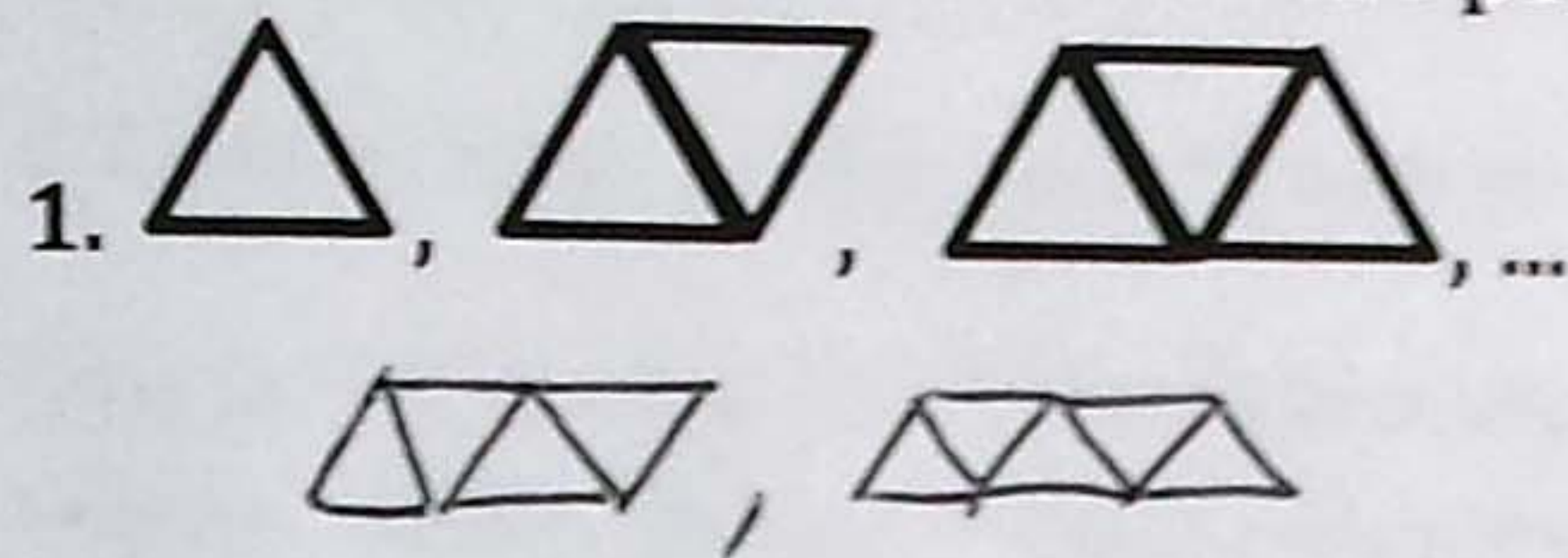
1. △ , ▽ , △▽ , ...   2. $\frac{1}{6}, \frac{2}{7}, \frac{3}{8}, \frac{4}{9}, \dots \; \frac{5}{10}, \frac{6}{11}$

△▽▽ , ▽△△ ,

Complete the conjecture:

3. The sum of an even number and an odd number is ___ODD___.

4. The square of a whole number is __POSITIVE__.

Determine if the conjecture is true or false. If false, provide a counterexample.

5. If B is the midpoint of $\overline{AC}$, then $\overline{AC} \cong \overline{BC}$. $\overline{AB} \cong \overline{BC}$

6. If $2x + 3 = 15$, then $x = 6$ TRUE

7. There are 28 days in February. FALSE (LEAP YEAR)

8. If two angles are adjacent, then they have a common ray. TRUE

Write the converse, inverse, and contrapositive of the conditional statement given. Then find their truth values. (You do NOT have to provide a counterexample if the truth value is false).

9. <u>Conditional</u>: If $\angle X$ is a right angle, then $m\angle X = 90°$

<u>Converse</u>: IF $m\angle X = 90°$, THEN $\angle X$ IS A RIGHT ANGLE   TRUE

<u>Inverse</u>: IF $\angle X$ IS NOT A RT. $\angle$, THEN $m\angle X \neq 90°$ TRUE

<u>Contrapositive</u>: IF $m\angle X \neq 90°$, THEN $\angle X$ IS NOT A RT. $\angle$ TRUE

10. <u>Conditional</u>: If x is a whole number, then $x = 2$.   FALSE

<u>Converse</u>: IF $X = 2$, THEN x IS A WHOLE #   TRUE

<u>Inverse</u>: IF x IS NOT A WHOLE #, THEN $X \neq 2$ TRUE

<u>Contrapositive</u>: IF $X \neq 2$ THEN x IS NOT A WHOLE #   FALSE

11. Use the true statements below to determine whether each conclusion is true or false:
Jenn is a member of the basketball team. When the team practices, Jenn shoots hoops. The team begins practice when the gate to the courts is unlocked. The gates are unlocked at 5:00am on weekdays and 8:00am on Saturdays.

a) The basketball team practices on weekdays only.   FALSE

b) Jenn shoots hoops on Saturdays   TRUE

c) Basketball practice starts at the same time every day.   FALSE

12. Determine if the conjecture is valid _by the Law of Detachment_.

Given: If Mrs. Garnet goes to Starbucks, then she will buy a Pumpkin Spice Latte. Mrs. Garnet went to Starbucks.

Conjecture: She bought a Pumpkin Spice Latte   VALID

13. Determine if the conjecture is valid _by the Law of Syllogism_.

Given: If a bank robber steals money, then the sheriff will track the bank robber down. If the sheriff tracks the bank robber down, then the bank robber will be arrested. The bank robber stole money.

Conjecture: The bank robber is rich $$$!!!   NOT VALID

14. Determine if a true biconditional can be formed from the conditional statement given. If so, write the biconditional statement. If not, provide a counterexample.

Conditional: If a number is divisible by 10, then it ends in a zero.

   A NUMBER IS DIVISIBLE BY 10 IFF IT ENDS IN ZERO

Fill in the blank(s) to form a true biconditional statement:

15. Two angles are COMPLEMENTARY iff the sum of their measures are 90°.

16. The area of a square is equal to s^2 iff the perimeter of the square is ___4s___ OR S+S+S+S.

17. Solve the equation. Write the justification for each step.

① $\dfrac{m}{-5} + 3 = -4.5$ ① GIVEN

② $\dfrac{M}{-5} = -7.5$ ② SPE

③ $m = 37.5$ ③ MPE

Use each property to write the next statement in a proof:

18. Definition of Congruent Segments: AB = EF $\overline{AB} \cong \overline{EF}$

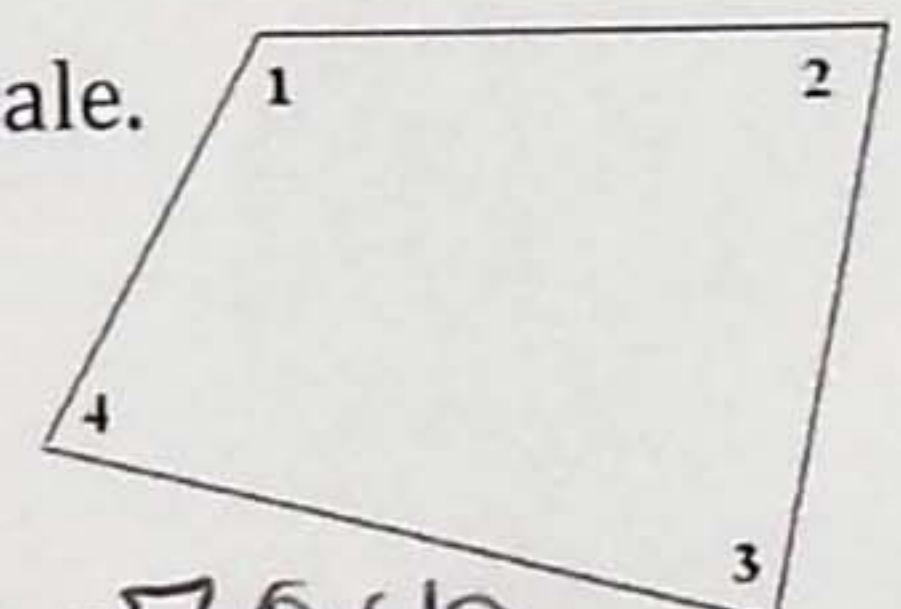**19. Substitution Property of Equality:** $3n + 4$ and $n = 7$ $3(7) + 4$

20. Definition of Complementary Angles: $\angle 3$ and $\angle 4$ are complementary $m\angle 3 + m\angle 4 = 90°$

21. Reflexive Property of Congruence: $\triangle XYZ$ $\triangle XYZ \cong \triangle XYZ$

22. In a quadrilateral, $m\angle 1 + m\angle 2 + m\angle 3 + m\angle 4 = 360°$. If $m\angle 2 = 2m\angle 1$, $m\angle 3 = m\angle 1 + 10$, and $m\angle 4 = m\angle 1$.
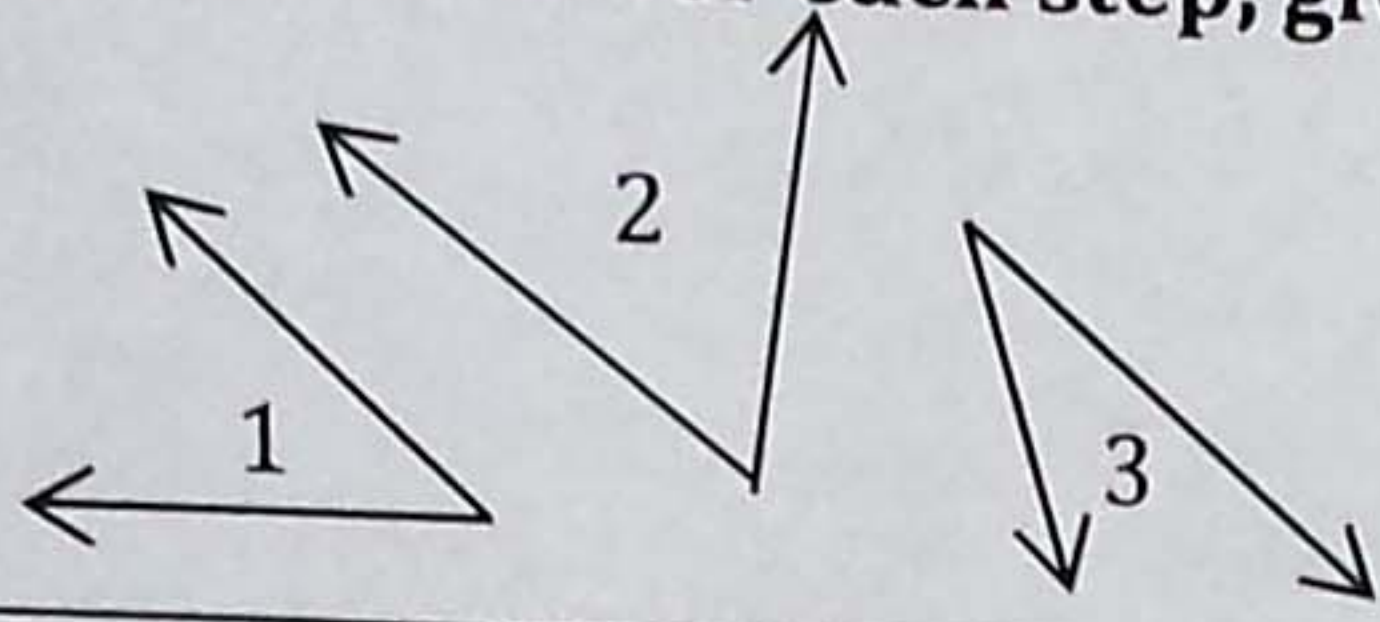
Find $m\angle 3$ in degrees. HINT: Put everything in terms of $m\angle 1$, then solve. Diagram is **NOT** to scale.

$m\angle 1 + 2m\angle 1 + m\angle 1 + 10 + m\angle 1 = 360$
$5m\angle 1 + 10 = 360$
$5m\angle 1 = 350$
$5m\angle 1 = 350$
$m\angle 1 = 70$

$m\angle 3 = 70 + 10$
$\boxed{m\angle 3 = 80°}$

23. Write a justification for each step, given that ∠1 and ∠2 are complementary, and ∠1 ≅ ∠3

Statements	Reasons
1. ∠ 1 and ∠2 are complementary	1. GIVEN
2. $m∠1 + m∠2 = 90°$	2. DEF of COMP. ∠s
3. ∠1 ≅ ∠3	3. GIVEN
4. $m∠1 = m∠3$	4. DEF ≅ ∠s
5. $m∠3 + m∠2 = 90°$	5. SUBST. PE
6. ∠ 3 and ∠ 2 are complementary	6. DEF of COMP. ∠s

Find the value of each variable. Write the theorem or definition you used to write the equation in your first step.

24. $(z-2)°$ LINEAR PAIR
     $(2+7z)°$ THM.

$$(z-2)+(2+7z)=180°$$
$$8z = 180°$$
$$z = 22.5°$$

25. $135°$ VERT. ∠s THM.
     $3w°$

$$135 = 3w$$
$$45 = w$$
$$w = 45°$$

26. Use the given two-column proof to write a _flowchart proof_:

Given: ∠ 1 ≅ ∠ 3
Prove: ∠4 ≅ ∠ 5

Statements	Reasons
1. ∠1 ≅ ∠3	1. Given
2. ∠1 ≅ ∠4, ∠3 ≅ ∠5	2. Vert ∠ Thm.
3. ∠1 ≅ ∠5	3. Trans. Prop. ≅
4. ∠4 ≅ ∠5	4. Trans. Prop. ≅

∠1 ≅ ∠3 → ∠1 ≅ ∠5
GIVEN   TRANS. PC

∠1 ≅ ∠4
∠3 ≅ ∠5
VERT. ∠ THM

∠4 ≅ ∠5
TRANS. PC