2-1 Skills Practice

Inductive Reasoning and Conjecture

Write a conjecture that describes the pattern in the sequence. Then use your conjecture to find the next item in the sequence.

1. each shape has two more shaded and one more unshaded diamonds than the one before it;

(handwritten left margin:) $-4+3=-1$ $-1+3=2$ and so on

2. $-4, -1, 2, 5, 8$

each element is three more than the previous element; 11

(handwritten:) can also be written as: $\frac{12}{2}, \frac{11}{2}, \frac{10}{2}, \frac{9}{2}, \frac{8}{2}$

3. $6, \frac{11}{2}, 5, \frac{9}{2}, 4$

each element has a numerator one less than the previous element and the denominator is always 2; $\frac{7}{2}$

4. $-2, 4, -8, 16, -32$

each element is -2 times the previous element; 64

(handwritten:) $-2(-2)=4$ $-2(4)=-8$ $-2(-8)=16$ and so on.

Make a conjecture about each value or geometric relationship.
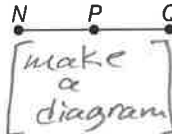**5–8. Sample answers are given.**

(handwritten:) if this

5. Points A, B, and C are collinear, and D is between B and C.

(handwritten:) answer: **A, B, C, and D are collinear.**

(handwritten left:) then this

(handwritten:) make a diagram to help.

6. Point P is the midpoint of $\overline{NQ}$.

$NP = PQ$ *(answer)*
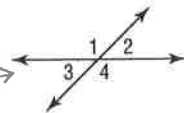
(handwritten:) if this then this

(handwritten:) make a diagram
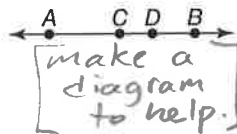
7. $\angle 1$, $\angle 2$, $\angle 3$, and $\angle 4$ form four linear pairs.

$\angle 1$, $\angle 2$, $\angle 3$, and $\angle 4$ are formed by two intersecting lines.

(handwritten:) first draw it

(handwritten:) then you can answer it

8. $\angle 3 \cong \angle 4$

(handwritten:) $m\angle 3 = m\angle 4$

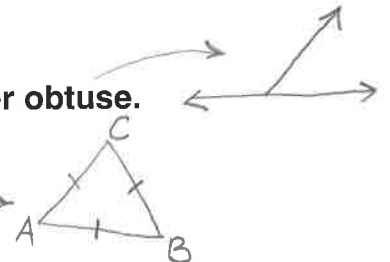the measure of $\angle 3$ is equal to the measure of $\angle 4$.

Determine whether each conjecture is *true* or *false*. Give a counterexample for any false conjecture.

9. If $\angle ABC$ and $\angle CBD$ form a linear pair, then $\angle ABC \cong \angle CBD$.

False; one of the angles could be acute and the other obtuse.

10. If $\overline{AB}$, $\overline{BC}$, and $\overline{AC}$ are congruent, then A, B, and C are collinear.

False; $\overline{AB}$, $\overline{BC}$ and $\overline{AC}$ could form a triangle.
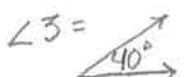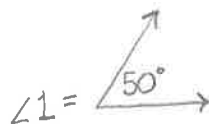

11. If $AB + BC = AC$, then $AB = BC$.

False; counterexample:

12. If $\angle 1$ is complementary to $\angle 2$, and $\angle 1$ is complementary to $\angle 3$, then $\angle 2 \cong \angle 3$.

true

(handwritten:) $m\angle 1 + m\angle 2 = 90$ $m\angle 1 + m\angle 3 = 90$ therefore $m\angle 2 = m\angle 3$

(side tab:) Lesson 2-1