

Homework

4.2 Use Inductive Reasoning

4.3 Analyze Conditional
Statements

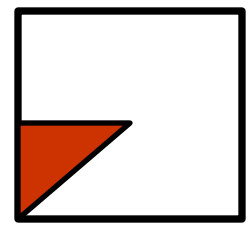
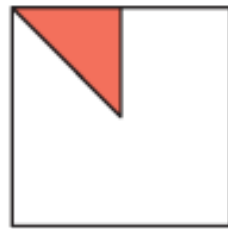
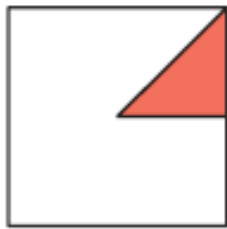
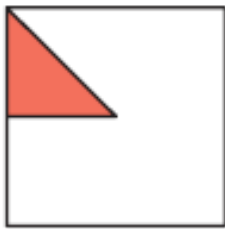
pp. 201 – 202 2, 3, 6, 12 – 16 even,
20 – 23 all

pp. 207 2 – 18 even

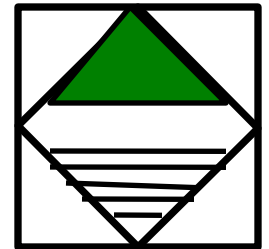
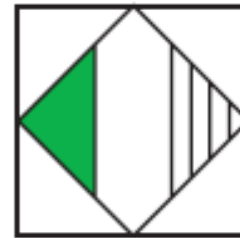
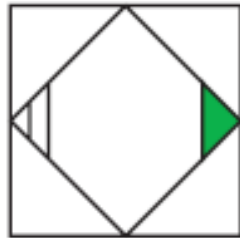
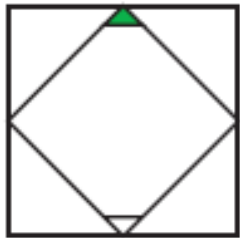


Sketch the next figure in the pattern.

2.



3.



Describe a pattern in the numbers. Write the next number in the pattern.

6. 22, 21, 19, 16, 12, . . .

The numbers are decreasing by consecutive natural numbers.

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12. 1.1, 3.3, 13.2, 66, 396, . . .

Multiply the previous number by $(n + 2)$;

2772



Describe a pattern in the numbers. Write the next number in the pattern.

14. 1, 2, 6, 15, ...

The rate of increase is increasing by n^2

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16. $3, \frac{3}{2}, \frac{3}{8}, \frac{3}{48}, \dots$

Multiply the previous number by $\frac{1}{2n^2}$

$\frac{3}{384}$



In Exercises 20 and 21, complete the conjecture based on the pattern you observe in the table. The table shows the squares of several natural numbers. The first differences are the differences of consecutive squares. The second differences are the differences of consecutive first differences.

Whole Numbers	1	2	3	4	5	6	7	8
Squares	1	4	9	16	25	36	49	64
First Differences		3	5	7	9	11	13	15
Second Differences			2	2	2	2	2	

20. **Conjecture** For squares of consecutive natural numbers, each first difference is ___?___ the previous first difference. **2 greater than**
21. **Conjecture** For squares of consecutive natural numbers, each second difference is ___?___ the previous second difference. **equal to**



Show the conjecture is false by finding a counterexample.

22. The sum of the squares of any two consecutive squared natural numbers is an even number.
23. The sum of the squares of any two squared natural numbers is an odd number.

22. $1^2 + 2^2 = 5$; 5 is not even

23. $1^2 + 3^2 = 10$; 10 is not odd



Rewrite the conditional statement in if-then form.

2. There are 12 eggs if the carton is full.

If the carton is full, then there are 12 eggs.

4. The car runs when there is gas in the tank.

If there is gas in the tank, then the car will run.



Write the converse, inverse, and contrapositive of each statement.

6. If x is odd, then $3x$ is odd.

Converse: If $3x$ is odd, then x is odd.

Inverse: If x is not odd, then $3x$ is not odd.

Contrapositive: If $3x$ is not odd, then x is not odd.



Decide whether the statement is *true* or *false*. If false, provide a counterexample.

8. If $x^2 = 36$, then x must equal 18 or -18 .

False $x = 6$.

10. Two lines intersect in at most one point.

True



Write the converse of each true statement. If the converse is also true, combine the statements to write a true biconditional statement.

12. If two angles are supplementary, then their sum is 180° .

If the sum of two angles is 180° , then they are supplementary.

The sum of two angles is 180° if and only if they are supplementary.

or The two angles are supplementary if and only if their sum is 180° .



Write the converse of each true statement. If the converse is also true, combine the statements to write a true biconditional statement.

14. If an animal is a panther, then it lives in the forest.

If an animal lives in the forest, then it is a panther.

False.



Rewrite the biconditional statement as a conditional statement and its converse.

16. A point is a midpoint of a segment if and only if it divides the segment into two congruent segments.

If a point is a midpoint of a segment, then it divides the segment into two congruent segments.

If a point divides a segment into two congruent segments, then it is the midpoint of the segment.



Decide whether the statement is a valid definition.

18. If two angles have the same measure, then they are congruent.

This conditional is true.

Converse:

If two angles are congruent, then they have the same measure.

This converse is true. The statement is a valid definition.

