BEFORE BEGINNING THIS MODULE, MAKE SURE YOU ARE ONLY USING THE MOZILLA FIREFOX OR GOOGLE CHROME BROWSER. DO NOT USE INTERNET EXPLORER!!

PLEASE READ ALL DIRECTIONS CAREFULLY!!

**Today you will begin/complete a module, but first a few computer lab norms:**

1) NO FOOD OR DRINK IN THE LAB
2) NO CELL PHONES – ZERO TOLERANCE!
3) NO MUSIC WEBSITES OF ANY SORT
4) DO NOT TOUCH ANYTHING BESIDES THE COMPUTER STATION YOU'RE USING
5) NO LOUD TALKING
6) BE MINDFUL OF POWER CORDS

WARM UP – 5 MINUTES

TO BE COMPLETED ON YOUR WARM UP PAPER.

1. Find $m\angle C$ if $\angle C$ and $\angle D$ are supplementary, $m\angle C = 3y - 5$, and $m\angle D = 8y + 20$.

2. Find SR if R is the midpoint of SU shown in the figure.

$$6a + 4 \qquad 2(5a - 4)$$

S   R   U
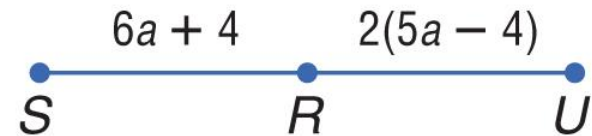
Lesson 2-1: Inductive Reasoning and Conjecture (Pg.89)

ONLINE MODULE

Tuesday, October 25, 2016

TARGETS

- Make conjectures based on inductive reasoning.

- Find counterexamples.

Note: You can access pages 89-96 under the textbook section of the class website**

CCSS

Content Standards

G-CO.9 Prove theorems about lines and angles. Theorems include: vertical angles are congruent; when a transversal crosses parallel lines, alternate interior angles are congruent and corresponding angles are congruent; points on a perpendicular bisector of a line segment are exactly those equidistant from the segment's endpoints.

Mathematical Practices

2 Reason abstractly and quantitatively.

3 Construct viable arguments and critique the reasoning of others.

6 Attend to precision.

8 Look for and express regularity in repeated reasoning.

Essential Question:

How do you use inductive reasoning to make a conjecture?

Completing the Module

Step 1) Copy the following objectives in your notes:

a) Make conjectures based on inductive reasoning.
b) Find counterexamples

Step 2) Define the following vocabulary words**:**

a) **inductive reasoning**
b) **conjecture**
c) **counterexample**

**Step 3) View the video clip Using Inductive Reasoning to Make Conjectures**

Step 4) Review the remaining slides in this Powerpoint (you must click through each slide, it is not automated), directions will continue after the end of the slideshow.

EXAMPLE 1   **Patterns and Conjecture**

A. Write a conjecture that describes the pattern 2, 4, 12, 48, 240. Then use your conjecture to find the next item in the sequence.

Step 1   Look for a pattern.

2   4   12   48   240

×2   ×3   ×4   ×5
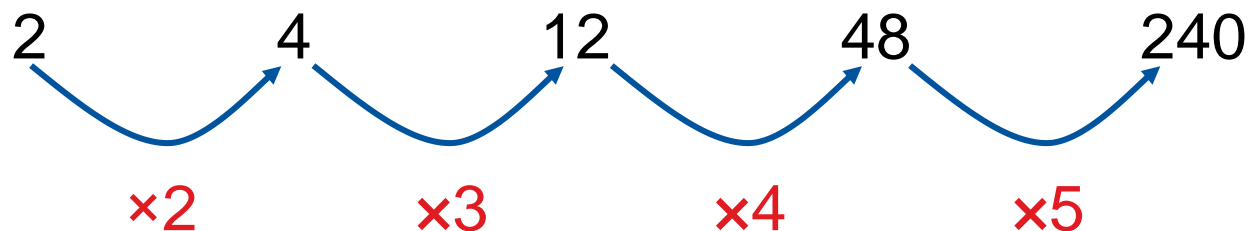
Step 2   Make a conjecture

The numbers are multiplied by 2, 3, 4, and 5. The next number will be multiplied by 6. So, it will be 6 ● 240 or 1440.
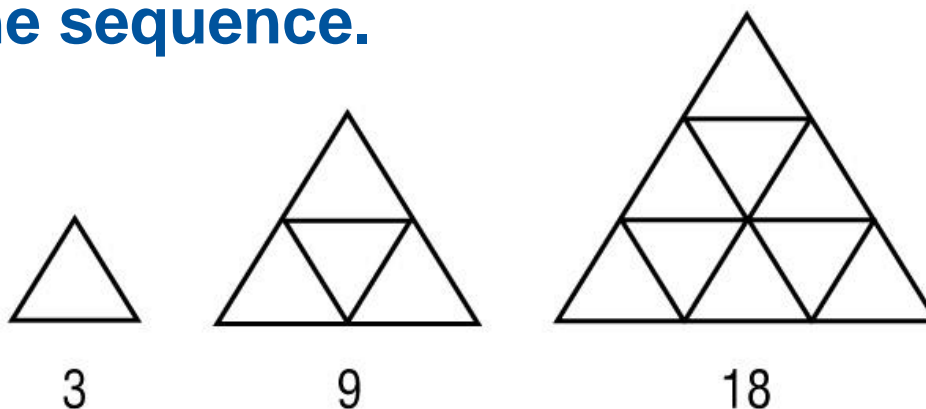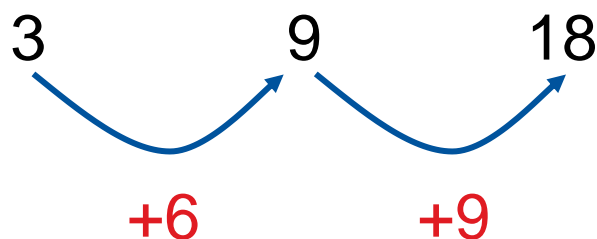
Answer: 1440

EXAMPLE 1   **Patterns and Conjecture**

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

3   9   18

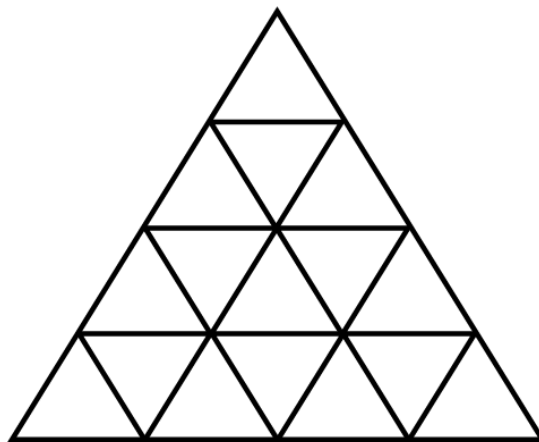**Step 1**   Look for a pattern.

3   9   18

+6   +9

EXAMPLE 1   **Patterns and Conjecture**

Step 2   Make a conjecture.

Conjecture: Notice that 6 is 3 × 2 and 9 is 3 × 3. The next figure will increase by 3 × 4 or 12 segments. So, the next figure will have 18 + 12 or 30 segments.

Answer: 30 segments

Check   Draw the next figure to check your conjecture.

MENU

EXAMPLE 1 ✓ **Check Your Progress** ✓ **CheckPoint**

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

$$1, \frac{1}{4}, \frac{1}{9}, \frac{1}{16}, \frac{1}{25}$$

A. $\dfrac{1}{32}$

B. $\dfrac{1}{36}$
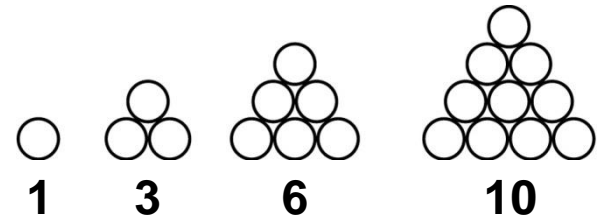
C. $\dfrac{1}{34}$

D. $\dfrac{1}{49}$

MENU

EXAMPLE 1   ✔ Check Your Progress   ✔ CheckPoint

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

1   3   6   10

A.   The next figure will have 10 circles.

B.   The next figure will have 10 + 5 or 15 circles.

C.   The next figure will have 15 + 5 or 20 circles.

D.   The next figure will have 15 + 6 or 21 circles.

EXAMPLE 2   **Algebraic and Geometric Conjectures**

A. Make a conjecture about the sum of an odd number and an even number. List some examples that support your conjecture.

Step 1 List some examples.

$1 + 2 = 3$ $1 + 4 = 5$ $4 + 5 = 9$ $5 + 6 = 11$

Step 2 Look for a pattern.

Notice that the sums 3, 5, 9, and 11 are all odd numbers.
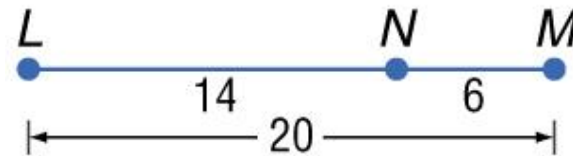
Step 3 Make a conjecture.

Answer: The sum of an odd number and an even number is odd.

EXAMPLE 2   Algebraic and Geometric Conjectures

B. For points *L, M,* and *N, LM* = 20, *MN* = 6, and *LN* = 14. Make a conjecture and draw a figure to illustrate your conjecture.

Step 1   Draw a figure.

Step 2   Examine the figure.

Since *LN* + *MN* = *LM,* the points can be collinear with point *N* between points *L* and *M.*

Step 3   Make a conjecture.

Answer: *L*, *M*, and *N* are collinear.

EXAMPLE 2 ✓ Check Your Progress ✓CheckPoint

A. Make a conjecture about the product of two odd numbers.

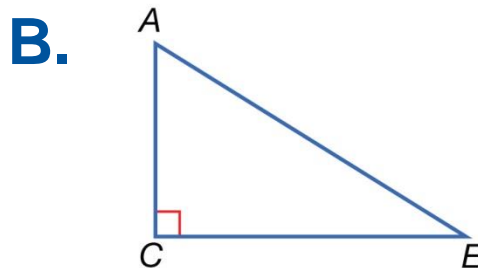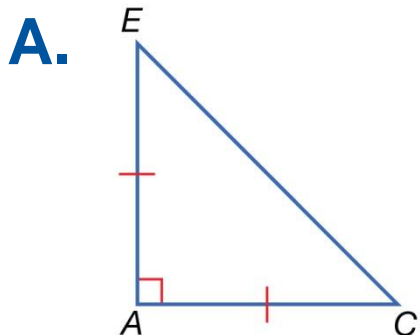**A.** The product is odd.

B. The product is even.

C. The product is sometimes even, sometimes odd.

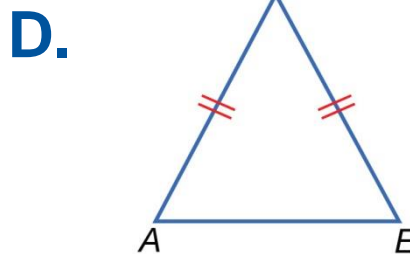**D.** The product is a prime number.

EXAMPLE 2   ✓ **Check Your Progress**

CheckPoint

B. **Given:** *ACE* **is a right triangle with** *AC* = *CE*. **Which figure would illustrate the following conjecture?** Δ*ACE* **is isosceles,** ∠*C* **is a right angle, and** *AE* **is the hypotenuse.**

A.

B.

C.

D.
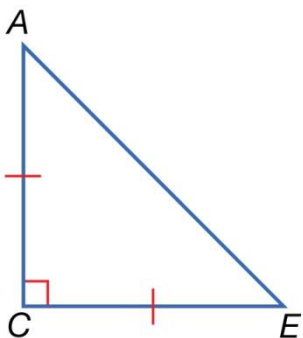
Real-World Example 3

Make Conjectures from Data

A. SALES The table shows the total sales for the first three months a store is open. The owner wants to predict the sales for the fourth month.

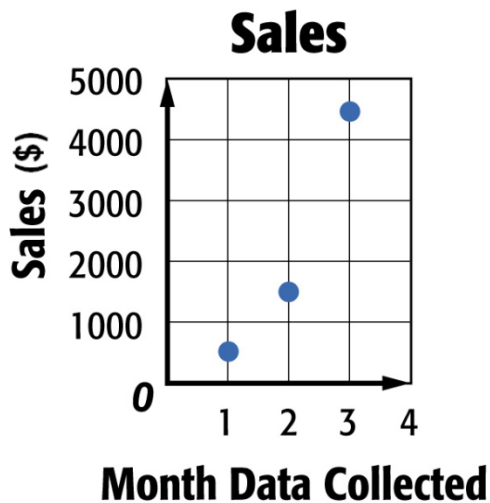| Month	Sales
1	$500
2	$1500
3	$4500

Make a statistical graph that best displays the data.

Since you want to look for a pattern over time, use a scatter plot to display the data. Label the horizontal axis with the months and the vertical axis with the amount of sales. Plot each set of data.

Real-World Example 3

Make Conjectures from Data

Answer:

Sales

Sales ($)

5000
4000
3000
2000
1000
0

1 2 3 4

Month Data Collected

Real-World Example 3 — **Make Conjectures from Data**

B. SALES **The table shows the total sales for the first three months a store is open. The owner wants to predict the sales for the fourth month.**

Make a conjecture about the sales in the fourth month and justify your claim or prediction.

Look for patterns in the data. The sales triple each month.

Answer: The sales triple each month, so in the fourth month there will be $4500 × 3 or $13,500 in sales.

Real-World **Example 3**

✓ **Check Your Progress**

✓ **CheckPoint**

A. SCHOOL The table shows the enrollment of incoming freshmen at a high school over the last four years. The school wants to predict the number of freshmen for next year. Make a statistical graph that best displays the data.

Incoming Freshman Class

Year	Enrollment
1	258
2	282
3	308
4	333

A.

Incoming Freshman Class

B.

Incoming Freshman Class

C.

Incoming Freshman Class

D.

Incoming Freshman Class

Real-World **Example 3**

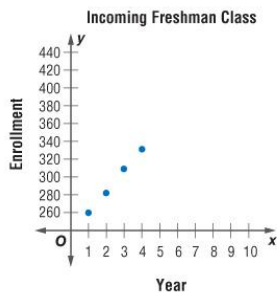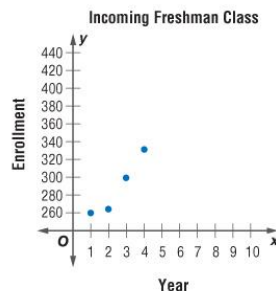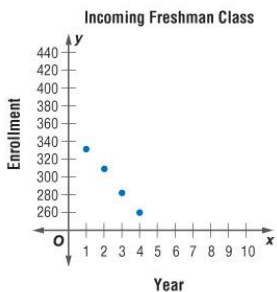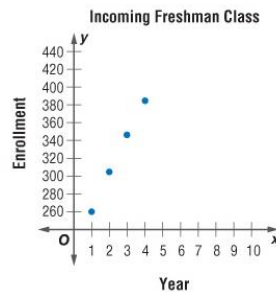✓ **Check Your Progress**

✓**Check**Point

B. SCHOOL The table shows the enrollment of incoming freshmen at a high school over the last four years. The school wants to predict the number of freshmen for next year. Make a conjecture about the enrollment for next year.

Incoming Freshman Class

Year	Enrollment
1	258
2	282
3	308
4	333

A. Enrollment will increase by about 25 students; 358 students.

B. Enrollment will increase by about 50 students; 383 students.

C. Enrollment will decrease by about 20 students; 313 students.

D. Enrollment will stay about the same; 335 students.

EXAMPLE 4 **Find Counterexamples**

UNEMPLOYMENT Based on the table showing unemployment rates for various counties in Texas, find a counterexample for the following statement. *The unemployment rate is highest in the cities with the most people.*

County	Population	Rate
Armstrong	2,163	3.7%
Cameron	371,825	7.2%
El Paso	713,126	7.0%
Hopkins	33,201	4.3%
Maverick	50,436	11.3%
Mitchell	9,402	6.1%

EXAMPLE 4 | **Find Counterexamples**

Examine the data in the table. Find two cities such that the population of the first is greater than the population of the second, while the unemployment rate of the first is less than the unemployment rate of the second. El Paso has a greater population than Maverick, while El Paso has a lower unemployment rate than Maverick.

Answer: Maverick has only 50,436 people in its population, and it has a higher rate of unemployment than El Paso, which has 713,126 people in its population.

EXAMPLE 4   ✅ Check Your Progress   ✓ CheckPoint

DRIVING This table shows selected states, the 2000 population of each state, and the number of people per 1000 residents who are licensed drivers in each state. Based on the table, which two states could be used as a counterexample for the following statement?

State	Population	Licensed Drivers per 1000
Alabama	4, 447, 100	792
California	33, 871, 648	627
Texas	20, 851, 820	646
Vermont	608, 827	831
West Virginia	1, 808, 344	745
Wisconsin	5, 363, 675	703

The greater the population of a state, the lower the number of drivers per 1000 residents.

A.   Texas and California

B.   Vermont and Texas

C.   Wisconsin and West Virginia

D.   Alabama and West Virginia

<u>Completing the Module</u> (cont.)

Step 5) Open the worksheet 2-1 Inductive Reasoning & Conjecture (in the Online Modules section) and complete 1-11 all on a separate sheet of paper. Hand in before you leave.

Closure

1) Check your work area before you leave.

2) Close all computer programs, but do log off.

3) Return all calculators.

4) Take your personal belongings.

HAVE A GREAT DAY!