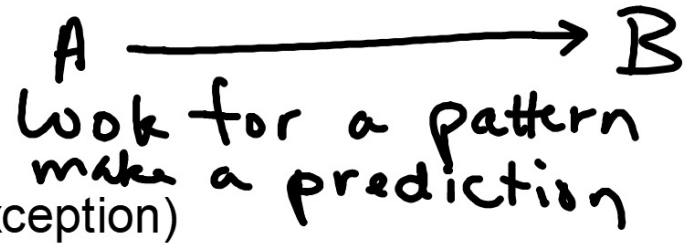
Geometry 2.1
Make conjectures based on inductive reasoning
Find counterexamples



inductive reasoning
conjecture
counterexample (exception)

1. Find the pattern (conjecture)
"Here's what I think is going on..."
2. Extend the pattern to answer the question...

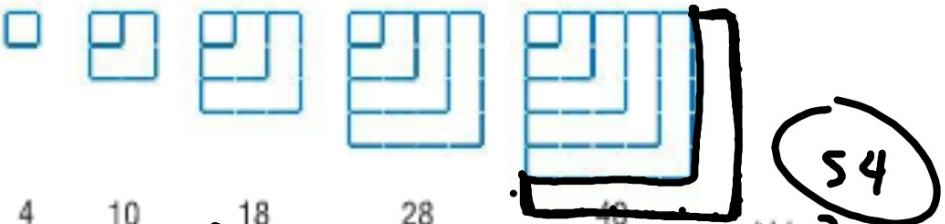
Example 1 Patterns and Conjecture

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

a. Movie show times: 8:30 A.M., 9:45 A.M., 11:00 A.M., 12:15 P.M., . . . 1:30

Show every 1:15.
Next show 1:30

b.



4 +6 10 +8 18 +10 28 +12 40 +14 ? 54

Guided Practice

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

1A. Follow-up visits: Dec., May, Oct., Mar., . . .

visit every 5 mo
Aug.

1B. 10, 4, −2, −8, . . .

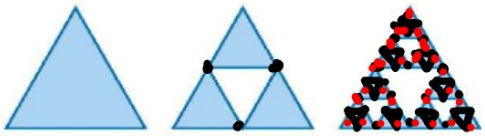
10 4 -2 -8

Subtract 6

+6
-14

Find the pattern: conjecture
Extend the pattern: prediction

1C.



1 3 9

next x 3 = blue

27 blue

Example 2 Algebraic and Geometric Conjectures

Make a conjecture about each value or geometric relationship. List or draw some examples that support your conjecture.

a. the sum of two odd numbers will always be even

odd + odd

1 + 3 = 4

Examples are not the same as proving it…but it's a start.

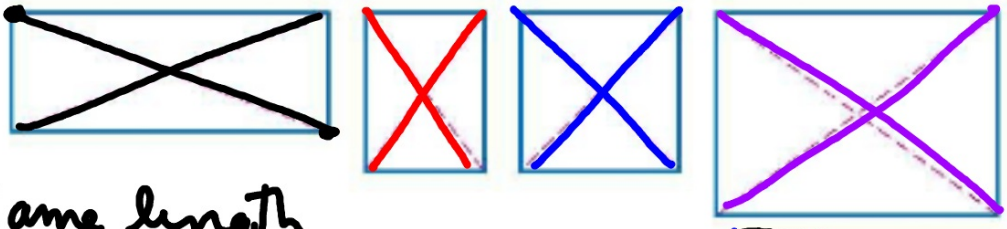
Sum 2 odds = even

3 + 5 = 8

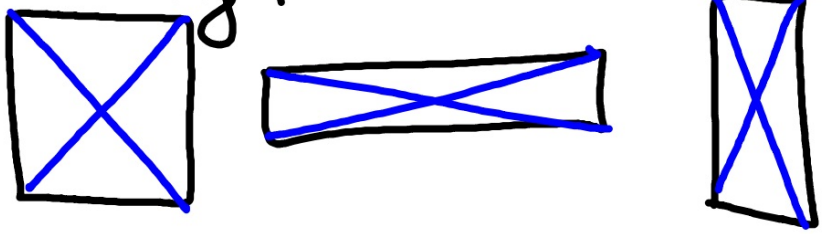
9 + 3 = 12

b. segments joining opposite vertices of a rectangle

Step 1



Same length



2+2=4 2+6=8
4+2=6

GuidedPractice

2A. the sum of two even numbers is always even

2B. the relationship between AB and EF if $AB = CD$ and $CD = EF$ AB = EF always

2C. the sum of the squares of two consecutive natural numbers

$(1)^2+(2)^2=5$ $(3)^2+(4)^2=25$

$(2)^2+(3)^2=13$ $(9)^2+(10)^2=181$

GuidedPractice

3. POSTAGE The table at the right shows the price of postage for the years 1982 through 2009.

A. Make a statistical graph that best displays the data.

B. Predict the postage rate in 2015 based on the graph.

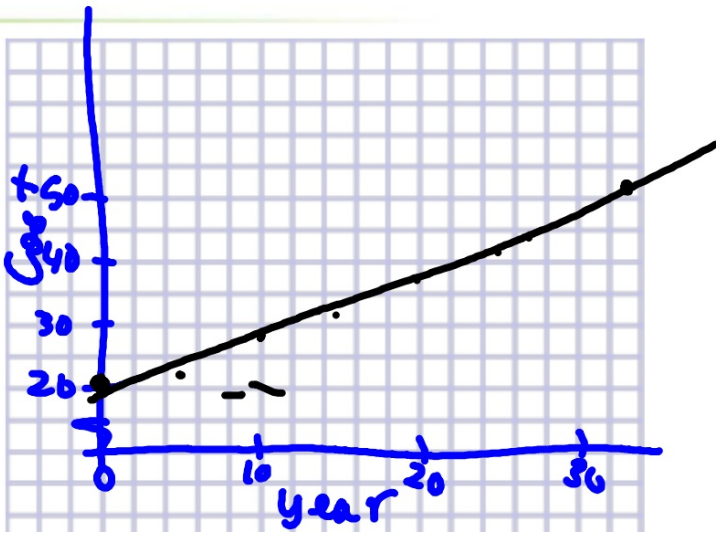
C. Does it make sense that the pattern of the data will continue over time? If not, how will it change? Explain your reasoning.

x y

Since 1982

Year	Rate (cents)
1982 0	20
1987 5	22
1992 10	29
1997 15	32
2002 20	37
2007 25	41
2009 27	44

52



Examples do not prove that something is always true. But a single counterexample (*an exception*) proves that something is not always true. All you need is one...

★ All dogs are brown. Taylor has white dog

(All) Months have 31 days. Feb. has 28

The sum of two numbers is even.

3+6

What if...?

2 Find Counterexamples To show that a conjecture is true for all cases, you must prove it. It takes only one false example, however, to show that a conjecture is not true. This false example is called a **counterexample**, and it can be a number, a drawing, or a statement.

Example 4 Find Counterexamples

Find a counterexample to show that each conjecture is false.

a. If n is a real number, then $n^2 > n$.

"If I square a number, it is always more than the original number."
Can you think of an exception (counterexample)?

b. If $JK = KL$, then K is the midpoint of $\overline{JL}$.

"If two lengths are equal, then K is the midpoint.
Can you think of an exception? (counterexample)

Counterexample (exception)

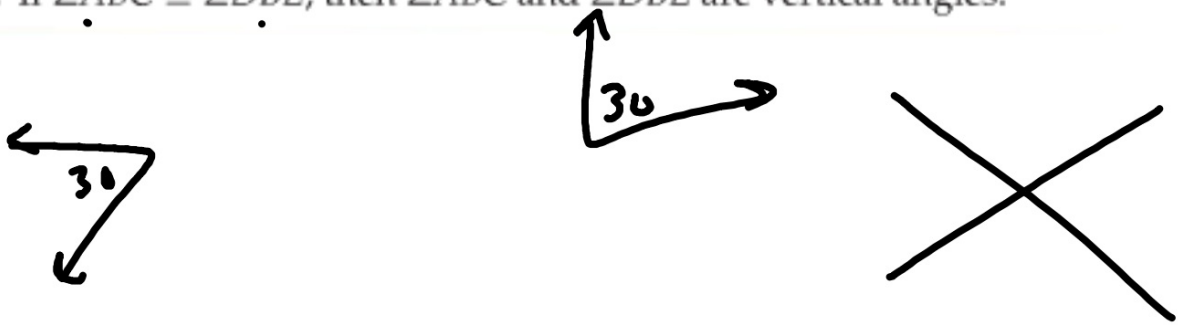
Guided Practice

what if n is neg?

4A. If n is a real number, then $-n$ is a negative number. $n = -5$

$-(-5)$

4B. If $\angle ABC \cong \angle DBE$, then $\angle ABC$ and $\angle DBE$ are vertical angles.



2.1
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