*Warm up*
Have your things out
ready to go! :)

Pg 720  # 10,11

④ $x \dfrac{m}{2} -3 = x^2 1$

$m + 6 = -2$
$-6 \quad -6$
_____
$m = -8$

⑩ $\dfrac{5}{7} p - 10 = 30$
$+10 \quad +10$

$\dfrac{7}{5}\left(\dfrac{5}{7} p\right) = (40)\dfrac{7}{5}$

$p = \dfrac{40 \cdot 7}{5} = 8 \cdot 7 = 56$

P E M D A S

P
E
MD
AS

*Definitions*

- **Inductive Reasoning**: The process of:

    1) Observing data

    2) Recognizing patterns

    3) Making ***generalizations*** from your observations.

    *Rubber Exercise*

- **Conjecture**: Also called a *hypothesis*.

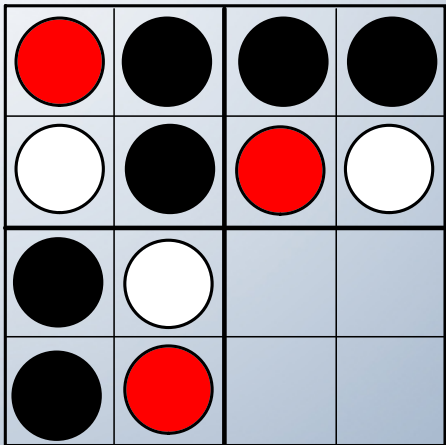    The generalizations you make using inductive reasoning.

    Assumes the pattern / relationship will continue.
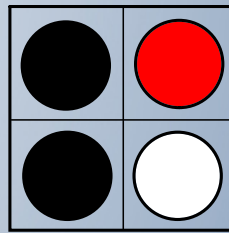
    *Scientific Process*

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*Why is <u>inductive reasoning</u> important to geometry?*

- Geometry is focused on ***proving*** things.

- ***Observe*** a pattern / relationship ...

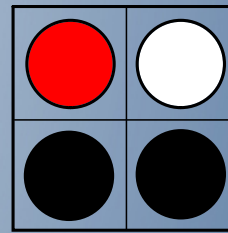    ... form a ***conjecture*** ...

    ... ***test*** the conjecture.
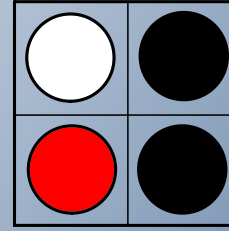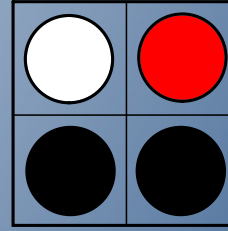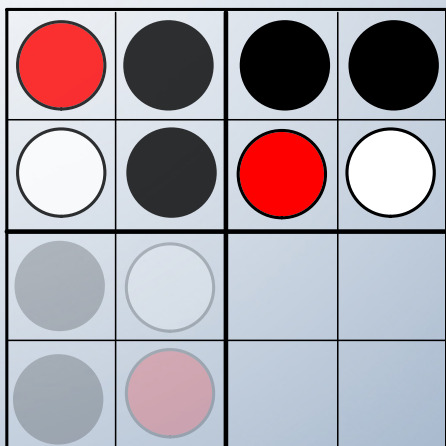
Pattern puzzle...what comes next?



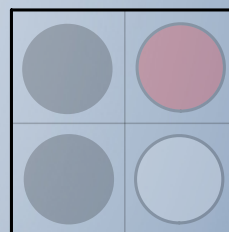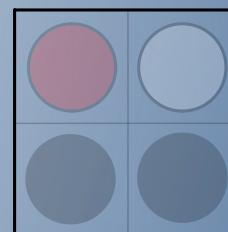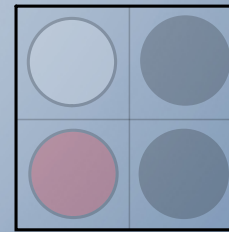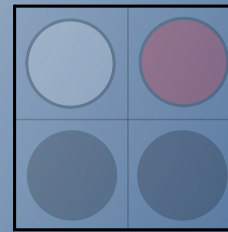Pattern puzzle...
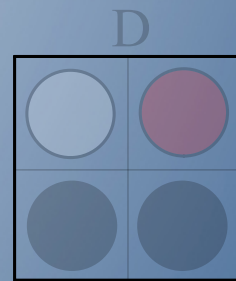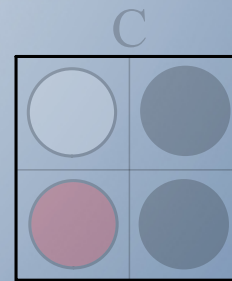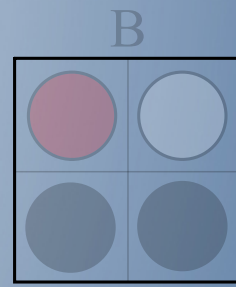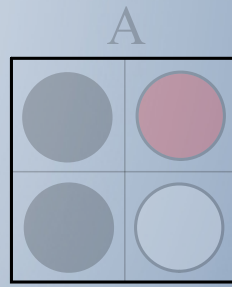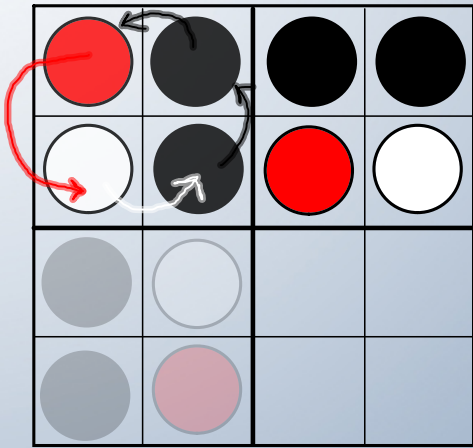
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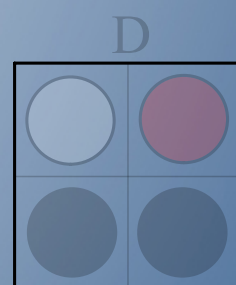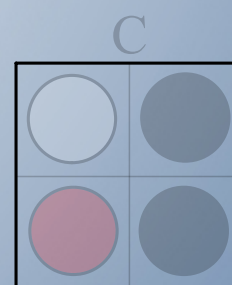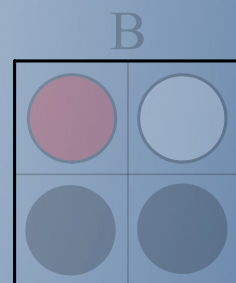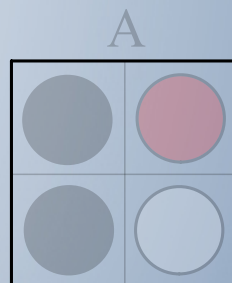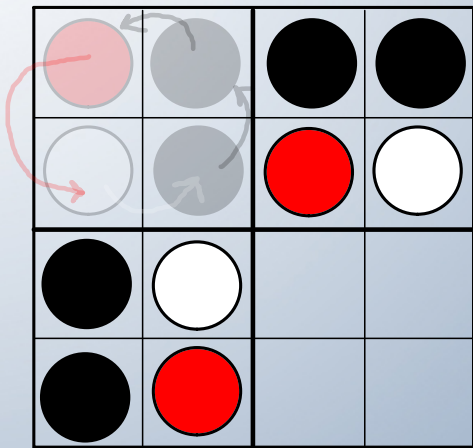


Pattern puzzle...
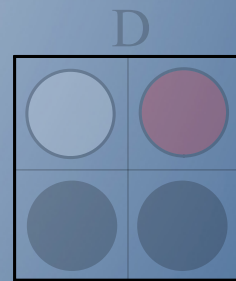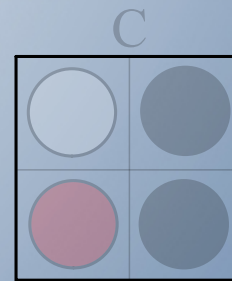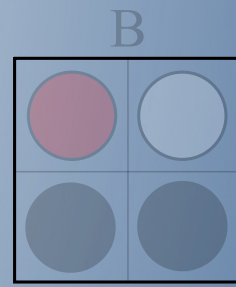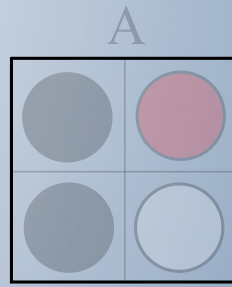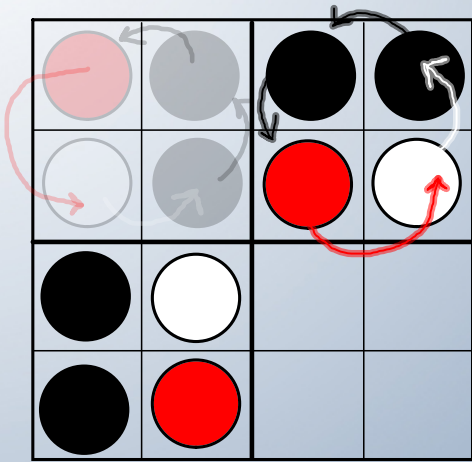
*Pattern puzzle...*



*Pattern puzzle...*
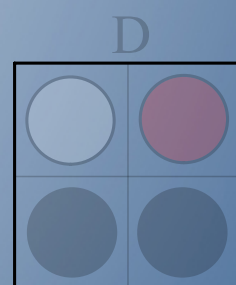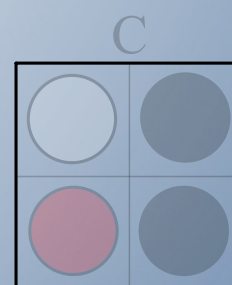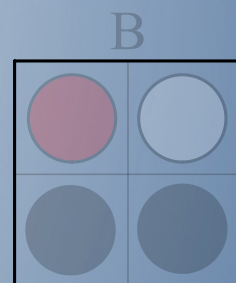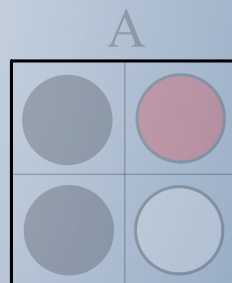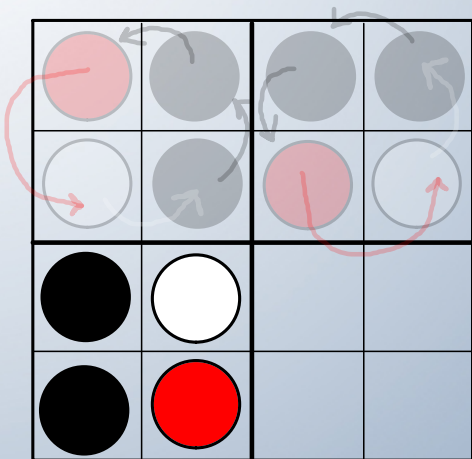
## Is _inductive reasoning_ sufficient for proof?

- Counterexample:

  A case that proves the conjecture wrong.

  It only takes one counterexample to disprove a conjecture.

## How do we prove something then?

- **Deductive reasoning**:

  Also called _logical reasoning_.

  **If** certain statements are accepted as true...

  **Then** other statements can be shown to _always_ follow from them.

  Used to prove a conjecture true ... geometric proofs.

  True Statement
  If it is raining then water is fall from the sky.

  Hey... it is raining right now
  ... Therefore water is falling

*Inductive reasoning* is used to form our conjecture...

...*a single counterexample **disproves*** our conjecture.

...***deductive reasoning*** is used to ***prove*** our conjecture.

*How do reason inductively?*

Ask yourself:

1) Are there any ***patterns***?  Is there a sequence?

2) How are they ***similar***?  Anything the same?  Anything in common?

3) How are they ***different***?  How changing?  What's added/subtracted...

4) How do they ***relate***.

## Inductive Reasoning Steps

1) Identify what is changing

2) Make conjecture about how things are changing

3) Use your conjecture to predict the next step

4) Check it

5) If it doesn't work, conjecture is wrong

6) If it is correct, try a few more steps...

## REMEMBER!!!

Following these steps does not...

...prove the conjecture.

...it just gives you more confidence in it...

...or disproves it.

### Example from algebra

Observe:

$0 * 0 = 0$

$1 * 1 = 1$

Conjecture:

$x * x = x$

Check next step:

$2 * 2 = 4 \rightarrow$ *false* !

A single counterexample disproves conjecture.

### Silly Example

Observe:

2, 4, 6, 8 ...

Conjecture:

10, 12 ...

Check next step:

Wrong!

Who do we appreciate?

**Be ready to think outside the box!**

L1.1 HW Problems:

Pg 6, #1-12, 17,
    19-22, 25-29,
    31-33,
    36, 44, 52, 54

O T T F F S S E N T
$\overset{one}{1}$ $\overset{two}{2}$ $\overset{three}{3}$ $\overset{four}{4}$ $\overset{five}{5}$ $\overset{six}{6}$ $\overset{seven}{7}$ $\overset{eight}{8}$ $\overset{nine}{9}$ $\overset{ten}{10}$

number the items in the sequence
... this often helps you see the pattern
or identify how things are changing.