Warm Up

9/12/22

LOGICAL REASONING

Chest 1

The gold is not in 2

Chest 2

The gold is in 1 or 3

Chest 3

The gold is not in here

If all of the statements are true, where is the gold?

Introduction to Proofs

Conjecture: a statement believed to be true

Theorem: a statement that has been proven

Proof: the process that uses logic to show that a conclusion is true-uses undefined/defined words, mathematical relationships, postulates and other previously-proven theorems

Deductive Reasoning: the process of using logic to draw conclusions

Properties of Equality	
Addition Property of Equality	If $a = b$, then $a + c = b + c$.
Subtraction Property of Equality	If $a = b$, then $a - c = b - c$.
Multiplication Property of Equality	If $a = b$, then $ac = bc$.
Division Property of Equality	If $a = b$ and $c \neq 0$, then $\frac{a}{c} = \frac{b}{c}$.
Reflexive Property of Equality	$a = a$
Symmetric Property of Equality	If $a = b$, then $b = a$.
Transitive Property of Equality	If $a = b$ and $b = c$, then $a = c$.
Substitution Property of Equality	If $a = b$, then b can be substituted for a in any expression.

Use the properties to solve an equation.

Statement	Reason
$\mathbf{3x - 5 = 13}$	Given
$3x - 5 = 13$ $\underline{+5 \quad\quad + 5}$ $3x \quad\quad\quad = 18$	addition property of equality
$\frac{3x}{3} = \frac{18}{3}$	division property of equality

When writing a two column proof:

- Number each step
- Start with the given information
- Statements with the same reason can be combined into one step
- Draw a picture and mark it with the given information
- You must have a reason for every statement
- The order of the statements is not always fixed, but make sure the order makes logical sense
- Reasons will be definitions, postulates, properties, or previously proved theorems
- Use symbols and abbreviations for words in proofs