

Inductive and Deductive Reasoning

Determine if each case is inductive or deductive reasoning and explain why.

1. A scientist dips a platinum wire into a solution containing salt, passes the wire over a flame, and observes that it produces an orange-yellow flame. She does this with many other solutions that contain salt, finding that they all produce an orange-yellow flame. She states "A solution that contains salt produces a orange-yellow flame in a flame test".

2. Amanda was learning to drive when her father told her to never run the car if the overheat light comes on. Last summer while driving to Anchorage, her overheat light turned on so she turned off the car and called for help.

3. Your teacher tells the class that no credit will be given to assignments that show no work. For two months you do your homework. Last week, your assignment had a couple of problems where no work was shown. You received no credit for the assignment.

4. Alyssa was working for AJ inc. In August, she worked really hard on all six projects she was assigned and finished them all before their due dates. On her August paycheck, she had \$300 extra. In September, she finished one project early and three projects on time. Her September paycheck was normal. In October, she finished four projects early and one project late. Her October paycheck was normal. In November, she finished three projects early. Her November paycheck had a \$150 extra. She determines that if she finishes all of her projects for the month early, she will receive a \$50 bonus for each project.

5. Hunter notices that every day his math teacher wears what seems to be a different tie everyday. He starts keeping track of what his teacher wears. After one semester, Hunter approaches his teacher and states, "I think you wear a different tie every day, do you have a 180 different ties?"

Use inductive reasoning to make a conjecture about the next item in the pattern and what the pattern is.

6. •• •• ••• •••
- •• ••• •••
- ••• •••
- •••
- •••

Pattern: _____

7. 1, 2, 4, 8, 16, _____

Pattern: _____

8. Δ∇ ΔΔ∇∇ ΔΔΔ∇∇∇ _____

Pattern: _____

9. $\frac{1}{3}, \frac{2}{3}, 1, \frac{4}{3}, \frac{5}{3}, 2, \underline{\hspace{2cm}}$

Pattern: _____



Pattern: _____

Use deductive reasoning to determine what is true, state why it is true, and draw a picture.

11. Given: Lines l and m are perpendicular.
What is true?

Picture:

Why?

12. Given: Angles 3 and 4 are a linear pair.
What is true?

Picture:

Why?

13. Given: BD is an angle bisector of angle ABC .
What is true?

Picture:

Why?

14. Given: Point A is between points C and T .
What is true?

Picture:

Why?

15. Given: B is the midpoint of PJ
What is true?

Picture:

Why?

16. Given: Angles 1 and 2 are complementary
What is true?

Picture:

Why?

Find a counterexample for each conjecture..

17. Given: x is an integer
Conjecture: $-x$ is negative.
Counterexample:

18. Given: Angle 1 and angle 2 are complementary angles.
Conjecture: Angle 1 and angle 2 form a right angle.
Counterexample:

19. Given: $DE=EF$
Conjecture: E is the midpoint of DF
Counterexample:

20. Given: $MA + AC = MC$
Conjecture: A is the midpoint of MC
Counterexample: