CSE 215 - Homework 2

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Problem Set 1

10. If we plug in the integer 1 into the expression $\frac{a-1}{a}$, we get $\frac{1-1}{1}$ which is equivalent to 0. 0 is an integer, therefore this statement is false.

12. If we set x = 4 and y = 9, the equation is $\sqrt{4+9} = \sqrt{4} + \sqrt{9}$. This would simplify down to 3.60555 and 7. $3.60555 \neq 7$, therefore this statement is false.

Problem Set 2

29a. "There is an object in the set of geometric figure in the plane that is a square and a rectangle." - This is true because all squares are rectangles and there can be a square in a plane.

29b. "There is an object in the set of geometric figure in the plane that is a rectangle, but not a square." - This is true because not all rectangles are squares and there are many examples of that on a plane.

29c. "For all geometric figures in the plane, if the figure is a square, then it is a rectangle." - This is true because all squares are rectangles.

Problem Set 3

33c. true

33d. true

Problem Set 4

10. $\exists$ computer programs P, such that P compiles without error messages and P isn't correct

17. $\exists$ integers d, such that 6/d is an integer, but d $\neq$ 3.

19. $\exists$ n $\in \mathbb{Z}$, such that n is prime and n isn't odd and n $\neq$ 2.

21. $\exists$ integers n, such that n is divisible by 6 and n isn't divisible by 2 or by 3.

23. $\exists$ a function that is differentiable, but isn't continuous.

Problem Set 5

40. If x is divisible by 8, the x is divisible by 4.

42. If you don't pass a comprehensive exam, then you will not obtain a master's degree.

44. $\exists$ a person that doesn't have a large income and is happy.

46. $\exists$ a polynomial that has a function without a real root.

47. $\forall$ computer programs, if it has reasonable [program] correctness, then it doesn't have error messages during translation.

Problem Set 6

41c. false. It is impossible to find a value where all real numbers + 1 is equal to said number.

41d. true. Every number multiplied by its reciprocal is equal to 1.

41f. false. If x is less than y, then x - y will be negative and there is no positive integer that can represent a negative number.

41g. true. An integer minus another integer is another integer.

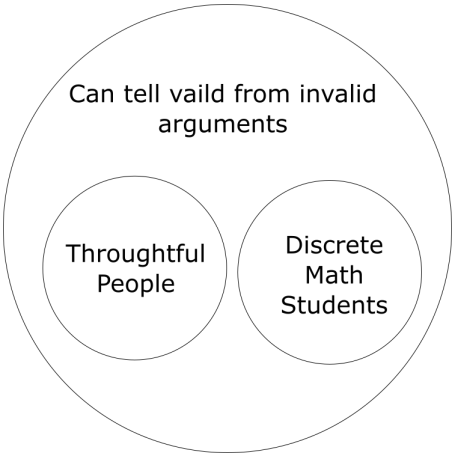
41h. false. There is no such positive number where every positive number multiplied by it will be less that that number.

Problem Set 7

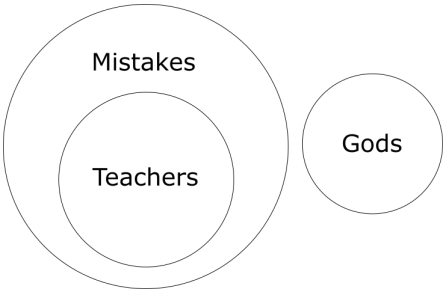
13. Valid because of universal modus ponens.
14. Invalid because of inverse error.
15. Invlaid becuse of converse error.
17. Invalid because of converse error.
18. Valid because of modus tollens.

Problem Set 8

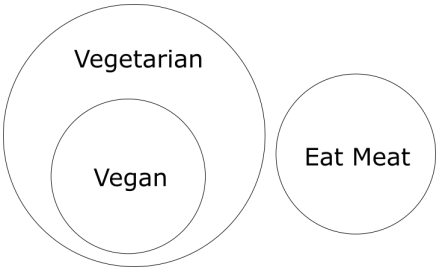
22. false



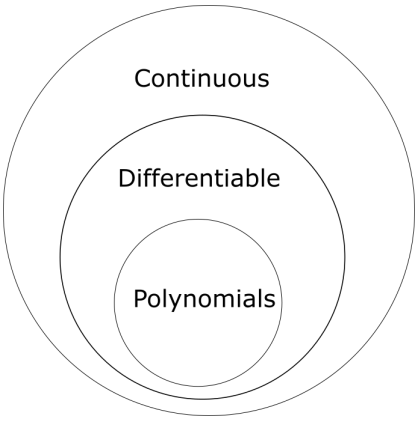
23. true



24. true



26. true



27. false