Math 3336
Homework Assignment 1

Instructions

- Record your answers to the following 10 questions. Show your work when a question requires you to do so.
- Scan your work and save the file as a .pdf (make sure your work and answers are legible)
- Upload your scanned work to CASA CourseWare using the "Assignments" tab. (Click this link for instructions on how to do this).
- Homework submitted after 11:59pm on the indicated due date will be assigned a grade of 0.

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1. Write down a non-statement, and explain *why* it is not a statement.

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2. Consider the open sentence

$$t^2 + 2t + 1 = 0.$$

Are there any values one can substitute for t that makes this a true statement? Are there any values one can substitute for t that makes this a false statement? Provide examples if possible, and explain your answers.

3. Consider the statement P

$$P: \quad \frac{1}{3} + \frac{2}{5} = \frac{11}{15}.$$

Provide an example of a statement Q that makes $P \oplus Q$ true (no work need be included with this question).

4. Suppose P is a true statement and that $(P \wedge Q) \vee \neg P$ is false. What is the "truth value" of Q? (No work need be included with this question).

5. Suppose P is a false statement. Is it ever possible for $P \Rightarrow Q$ to be false? Explain your answer.

6. Consider the open sentences

$$P(x): \quad x+1>2$$
$$Q(x): \quad 2x \leq 20$$

Are there any values one can substitute for x that makes $P(x) \wedge Q(x)$ a true statement? Are there any values one can substitute for x that makes this a false statement? Provide examples if possible, and explain your answers.

7. Consider the open sentences

$$P(x): \quad x>0$$
$$Q(x): \quad (x+1)^3>1$$

Are there any values one can substitute for x that makes $P(x) \oplus Q(x)$ a true statement? Are there any values one can substitute for x that makes this a false statement? Provide examples if possible, and explain your answers.

8. Of the sentences provided below, which is an example of a false statement? (No work need be included with this question; just circle your answer).

(a) $a^2 + b^2 = c^2$

(b) $54 \div 6 = 9$

(c) $e^{\ln 3} = 2$

(d) $x + 4 = 5$

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9. Of the sentences provided below, which is an example of a true statement? (No work need be included with this question; just circle your answer).

(a) $a^2 + b^2 = c^2$

(b) $(12 \cdot 5 = 70) \Rightarrow \left(2^4 = 25\right)$

(c) $(12 \cdot 5 = 60) \Rightarrow \left(2^4 = 25\right)$

(d) $(12 \cdot 5 = 60) \iff \left(2^4 = 25\right)$

(e) $(12 \cdot 5 = 70) \vee \left(2^4 = 25\right)$

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10. What did you learn (or re-learn) by working through this assignment? Which questions, if any, were particularly helpful? Which ones, if any, were unhelpful?