# Homework 2

### Math 300, Fall 2022

This homework is due on Friday, September 2.

1. Use a truth table to determine whether the following implications are true or false.

   (a) $P \Rightarrow (P \wedge Q)$

   (b) $(P \wedge Q) \Rightarrow Q$

   (c) $(P \wedge Q) \Rightarrow (P \vee Q)$

   (d) $\neg(P \wedge Q) \Rightarrow (P \vee (\neg Q))$

2. (a) Rewrite the following quantified statement using "$\forall$" or "$\exists$": *The implication $(P \Rightarrow Q) \Rightarrow (Q \Rightarrow P)$ is true for every statement $P$ and every statement $Q$.*

   (b) Is your answer to (a) a true statement? Explain.

3. Determine whether each statement is true or false. Explain your answer.

   (a) For every real number $x$, the equality $x^2 - 6x + 9 = 0$ holds if and only if $x = 3$.

   (b) For every real number $x$, the equality $x^2 - 2x - 3 = 0$ holds if and only if $x = 3$.

   (c) For every real number $x$, the equality $x^2 + 3 = 0$ holds if and only if $x = 3$.

   (d) For every real number $x$, if the equality $x^2 + 3 = 0$ holds, then $x = 3$.

4. Section 1.1 #2e, 3ac, 5hi, 11, 13, 16

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# Writing Assignment 2

### Math 300

This homework is due on Friday, September 2. *Complete this part on a separate piece of paper, not the same paper for Homework 2.*

1. Check some of the AMS (American Mathematical Society) Mathematical Moments (some have associated podcasts) available here:

   `https://www.ams.org/publicoutreach/mathmoments/mathmoments`

   Pick one of these.

   (a) State the title/topic

   (b) Summarize what you learned in a few sentence.

   (c) Write a one-paragraph response (why did you pick this topioc, did anything surprise/interest/confuse you, etc.).