Feedback — Problem Set 2

You submitted this homework on **Sun 12 Oct 2014 2:59 AM PDT**. You got a score of **39.00** out of **41.00**.

This problem set focuses on material covered in Week 2 (Lectures 3 and 4), so I recommend you to watch both lectures and attempt Assignments 3 and 4 before submitting your answers. The deadline for completing (and submitting) the problem set is Monday October 13 at 9:00 AM PST. Note that you can save your entries as you work through the problems, and can change them at any time prior to submission, but once you submit your answers no further changes are possible. Note: A downloadable PDF file of this problem set is supplied as an asset to Lecture 4.
NOTE: THE PLATFORM DISPLAYS THE 8 PARTS OF QUESTION 4 AS SEPARATE QUESTIONS. AS A RESULT, THE QUESTION NUMBERING HERE DIFFERS FROM THE NUMBERS IN THE PDF VERSION AND IN THE TUTORIAL VIDEO.

Question 1

Which of the following conditions are *necessary* for the natural number n to be divisible by 6?

Select all those you believe are necessary. [6 points]

Your Answer		Score	Explanation
☑ n is divisible by 3.	✔	1.00	You have to select conditions that follow from n being divisible by 6.
☐ n is divisible by 9.	✔	1.00	You have to select conditions that follow from n being divisible by 6.
☐ n is divisible by 12.	✔	1.00	You have to select conditions that follow from n being divisible by 6.
☐ $n = 24$.	✔	1.00	You have to select conditions that follow from n being divisible by 6.
☑ n^2 is divisible by 3.	✔	1.00	You have to select conditions that follow from n being divisible by 6.
☑ n is even and divisible by 3.	✔	1.00	You have to select conditions that follow from n being divisible by 6.
Total		6.00 / 6.00	

Question 2

Which of the following conditions are *sufficient* for the natural number n to be divisible by 6? Select all those you believe are sufficient. [6 points]

Your Answer		Score	Explanation
☐ n is divisible by 3.	✔	1.00	You have to select conditions that imply n is divisible by 6.
☐ n is divisible by 9.	✔	1.00	You have to select conditions that imply n is divisible by 6.
☑ n is divisible by 12.	✔	1.00	You have to select conditions that imply n is divisible by 6.
☑ $n = 24$.	✔	1.00	You have to select conditions that imply n is divisible by 6.
☐ n^2 is divisible by 3.	✔	1.00	You have to select conditions that imply n is divisible by 6.
☑ n is even and divisible by 3.	✔	1.00	You have to select conditions that imply n is divisible by 6.
Total		6.00 / 6.00	

Question 3

Which of the following conditions are *necessary and sufficient* for the natural number n to be divisible by 6? Select all those you believe are necessary and sufficient. [6 points]

Your Answer		Score	Explanation
☐ n is divisible by 3.	✔	1.00	You have to select conditions that both imply and are a consequence of n being divisible by 6.
☐ n is divisible by 9.	✔	1.00	You have to select conditions that both imply and are a consequence of n being divisible by 6.
☐ n is divisible by 12.	✔	1.00	You have to select conditions that both imply and are a consequence of n being divisible by 6.

☐ $n = 24$.	✔	1.00	You have to select conditions that both imply and are a consequence of n being divisible by 6.
☐ n^2 is divisible by 3.	✔	1.00	You have to select conditions that both imply and are a consequence of n being divisible by 6.
☑ n is even and divisible by 3.	✔	1.00	You have to select conditions that both imply and are a consequence of n being divisible by 6.
Total		6.00 / 6.00	

Question 4

Identify the antecedent in the following conditional:

If the apples are red, they are ready to eat. [1 point]

Your Answer		Score	Explanation
◉ The apples are red	✔	1.00	You have to select the condition that implies or causes the other.
◯ The apples are ready to eat			
Total		1.00 / 1.00	

Question 5

Identify the antecedent in the following conditional:

The differentiability of a function f is sufficient for f to be continuous. [1 point]

Your Answer		Score	Explanation
◉ f is differentiable	✔	1.00	You have to select the condition that implies or causes the other.
◯ f is continuous			
Total		1.00 / 1.00	

Question 6

Identify the antecedent in the following conditional:

A function f is bounded if f is integrable. [1 point]

Your Answer	Score	Explanation
○ f is bounded		
◉ f is integrable	✔ 1.00	You have to select the condition that implies or causes the other.
Total	1.00 / 1.00	

Question 7

Identify the antecedent in the following conditional:

A sequence S is bounded whenever S is convergent. [1 point]

Your Answer	Score	Explanation
○ S is bounded		
◉ S is convergent	✔ 1.00	You have to select the condition that implies or causes the other.
Total	1.00 / 1.00	

Question 8

Identify the antecedent in the following conditional:

It is necessary that n is prime in order for $2^n - 1$ to be prime. [1 point]

Your Answer	Score	Explanation
○ n is prime		
◉ $2^n - 1$ is prime	✔ 1.00	You have to select the condition that implies or causes the other.

Total	1.00 / 1.00	

Question 9

Identify the antecedent in the following conditional:

The team wins only when Karl is playing. [1 point]

Your Answer	Score	Explanation
⦿ The team wins	✔ 1.00	You have to select the condition that implies or causes the other.
◯ Karl is playing		
Total	1.00 / 1.00	

Question 10

Identify the antecedent in the following conditional:

When Karl plays the team wins. [1 point]

Your Answer	Score	Explanation
◯ The team wins		
⦿ Karl is playing	✔ 1.00	You have to select the condition that implies or causes the other.
Total	1.00 / 1.00	

Question 11

Identify the antecedent in the following conditional:

The team wins when Karl plays. [1 point]

Your Answer	Score	Explanation
○ The team wins		
◉ Karl is playing	✔ 1.00	You have to select the condition that implies or causes the other.
Total	1.00 / 1.00	

Question 12

For natural numbers m, n, is it true that mn is even iff m and n are even? [2 points]

Your Answer	Score	Explanation
○ Yes		
◉ No	✔ 2.00	correct. $m = 2$, $n = 3$ provides a counterexample.
Total	2.00 / 2.00	

Question 13

Is it true that mn is odd iff m and n are odd? [2 points]

Your Answer	Score	Explanation
◉ Yes	✔ 2.00	Correct. The question splits into two parts: (i) does mn being odd imply both m and n are odd, and (ii) does m and n being odd imply mn is odd. The answer in both cases is Yes.
○ No		
Total	2.00 / 2.00	

Question 14

Which of the following pairs of propositions are equivalent? Select all you think are equivalent. [6 points]

Your Answer	Score	Explanation
☑ $\neg P \vee Q$, $P \Rightarrow Q$	✔ 1.00	Yes, these are equivalent. If you evaluate the two truth tables correctly, you will find they have the same final columns.
☑ $\neg(P \vee Q)$, $\neg P \wedge \neg Q$	✔ 1.00	Yes, these are equivalent. If you evaluate the two truth tables correctly, you will find they have the same final columns.
☐ $\neg P \vee \neg Q$, $\neg(P \vee \neg Q)$	✔ 1.00	These are not equivalent. If you evaluate the two truth tables correctly, you will find they have different final columns.
☑ $\neg(P \wedge Q)$, $\neg P \vee \neg Q$	✔ 1.00	Yes, these are equivalent. If you evaluate the two truth tables correctly, you will find they have the same final columns.
☑ $\neg(P \Rightarrow (Q \wedge R))$, $\neg(P \Rightarrow Q) \vee \neg(P \Rightarrow R)$	✔ 1.00	Yes, these are equivalent. If you evaluate the two truth tables correctly, you will find they have the same final columns.
☑ $P \Rightarrow (Q \Rightarrow R)$, $(P \wedge Q) \Rightarrow R$	✔ 1.00	Yes, these are equivalent. If you evaluate the two truth tables correctly, you will find they have the same final columns.
Total	6.00 / 6.00	

Question 15

A major focus of this course is learning how to assess mathematical reasoning. How good you are at doing that lies on a sliding scale. Your task is to evaluate this purported proof, and grade it according to the course rubric. Enter your grade (which should be a whole number between 0 and 24, inclusive) in the box. You should come within 4 points of the instructor's grade for full marks [5 points], within 6 points for partial marks [3 points].

You should read the website section "Using the evaluation rubric" (it includes a short explanatory video) before attempting this question. There will be many more proof evaluation questions as the course progresses.

You entered:

12

Your Answer		Score	Explanation
12	✔	3.00	A bit too low.The proof of the left-to-right implication is correct and well laid out, so you should end up giving at least 12 out of a possible 24. The author is wrong to assume the other implication is valid (in fact the two are not equivalent), but the logical structure and clarity is good, so 18 would be a fair grade. WATCH THE TUTORIAL VIDEO.
Total		3.00 / 5.00	