Grading of Groupwork 4

Using the solutions and Grading Guidelines, grade your Groupwork 4 Problems:

- Use the table below to grade your past groupwork submission and calculate scores.
- While grading, mark up your past submission. Include this with the table when you submit your grading.
- Write whether your submission achieved each rubric item. If it didn't achieve one, say why not.
- For extra credit, write positive comment(s) about your work.
- You don't have to redo problems correctly, but it is recommended!
- See "All About Groupwork" on Canvas for more detailed guidance, and what to do if you change groups.

	(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)	(viii)	(ix)	(x)	(xi)	Total:
Problem 1	0	0	0									0/12
Problem 2	1	1	0	1	0	0	1	0				5/8
Total:												5/20

Comments

I went to OH and tried. Good effort although the solutions were different from the answer key.

Groupwork 4 Problems

1. Mostly Rational [12 points]

Show that if r is an irrational number, there is a unique integer n such that the distance between r and n is *strictly* less than $\frac{1}{2}$.

Solution:

Different from the answer key, but still correct?

Proof by contradiction:

Assume $r \notin \mathbb{Q}, \exists n_1 \exists n_2[\vert r - n_1\vert < \frac{1}{2} \wedge \vert r - n_2\vert < \frac{1}{2}](n_1, n_2 \in \mathbb{Z})$	premise
$\vert n_1 - n_2\vert \leq \vert r - n_1\vert + \vert r - n_2\vert$	triangle inequality
$\vert n_1 - n_2\vert \leq \frac{1}{2} + \frac{1}{2} = 1$	substitution
Since $n_1, n_2 \in \mathbb{Z}$,	
they cannot have a distance < 1,	
this contradicts with the premise	contradiction

Therefore, the original proposition holds by proof by contradiction.

2. Set in Stone [8 points]

Prove using set identities that

$$(A \cap C) - (B \cap A) = (C - B) \cap A$$

for any three sets A, B and C.

Solution:

Different from the answer key, but still correct?

Let $x \in (A \cap C) - (B \cap A)$	premise
$x \in (A \cap C) \wedge x \notin (B \cap A)$	definition of minus
$x \in A \wedge x \in C \wedge (x \notin B \vee x \notin A)$	DeMorgan's Laws
$(x \in A \wedge x \in C \wedge x \notin B) \vee (x \in A \wedge x \in C \wedge x \notin A)$	distributive
$(x \in A \wedge x \in C \wedge x \notin B) \vee F$	
$x \in (C - B) \cap A$	definition of minus / intersect

Conversely,

Let $x \in (C - B) \cap A$	premise
$(x \in C \wedge x \notin B) \cap A$	definition of minus
$(x \in C \cap x \in A) \wedge (x \notin B \cap A)$	distributive
$x \in (A \cap C) \wedge x \notin (B \cap A)$	definition of minus
$x \in (A \cap C) - (B \cap A)$	

Thus, proved that each side is a subset of the other.