

SAMPLE SOLUTION FOR CSC165 QUIZ 3, THURSDAY JUNE 9

Name:

Student number:

Below each of the following four statements, draw a Venn diagram on the left (with non-empty regions, if any, shaded) showing sets B , C , and domain D for which the statement is FALSE, and draw a Venn diagram (with non-empty regions, if any, shaded) on the right showing sets B , C , and domain D for which the statement is TRUE. In all cases $B(x)$ means $x \in B$, and $C(x)$ means $x \in C$.

[Marking:] 1 mark per correct diagram.

1. $\neg(\forall x \in D, C(x) \Rightarrow B(x))$.

Any Venn diagram that leaves $C \setminus B$ empty falsifies the statement. Any Venn diagram that shades $C \setminus B$ makes the statement true.

2. $\exists x \in D, B(x) \wedge C(x)$.

Any Venn diagram that leaves $B \cap C$ blank falsifies the statement. Any Venn diagram that shades $B \cap C$ makes the statement true.

3. $\exists x \in D, C(x) \Rightarrow B(x)$.

Any Venn diagram that leaves $(D \setminus C) \cup B$ blank falsifies the statement. Any Venn diagram that shades any portion of $(D \setminus C) \cup B$ makes the statement true.

4. $\exists x \in D, C(x) \Leftrightarrow B(x)$.

Any Venn diagram that leaves both $C \cap B$ and $D \setminus (C \cup B)$ blank falsifies the statement. Any Venn diagram that shades any portion of $C \cap B$ or $D \setminus (C \cup B)$ makes the statement true.