Prep 3 quiz

ⓘ This is a preview of the published version of the quiz

Started: Sep 19 at 12:16pm

Quiz Instructions

Readings

Please read the following parts of the **Course Notes** (http://www.teach.cs.toronto.edu/~heap/165/F19/Notes/csc165.pdf)

- Chapter 1, pp. 20–30 (this should be review)
- Chapter 2, pp. 31–38

General instructions

You can review the general instructions for all prep quizzes at this page. Remember that you can submit multiple times! You might consider printing this quiz out so that you can work on paper first.

Question 1 **1 pts**

Review the definition of *divisibility* from lecture. Using this definition, select all of the **True** statements below.

- ☐ $\exists n \in \mathbb{Z},\ 0 \mid n$
- ☐ $\forall n \in \mathbb{Z},\ -1 \mid n$
- ☐ $\forall n, m \in \mathbb{Z},\ n \mid m$
- ☐ $\forall n \in \mathbb{Z}, \exists m \in \mathbb{Z},\ n \mid m$
- ☐ $\forall n \in \mathbb{Z},\ 0 \mid n$
- ☐ $\forall n \in \mathbb{Z},\ n \mid 0$

Question 2

1 pts

Review the negation rules on page 25 of the Course Notes. Then, select the correct negation of this statement:

$\forall x \in \mathbb{R},\ \big(\exists y \in \mathbb{R}, P(y) \land Q(x,y)\big) \Rightarrow x > 5$

- $\forall x \in \mathbb{R},\ \big(\forall y \in \mathbb{R},\ \neg P(y) \lor \neg Q(x,y)\big) \Rightarrow x \leq 5$
- $\exists x \in \mathbb{R}, \big(\exists y \in \mathbb{R}, P(y) \land Q(x,y)\big) \land x \leq 5$
- $\exists x \in \mathbb{R},\ \big(\forall y \in \mathbb{R},\ \neg P(y) \lor \neg Q(x,y)\big) \lor x > 5$
- $\forall x \in \mathbb{R},\ \big(\exists y \in \mathbb{R},\ P(y) \land Q(x,y)\big) \Rightarrow x \leq 5$
- $\exists x \in \mathbb{R},\ \big(\forall y \in \mathbb{R},\ P(y) \land \neg Q(x,y)\big) \land x \leq 5$

Question 3

1 pts

Suppose we want to prove the statement $\exists k \in \mathbb{N},\ P(k)$ (assume that we've previously defined a predicate P).

Which of the following statements could we use to introduce k in our proof header?

- Let $k = -4$.
- Let k be a natural number such that $P(k)$.
- Let $P(k)$.
- Let $k = 1$.
- Let $k = 165$.

Question 4

1 pts

Suppose we want to prove the statement $\forall x, y \in \mathbb{R},\ P(x, y)$ (assume that we've previously defined a predicate P).

Which of the following statements could we use to introduce x and y in our proof header?

- [ ] Let x be an arbitrary real number, and let $y = x + 1$.
- [ ] Let $x = 1$ and $y = 3$.
- [ ] Let x and y be arbitrary real numbers.
- [ ] Let $x, y \in \mathbb{R}$.
- [ ] Let x and y be arbitrary real numbers such that $P(x, y)$ is true.

Question 5

1 pts

Suppose we have a proof with the following proof header:

> Let x be an arbitrary natural number. Assume that x is greater than 3 and that x is even (i.e., that 2 divides x). We will now prove that $Q(x)$ is true.
>
> *[...proof body omitted...]*

What is the statement being proven?

- $\forall x \in \mathbb{N},\ x > 3 \land 2 \mid x \Rightarrow Q(x)$
- $\forall x \in \mathbb{N}, Q(x)$
- $\exists x \in \mathbb{N}, x > 3 \land 2 \mid x \land Q(x)$
- $\forall x \in \mathbb{N}, x > 3 \land 2 \mid x \land Q(x)$
- $Q(x)$

Question 6

1 pts

Suppose we want to prove the statement $\forall x \in \mathbb{N},\ P(x) \Rightarrow Q(x+1)$.

Select the assumption we should make in our proof header (after we've introduced the variable x).

- Assume that $Q(x+1)$ is true.
- Assume that for all $x \in \mathbb{N}$, $P(x)$ is true.
- Assume that $P(0)$ is true.
- We should not make any assumptions in our proof header.
- Assume that $P(x)$ is true.

Saving... Submit Quiz