

# Prep 4 quiz

<b>Due</b> Feb 1 at 9pm	<b>Points</b> 6	<b>Questions</b> 6	<b>Available</b> until Feb 1 at 10pm	<b>Time Limit</b> None	<b>Allowed Attempts</b> Unlimited
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## Instructions

## Readings

Please read the following part of the [Course Notes](#) (this includes material we covered in Week 3, but also new material for Week 4). This quiz may not ask questions about every topic covered in the readings for this week.

- Pages 46–60

## General instructions

You can review the general instructions for all prep quizzes on the [Course Syllabus](#). Remember that you can submit multiple times! You might consider printing this quiz out so that you can work on paper first.

This quiz was locked Feb 1 at 10pm.

## Attempt History

	Attempt	Time	Score
KEPT	<a href="#">Attempt 10</a>	less than 1 minute	6 out of 6
LATEST	<a href="#">Attempt 10</a>	less than 1 minute	6 out of 6
	<a href="#">Attempt 9</a>	less than 1 minute	1 out of 6
	<a href="#">Attempt 8</a>	less than 1 minute	5.5 out of 6
	<a href="#">Attempt 7</a>	less than 1 minute	0.5 out of 6

Attempt	Time	Score
<a href="#">Attempt 6</a>	less than 1 minute	0.25 out of 6
<a href="#">Attempt 5</a>	6 minutes	0.5 out of 6
<a href="#">Attempt 4</a>	2 minutes	5.5 out of 6
<a href="#">Attempt 3</a>	2 minutes	5.5 out of 6
<a href="#">Attempt 2</a>	25 minutes	5.5 out of 6
<a href="#">Attempt 1</a>	22 minutes	2.75 out of 6

Score for this attempt: **6** out of 6

Submitted Jan 30 at 7:56pm

This attempt took less than 1 minute.

Correct!

Correct!

Correct!

Question 1

1 / 1 pts

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

☐  $\forall n, m \in \mathbb{Z}, n \mid m$

☒  $\forall n \in \mathbb{Z}, n \mid 0$

☒  $\exists n \in \mathbb{Z}, 0 \mid n$

☒  $\forall n \in \mathbb{Z}, -1 \mid n$

☐  $\forall n \in \mathbb{Z}, 0 \mid n$

Correct!

☒  $\forall n \in \mathbb{Z}, \exists m \in \mathbb{Z}, n \mid m$

Question 2

1 / 1 pts

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

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

☐  $\forall x \in \mathbb{R}, (\exists y \in \mathbb{R}, P(y) \wedge Q(x, y)) \Rightarrow x \leq 5$

☐  $\forall x \in \mathbb{R}, (\forall y \in \mathbb{R}, \neg P(y) \vee \neg Q(x, y)) \Rightarrow x \leq 5$

☒  $\exists x \in \mathbb{R}, (\exists y \in \mathbb{R}, P(y) \wedge Q(x, y)) \wedge x \leq 5$

☐  $\exists x \in \mathbb{R}, (\forall y \in \mathbb{R}, \neg P(y) \vee \neg Q(x, y)) \vee x > 5$

☐  $\exists x \in \mathbb{R}, (\forall y \in \mathbb{R}, P(y) \wedge \neg Q(x, y)) \wedge x \leq 5$

Correct!

Question 3

1 / 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  $P(k)$ .

☐ Let  $k$  be a natural number such that  $P(k)$ .

☒ Let  $k = 1$ .

☐ Let  $k = -4$ .

☒ Let  $k = 165$ .

Correct!

Correct!

Question 4

1 / 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  $y = x + 1$ .

Correct!

☐ Let  $x = 1$  and  $y = 3$ .

☒ Let  $x, y \in \mathbb{R}$ .

☐ Let  $x$  and  $y$  be arbitrary real numbers such that  $P(x, y)$  is true.

Correct!

☒ Let  $x$  and  $y$  be arbitrary real numbers.

Question 5

1 / 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?

☐  $\exists x \in \mathbb{N}, x > 3 \wedge 2 \mid x \wedge Q(x)$

☐  $\forall x \in \mathbb{N}, Q(x)$

☐  $\forall x \in \mathbb{N}, x > 3 \wedge 2 \mid x \wedge Q(x)$

☐  $Q(x)$

Correct!

☒  $\forall x \in \mathbb{N}, x > 3 \wedge 2 \mid x \Rightarrow Q(x)$

### Question 6

1 / 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  $P(x)$  is true.

☐ Assume that  $P(0)$  is true.

☐ We should not make any assumptions in our proof header.

Correct!

Quiz Score: **6** out of 6