

PRINTABLE VERSION

Quiz 2

You scored 75 out of 100

Question 1

Your answer is CORRECT.

After a statement P has been negated 9 times, the resulting statement is logically equivalent to

- a) ☐ $P \wedge \neg P$
- b) ☒ $\neg P$
- c) ☐ P
- d) ☐ $P \vee \neg P$
- e) ☐ None of the above.

Question 2

Your answer is CORRECT.

$\neg P \vee Q$ is logically equivalent to which, if any, of the following statements? (Hint: a truth table should help!)

- a) ☐ $\neg Q \wedge \neg P$
- b) ☐ $Q \Rightarrow P$
- c) ☐ $\neg P \wedge Q$
- d) ☒ $P \Rightarrow Q$
- e) ☐ $\neg P \Rightarrow \neg Q$

Question 3

Your answer is INCORRECT.

De Morgan's Laws tells us that $\neg(P \vee \neg Q)$ is logically equivalent to which of the following statements?

- a) ☒ $P \wedge Q$
- b) ☐ $\neg P \wedge Q$
- c) ☐ $P \vee Q$
- d) ☐ $\neg P \vee Q$
- e) ☐ $\neg Q \wedge \neg P$

Question 4

Your answer is CORRECT.

The symbol " $\exists !$ " means ...

- a) ☐ "There exists" or "Some "
- b) ☒ "There exists exactly one" or "There exists a unique"
- c) ☐ "There does not exist"
- d) ☐ "For all" or "For every"
- e) ☐ "Not all" or "Not every"

Question 5

Your answer is INCORRECT.

Determine which of the following statements is true when using the universal set $U = \mathbb{Z}$.

- a) ☒ $\forall x, x^3 - 4x \neq 0$
- b) ☐ $\forall x, x^3 - 4x = 0$
- c) ☐ $\exists x, x^2 \leq -1$, but not every x satisfies this condition.
- d) ☐ $\exists ! x, x^3 - 4x = 0$

e) ☐ $\exists x, x^3 - 4x = 0$, but not every x satisfies this condition.

Question 6

Your answer is CORRECT.

Consider the English sentence:

The sum of two integers is another integer.

Which of the following statements correctly expresses this sentences using logical symbols?

a) ☐ $\forall x, y \in \mathbb{Z}, x + y \leq 0$

b) ☐ $\exists x, y \in \mathbb{Z}, xy \in \mathbb{Z}$

c) ☐ $\exists x, y \in \mathbb{Z}, x + y \in \mathbb{Z}$

d) ☐ $\exists x, y \in \mathbb{Z}, x + y \leq 0$

e) ☒ $\forall x, y \in \mathbb{Z}, x + y \in \mathbb{Z}$

f) ☐ $\forall x, y \in \mathbb{Z}, xy \in \mathbb{Z}$

Question 7

Your answer is CORRECT.

Consider the following statement:

$$\exists x, \forall y, xy = 0.$$

From the options provided below, which universal set U makes this statement true?

a) ☐ $U = \{1/2, 1, 2\}$

b) ☒ $U = \{-9, -6, -3, 0, 3, 6, 9\}$

c) ☐ $U = \{-1, 3\}$

d) ☐ $U = \{5\}$

e) ☐ $U = \{2, 4, 6, 8, \dots\}$

Question 8

Your answer is CORRECT.

Consider the English sentence P : " Someone is wearing a blue shirt." The negation of P

can be expressed in logical symbols as which of the following? (We are using $U = \{ \text{all people} \}$ as our universal set.)

- a) ☒ $\neg P : \forall x, x$ is not wearing a blue shirt
- b) ☐ $\neg P : \exists x, x$ is not wearing a blue shirt
- c) ☐ $\neg P : \exists x, x$ is wearing a blue shirt
- d) ☐ $\neg P : \forall x, x$ is wearing a blue shirt