

# PRINTABLE VERSION

## Quiz 2

You scored 75 out of 100

### Question 1

Your answer is CORRECT.

After a statement  $P$  has been negated 2 times, the resulting statement is logically equivalent to

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

### Question 2

Your answer is CORRECT.

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

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

### Question 3

Your answer is INCORRECT.

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

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

#### Question 4

Your answer is CORRECT.

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

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

#### Question 5

Your answer is CORRECT.

Determine which of the following statements is true when using the universal set  $U = \{-2, 0, 2\}$ .

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

d) ☐  $\exists x, x^2 \leq -1$ , but not every  $x$  satisfies this condition.

e) ☐  $\exists ! x, x^3 - 4x = 0$

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

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

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

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

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

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

### Question 7

Your answer is CORRECT.

Consider the following statement:

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

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

a) ☒  $U = \{1/2, 1, 2\}$

b) ☐  $U = \{5\}$

c) ☐  $U = \{2, 4, 6, 8, \dots\}$

d) ☐  $U = \{-1, 3\}$

e) ☐  $U = \{-9, -6, -3, 0, 3, 6, 9\}$

### Question 8

Your answer is **INCORRECT**.

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