

# Logic Exercises

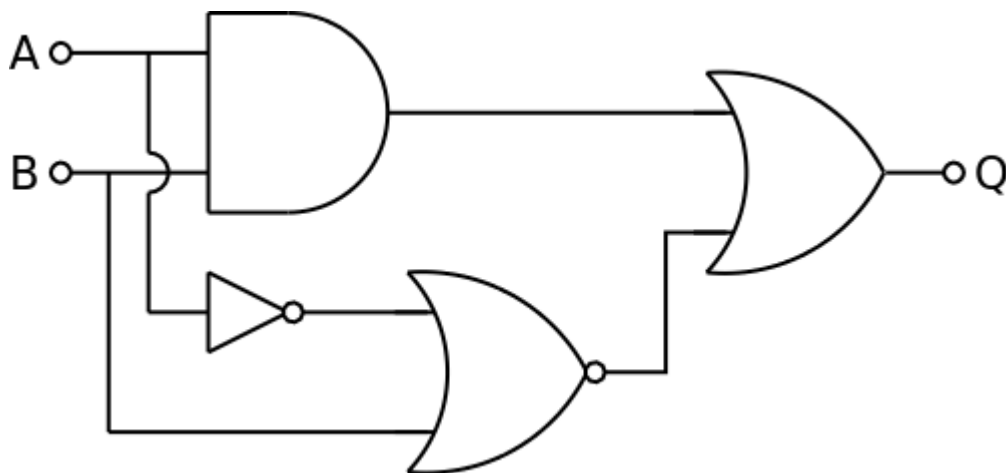
## Question 1

Draw the correct symbol and truth table for each of the following logic gates

- a) NOT gate
- b) AND gate
- c) OR gate
- d) NAND gate
- e) NOR gate

## Question 2

Complete the truth table for the following logic circuit



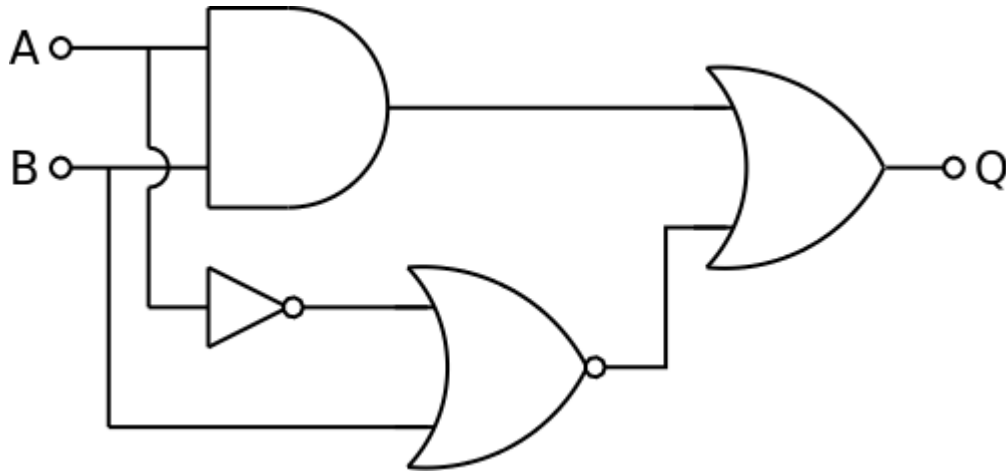
## Question 3

Draw the NAND gate equivalents for each of the following logic gates

- a) NOT
- b) AND
- c) OR
- d) NOR

### Question 4

Simplify the following circuit using only NAND gates by (a) replacing each logic gate with the correct NAND equivalent circuit and (b) removing any redundant logic gates



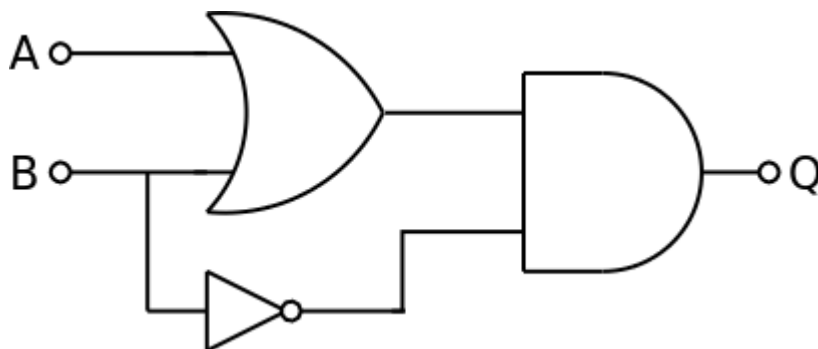
### Question 5

Write down the Boolean expressions for each of the following logic operations

- a) NOT
- b) AND
- c) OR
- d) NAND
- e) NOR

### Question 6

Write down the Boolean expression for the following logic circuit



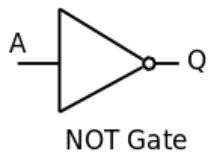
## Question 7

Write down the Boolean expression for the following truth table

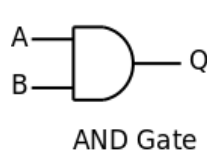
A	B	C	Q
0	0	0	0
0	0	1	1
0	1	0	1
0	1	1	0
1	0	0	1
1	0	1	0
1	1	0	0
1	1	1	0

# Logic Exercise Answers

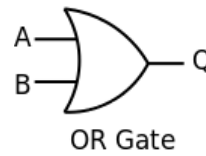
## Question 1



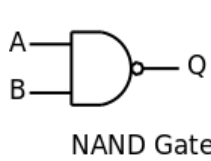
A	Q
0	1
1	0



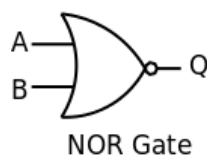
A	B	Q
0	0	0
0	1	0
1	0	0
1	1	1



A	B	Q
0	0	0
0	1	1
1	0	1
1	1	1



A	B	Q
0	0	1
0	1	1
1	0	1
1	1	0

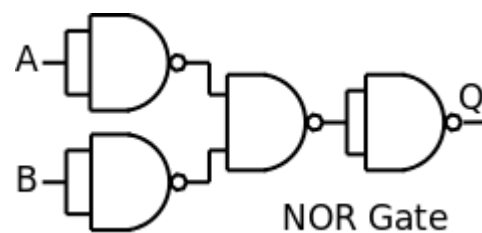
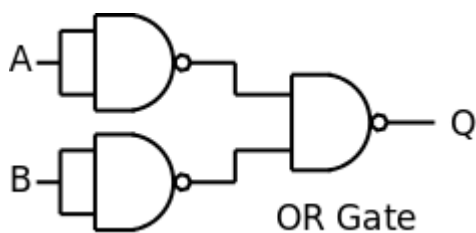
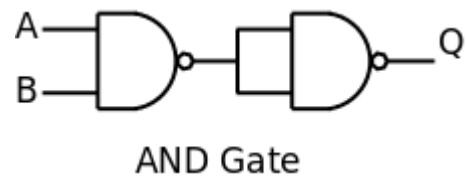
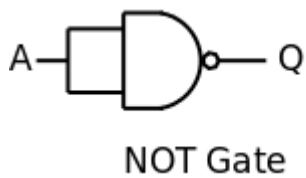


A	B	Q
0	0	1
0	1	0
1	0	0
1	1	0

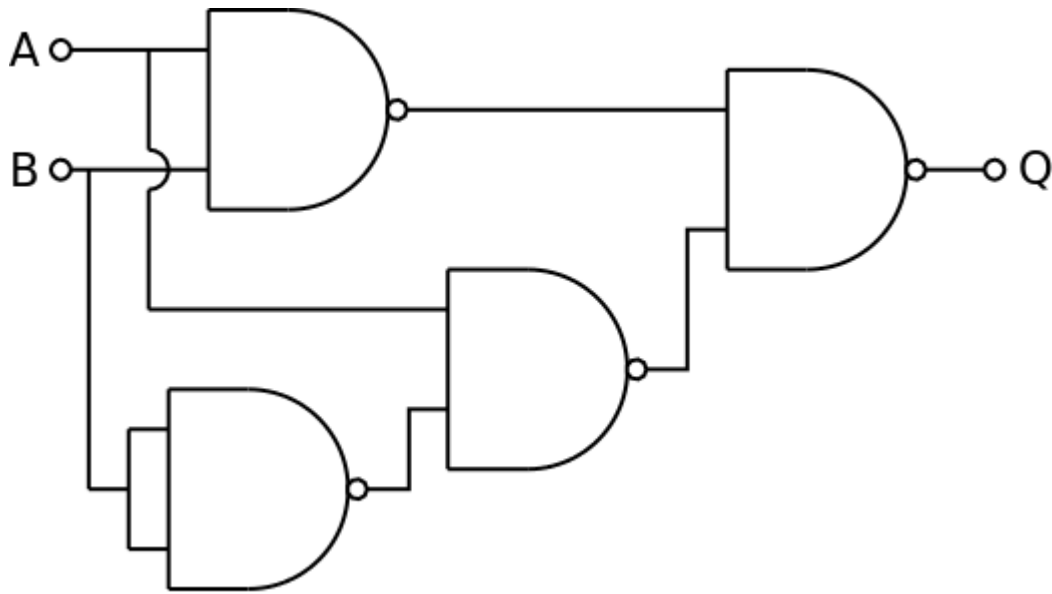
## Question 2

A	B	Q
0	0	0
0	1	0
1	0	1
1	1	1

## Question 3



### Question 4



### Question 5

- a)  $Q = \overline{A}$
- b)  $Q = A \cdot B$
- c)  $Q = A + B$
- d)  $Q = \overline{A \cdot B}$
- e)  $Q = \overline{A + B}$

### Question 6

$$Q = (A + B) \cdot \overline{B}$$

### Question 7

$$Q = (\overline{A} \cdot \overline{B} \cdot C) + (\overline{A} \cdot B \cdot \overline{C}) + (A \cdot \overline{B} \cdot \overline{C})$$