

a.

| OUT (111010)   | X         | Y        |
|----------------|-----------|----------|
| f (x, y) = -1  | 0001 (1)  | 0011 (3) |
| set x to zero  | 0000      |          |
| don't negate x | 0000      |          |
| set y to zero  |           | 0000     |
| don't negate y |           | 0000     |
| add x and y    | 0000      |          |
| negate result  | 1111 (-1) |          |

Final output: - 1111 (-1)

b.

| OUT (001101)  | X         | Y        |
|---------------|-----------|----------|
| f (x, y) =! x | 1010 (-6) | 0011 (3) |
| set x to zero | 1010      |          |
| negate x      | 1010      |          |
| set y to zero |           | 0011     |
| negate y      |           | 0011     |
| add x and y   |           |          |
| negate result | 0101      |          |

Final output: - 0101 (5)

c.

| OUT (011111)        | X         | Y        |
|---------------------|-----------|----------|
| $f(x, y) = x + 1$   | 1011 (-5) | 0001 (1) |
| set x to zero       | 1011      |          |
| negate x            | 0100      |          |
| set y to zero       |           | 0000     |
| don't negate y      |           | 0000     |
| add x and y         | 0100 + 1  |          |
| Don't negate result | 1100      |          |

Final output – 1100 (-4)

d.

| OUT (000010)        | X     | Y    |
|---------------------|-------|------|
| $f(x, y) = x + y$   | 1011  | 0101 |
| set x to zero       | 1011  |      |
| don't negate x      | 1011  |      |
| set y to zero       |       | 0101 |
| don't negate y      |       | 0101 |
| add x and y         | 10000 |      |
| Don't negate result | 10000 |      |

Final output - 10000 (16)

e.

| OUT (000000)        | X    | Y    |
|---------------------|------|------|
| f (x, y) = x & y    | 1011 | 1001 |
| set x to zero       | 0000 |      |
| negate x            | 0000 |      |
| set y to zero       |      | 0000 |
| negate y            |      | 0000 |
| add x and y         | 0000 |      |
| Don't negate result | 0000 |      |
| X AND y             | 1001 |      |

Final output – 1001 (-1)