

## Boolean Expression Simplification

### Problems

Simplify each of the following Boolean expressions. Then draw the logic circuit for the Boolean expression and the simplified version, and create the truth table for each to verify your work.

1.  $C + D + \bar{D}$

$$F = C + 1$$

$$F = C$$

2.  $AB\bar{B}C$

$$F = A \cdot 0 \cdot C$$

$$F = 0$$

3.  $X + Y + X$

$$F = X + Y$$

4.  $\bar{B} + AC\bar{A} + D$

$$F = \bar{B} + C \cdot 0 + D$$

$$F = \bar{B} + 0 + D$$

$$F = \bar{B} + D$$

5.  $(A + B)(A + B)$

$$F = A + B$$

6.  $(\bar{A} + B)(B + \bar{C})$

$$F = \bar{A}\bar{B} + \bar{A}C + B\bar{B} + B\bar{C}$$

$$F = B(\bar{A} \cdot 1 + 1 + 1 \cdot \bar{C}) + \bar{A}C$$

$$F = B(\bar{A} + 1 + \bar{C}) + \bar{A}C$$

$$F = B(1) + \bar{A}C$$

$$F = B + \bar{A}C$$

