

Simplify Boolean Expressions - Key

1.

$$Q = A.B + B$$

$$Q = B.(A + 1)$$

$$Q = B.1$$

$$Q = B$$

2.

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

$$Q = A.C + C.\overline{C}$$

$$Q = A.C + 0$$

$$Q = A.C$$

3.

$$Q = A.B.\overline{C} + A.\overline{C} + \overline{A}.\overline{C}.D + \overline{A}.\overline{C}.\overline{D}$$

$$Q = A.\overline{C}.(B + 1) + \overline{A}.\overline{C}.(D + \overline{D})$$

$$Q = A.\overline{C}.1 + \overline{A}.\overline{C}.1$$

$$Q = A.\overline{C} + \overline{A}.\overline{C}$$

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

$$Q = \overline{C}.1$$

$$Q = \overline{C}$$

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

$$Q = A.B.\overline{B} + A.B.C + B.C + B$$

$$Q = A.0 + A.B.C + B.(C + 1)$$

4.

$$Q = A.B.C + B.1$$

$$Q = A.B.C + B$$

$$Q = B.(A.C + 1)$$

$$Q = B.1$$

$$Q = B$$

5.

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

$$Q = A.B + B.\bar{C} + A + A.\bar{A} + A.B$$

$$Q = A.B + B.\bar{C} + A$$

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

$$Q = A + B.\bar{C}$$

6.

$$Q = A.B.\bar{C} + B.C + \bar{A}.B.\bar{C} + A.B.\bar{B}$$

$$Q = B.\bar{C}.(A + \bar{A}) + B.C + A.0$$

$$Q = B.\bar{C}.1 + B.C$$

$$Q = B.\bar{C} + B.C$$

$$Q = B.(\bar{C} + C)$$

$$Q = B.1$$

$$Q = B$$

7.

$$Q = A.B.C + B.C.D + B.C.\bar{D} + B.\bar{C}.D + A.B.\bar{C} + \bar{A}.B.\bar{C}$$

$$Q = A.B.C + B.C.(D + \bar{D}) + B.\bar{C}.D + B.\bar{C}.(A + \bar{A})$$

$$Q = A.B.C + B.C.1 + B.\bar{C}.D + B.\bar{C}.1$$

$$Q = A.B.C + B.C + B.\bar{C}.D + B.\bar{C}$$

$$Q = B.C.(A + 1) + B.\bar{C}.(D + 1)$$

$$Q = B.C.1 + B.\bar{C}.1$$

$$Q = B.C + B.\bar{C}$$

$$Q = B.(C + \bar{C})$$

$$Q = B.1$$

$$Q = B$$

8.

$$Q = A.B.C.D + A.B.D + A.\bar{B}.D + A.\bar{B}.C.D + A.C.D + \bar{A}.C.D$$

$$Q = A.B.D.(C + 1) + A.\bar{B}.D + A.C.D.(\bar{B} + 1) + \bar{A}.C.D$$

$$Q = A.B.D.1 + A.\bar{B}.D + A.C.D.1 + \bar{A}.C.D$$

$$Q = A.B.D + A.\bar{B}.D + A.C.D + \bar{A}.C.D$$

$$Q = A.D.(B + \bar{B}) + C.D.(A + \bar{A})$$

$$Q = A.D.1 + C.D.1$$

$$Q = A.D + C.D$$

$$Q = D.(A + C)$$