

| P Q R | D B |
|-------|-----|
| 0 0 0 | 0 0 |
| 0 0 1 | 1 1 |
| 0 1 0 | 1 1 |
| 0 1 1 | 0 1 |
| 1 0 0 | 1 0 |
| 1 0 1 | 0 0 |
| 1 1 0 | 0 0 |
| 1 1 1 | 1 1 |

K-maps

for P:

| P \ Q R |   | 00 | 01 | 11 | 10 |
|---------|---|----|----|----|----|
| 0       | 0 | 1  | 1  | 1  | 1  |
|         | 1 | 1  | 1  | 1  | 1  |

$$D = \bar{P} \bar{Q} R + \bar{P} Q \bar{R} + P \bar{Q} \bar{R} + P Q R$$

$$= \bar{P} (\bar{Q} R + Q \bar{R}) + P (\bar{Q} \bar{R} + Q R)$$

$$= \bar{P} (Q \oplus R) + P (\bar{Q} \oplus R)$$

$$= P \oplus Q \oplus R$$

for B

| P \ Q R |   | 00 | 01 | 11 | 10 |
|---------|---|----|----|----|----|
| 0       | 0 |    | 1  | 1  | 1  |
|         | 1 |    |    | 1  | 1  |

$$B = \bar{P} Q + \bar{P} \bar{Q} R + P Q R$$

$$= \bar{P} Q + R \overline{P \oplus R}$$