3e4.6 4.201 The answers for parts (a), (b), (c) are as follows.

$$W\cdot X\cdot Y\cdot Z\cdot(W\cdot X\cdot Y\cdot Z' + W\cdot X'\cdot Y\cdot Z + W'\cdot X\cdot Y\cdot Z + W\cdot X\cdot Y'\cdot Z)$$
$$= W\cdot X\cdot Y\cdot Z\cdot W\cdot X\cdot Y\cdot Z' + W\cdot X\cdot Y\cdot Z\cdot W\cdot X'\cdot Y\cdot Z + W\cdot X\cdot Y\cdot Z\cdot W'\cdot X\cdot Y\cdot Z + W\cdot X\cdot Y\cdot Z\cdot W\cdot X\cdot Y'\cdot Z \text{ (T8)}$$
$$= 0 + 0 + 0 + 0 \text{ (T6', T5', T2')}$$
$$= 0 \text{ (A4')}$$

$$A\cdot B + A\cdot B\cdot C'\cdot D + A\cdot B\cdot D\cdot E' + A\cdot B\cdot C'\cdot E + C'\cdot D\cdot E = A\cdot B + A\cdot B\cdot D\cdot E' + A\cdot B\cdot C'\cdot E + C'\cdot D\cdot E \text{ (T9)}$$
$$= A\cdot B + A\cdot B\cdot C'\cdot E + C'\cdot D\cdot E \text{ (T9)}$$
$$= A\cdot B + C'\cdot D\cdot E \text{ (T9)}$$

$$M\cdot N\cdot O + Q'\cdot P'\cdot N' + P\cdot R\cdot M + Q'\cdot O\cdot M\cdot P' + M\cdot R$$
$$= M\cdot N\cdot O + Q'\cdot P'\cdot N' + Q'\cdot O\cdot M\cdot P' + M\cdot R + P\cdot R\cdot M \text{ (T6)}$$
$$= M\cdot N\cdot O + Q'\cdot P'\cdot N' + Q'\cdot O\cdot M\cdot P' + M\cdot R \text{ (T9)}$$
$$= N\cdot(M\cdot O) + N'\cdot(Q'\cdot P') + (M\cdot O)\cdot(Q'\cdot P') + M\cdot R \text{ (T6',T7')}$$
$$= N\cdot(M\cdot O) + N'\cdot(Q'\cdot P') + M\cdot R \text{ (T11)}$$
$$= N\cdot M\cdot O + N'\cdot Q'\cdot P' + M\cdot R \text{ (T7')}$$

3e4.7 4.202 (a)

X	Y	Z	F
0	0	0	0
0	0	1	1
0	1	0	1
0	1	1	1
1	0	0	0
1	0	1	0
1	1	0	0
1	1	1	0

(b)

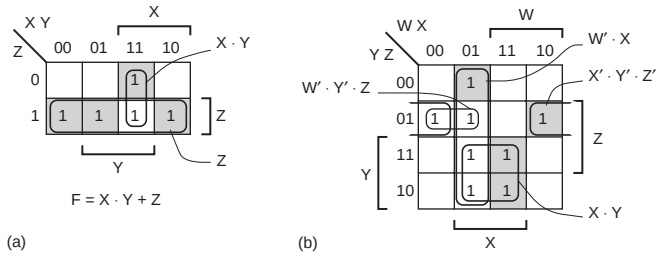
W	X	Y	Z	F
0	0	0	0	1
0	0	0	1	1
0	0	1	0	0
0	0	1	1	1
0	1	0	0	1
0	1	0	1	1
0	1	1	0	1
0	1	1	1	1
1	0	0	0	1
1	0	0	1	1
1	0	1	0	0
1	0	1	1	1
1	1	0	0	1
1	1	0	1	0
1	1	1	0	0
1	1	1	1	0

3e4.9 4.204

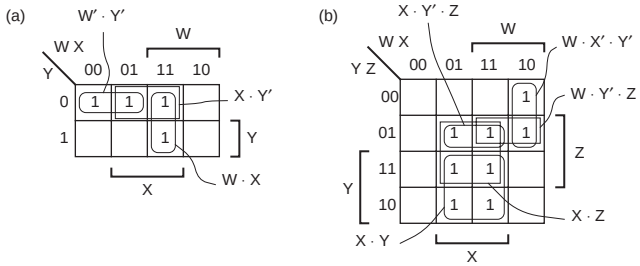
(a) $F = X'\cdot Y + Y'\cdot X = (X + Y)\cdot(X' + Y')$

(b) $F = A\cdot B = (A + B)\cdot(A + B')\cdot(A' + B)$

3e4.13 4.205



3e4.22 4.206 Consensus terms that must be added to cover the hazards are "circled" with rectangles.



3e4.69 4.219 For part (d), note that it is easiest to work with the product-of-sums directly; rather than multiplying out, one simply enters the 0s on the map.