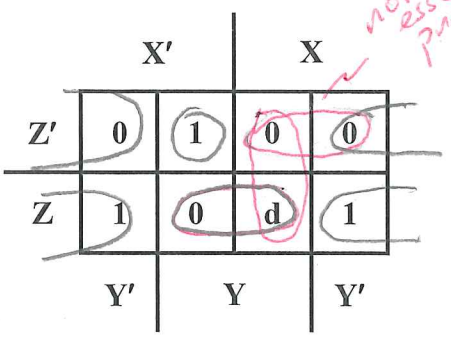
LEARNING OUTCOME #2: "an ability to analyze and design combinational logic circuits."

1. B
2. A
3. C
4. C
5. A
6. A
7. D
8. D
9. E
10. A
11. C
12. B
13. B – see PQ #6
14. A – see PQ #6
15. C – see PQ #6
16. C – see PQ #6
17. B
18. C
19. D
20. C
21. D
22. A
23. C
24. B
25. D
26. A
27. D
28. B
29. D
30. D

K-map for questions 6-11:

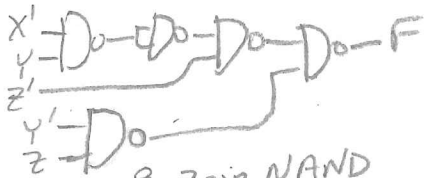


non-essential prime implicants → 2 does not matter which one is used → both yield the same result

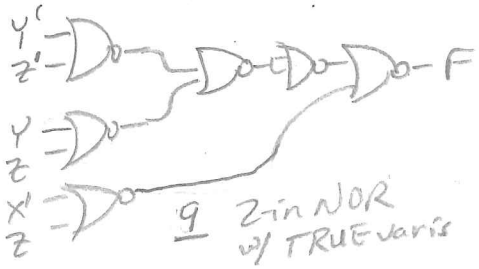
$F = X'YZ' + Y'Z$ COST = 10

$F' = YZ + Y'Z' + XZ'$

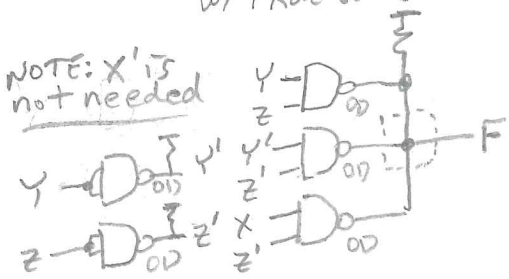
$\Rightarrow F = (Y'+Z') \cdot (Y+Z) \cdot (X'+Z)$ COST = 13



8 2-in NAND w/ TRUE vars



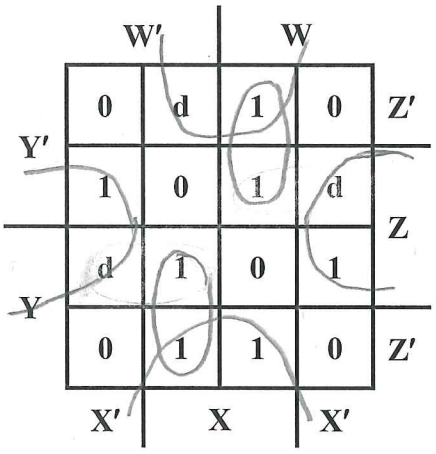
9 2-in NOR w/ TRUE vars



5 2-in OD NAND w/ TRUE vars

3 pull-up resistors

K-map for question 12:



$F = XZ' + X'Z + W'XY + WXY'$

$= (X \oplus Z) + X(W \oplus Y)$