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| **APCS Exposure Java** | **Exercises 13.04** | **Date:** |
| **Name:** | | **Period:** |

# Part 1 - Truth Tables

**In each of the following exercises use truth tables to determine if the given Boolean expressions are** *equivalent* **or** *not equivalent***.**

You will NOT receive ANY credit without the Truth Tables!

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# Part 2 - Boolean Logic Exercises

**Circle the “Best” answer for each of these Multiple Choice questions.**

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| 11. The Boolean expression  **A < B**  is equivalent to which of the following expressions?  (A) **not**(A < B)  (B) **not**(B < A)  (C) **not**(A >= B)  (D) A >= B  (E) B <= A | 12. The Boolean expression    **(A and B) or A**  is true  (A) only when A is true.  (B) only when B is true.  (C) whenever either A is true or B is true.  (D) only whenever both A is true and B is true.  (E) for all values of A and B. |
| 13. The Boolean expression  **(A and B) or (A and B)**  is true  (A) only when A is true.  (B) only when B is true.  (C) whenever either A is true or B is true.  (D)only whenever both A is true and B is true.  (E) for all values of A and B. | 14. The Boolean expression  **not(A and not B)**  is equivalent to which of the following expressions?  (A) A != B  (B) **not** A **or** B  (C) **not** A **and not** B  (D) **not** A **or not** B  (E) **not** A **and** B |
| 15. The Boolean expression  **not(A or B or C)**  is equivalent to which of the following expressions?  (A) A != B != C  (B) A **and** B **and** C  (C) A **or** B **or** C  (D) **not** A **or not** B **or not** C  (E) **not** A **and not** B **and not** C | 16. The Boolean expression  **(A and B) or not(A and B)**  evaluates to  (A) true in all cases.  (B) false in all cases.  (C) true whenever only A is true or only B is true.  (D) true whenever both A is true and B is true.  (E) false only when both A is false and B is false. |

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| 17. The Boolean expression  **not((A >= B) or (C < D))**  is equivalent to which of the following expressions?  (A) (A <= B) **or** (C > D)  (B) (A <= B) **and** (C > D)  (C) (A < B) **or** (C > D)  (D) (A < B) **or** (C >= D)  (E) (A < B) **and** (C >= D) | 18. The Boolean expression  **(A and B) and (not A or not B)**  evaluates to  (A) true in all cases.  (B) false in all cases.  (C) true only whenever both A is true and B is true.  (D) false only whenever both A is false and B is false.  (E) true only whenever A is true or B is true. |
| 19. The Boolean expression  **(not A and B) or (A and not B)**  evaluates to  (A) true in all cases.  (B) false in all cases.  (C) true only whenever A is false and B is true.  (D) true only whenever both A and B are the same  (E) true only whenever both A and B are the different | 20. The Boolean expression  **(A and B) or (not A and not B)**  evaluates to  (A) true in all cases.  (B) false in all cases.  (C) true only whenever A is false and B is true.  (D) true only whenever both A and B are the same  (E) true only whenever both A and B are the different |