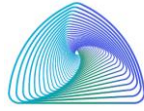


1. Which sentences are **propositions**? Give their truth values.
 - A. Cairo is the capital of Egypt.
 - B. Alexandria is the capital of Egypt.
 - C. $2 + 3 = 5$.
 - D. $5 + 7 = 10$.
 - E. $x + 2 = 11$.
 - F. Visit the Egyptian Museum.
2. Give the **negation** of each proposition.
 - A. Ahmed has a laptop.
 - B. There is no pollution in Cairo.
 - C. $(2 + 1 = 3)$.
 - D. The summer in Alexandria is hot and sunny.
3. Suppose that **Smartphone A** has 256 MB RAM and 32GB ROM, and the resolution of its camera is 8 MP; **Smartphone B** has 288 MB RAM and 64 GB ROM, and the resolution of its camera is 4 MP; and **Smartphone C** has 128 MB RAM and 32 GB ROM, and the resolution of its camera is 5 MP. **Determine the truth value** of each of these propositions.
 - A. Smartphone B has the most RAM of these three smartphones.
 - B. Smartphone C has more ROM or a higher resolution camera than Smartphone B.
 - C. Smartphone B has more RAM, more ROM, and a higher resolution camera than Smartphone A.
 - D. If Smartphone B has more RAM and more ROM than Smartphone C, then it also has a higher resolution camera.
 - E. Smartphone A has more RAM than Smartphone B if and only if Smartphone B has more RAM than Smartphone A.
4. Let p and q be the propositions
 - p : You drive over 65 miles per hour.
 - q : You get a speeding ticket.Write these propositions using p and q and logical connectives (including negations).
 - A. You do not drive over 65 miles per hour.
 - B. You drive over 65 miles per hour, but you do not get a speeding ticket.
 - C. You will get a speeding ticket if you drive over 65 miles per hour.
 - D. If you do not drive over 65 miles per hour, then you will not get a speeding ticket.
 - E. Driving over 65 miles per hour is sufficient for getting a speeding ticket.
 - F. You get a speeding ticket, but you do not drive over 65 miles per hour.
 - G. Whenever you get a speeding ticket, you are driving over 65 miles per hour.
5. Let p , q , and r be the propositions
 - p : You get an A on the final exam.
 - q : You do every exercise in this book.
 - r : You get an A in this class.Write these propositions using p , q , and r and logical connectives (including negations).
 - A. You get an A in this class, but you do not do every exercise in this book.
 - B. You get an A on the final, you do every exercise in this book, and you get an A in this class.
 - C. To get an A in this class, it is necessary for you to get an A on the final.
 - D. You get an A on the final, but you don't do every exercise in this book; nevertheless, you get an A in this class.
 - E. Getting an A on the final and doing every exercise in this book is sufficient for getting an A in this class.
 - F. You will get an A in this class if and only if you either do every exercise in this book or you get an A on the final.
6. For each of these sentences, state what the sentence means if the logical connective or is an inclusive or (that is, a disjunction) versus an exclusive or. Which of these meanings of or do you think is intended?



- A. To take discrete mathematics, you must have taken calculus or a course in computer science.
 - B. When you buy a new car from Acme Motor Company, you get \$2000 back in cash or a 2% car loan.
 - C. Dinner for two includes two items from column A or three items from column B.
 - D. School is closed if more than 2 feet of snow falls or if the wind chill is below -100 .
7. Determine whether each of these conditional statements is true or false.
- A. If $1 + 1 = 2$, then $2 + 2 = 5$.
 - B. If $1 + 1 = 3$, then $2 + 2 = 4$.
 - C. If $1 + 1 = 3$, then $2 + 2 = 5$.
 - D. If monkeys can fly, then $1 + 1 = 3$.
8. Determine whether these **biconditionals** are true or false.
- A. $2 + 2 = 4$ if and only if $1 + 1 = 2$.
 - B. $1 + 1 = 2$ if and only if $2 + 3 = 4$.
 - C. $1 + 1 = 3$ if and only if monkeys can fly.
 - D. $0 > 1$ if and only if $2 > 1$.