QUESTION 1:

Let the universal set be the set Z of all integer numbers and let $A = \{x \in Z | 0 < x \leq 2\}$, $B = \{x \in Z | 1 \leq x < 4\}$, and $C = \{x \in Z | 3 \leq x < 9\}$. Find each of the following:

a) $A \cup B =$

b) $A \cap B =$

c) $(A \cup B) \cap C =$

d) $(A \cup B) \cap (A \cup C) =$

e) $|A \cup C| =$

f) B – C =

g) $A \times (A \cup B) =$

h) P(B) =

QUESTION 2:

In the following question let

p: 2 is an even integer,
q: -3 is a negative integer.

Write the following sentences in terms of p, q and logical connectives. Then, find the truth-values of the given statements:

a) 2 is an even integer and -3 is a negative integer.

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b) 2 is not an even integer and -3 is a negative integer.

_____

c) If 2 is an even integer, then -3 is not a negative integer.

_____

d) 2 is an even integer if and only if -3 is a negative integer.

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QUESTION 3:

Determine whether statement A is logically equivalent to statement B, where

A: $(p \leftrightarrow q)$
B: $(p \rightarrow q) \wedge (q \rightarrow p)$