

» Set Theory: Diagnostic Quiz

NAME	CLASS
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Q1. State the sets defined by:

- (a) Prime numbers less than 10
- (b) The first three positive multiples of 6
- (c) The natural numbers between 4 and 5
- (d) The set of all positive integers

IMPORTANT
Always use correct set notation in this quiz!

Q2. Given the universal set $U = \{0, 1, 2, 3 \dots 20\}$ and $X = \{\text{multiples of 2 and 3}\}$, write down X' .

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Q3. Given the sets $A = \{1, 2, 3, 4, 5, 6\}$, $B = \{4, 5, 6, 7, 8\}$ and $C = \{7, 8, 9, 10\}$, write down:

- (a) $A \cup B$
.....
- (b) $A \cap B$
.....
- (c) $A \cap C$
.....
- (d) $n(A \cap B)$
.....
- (e) $n(A \cap C)$
.....

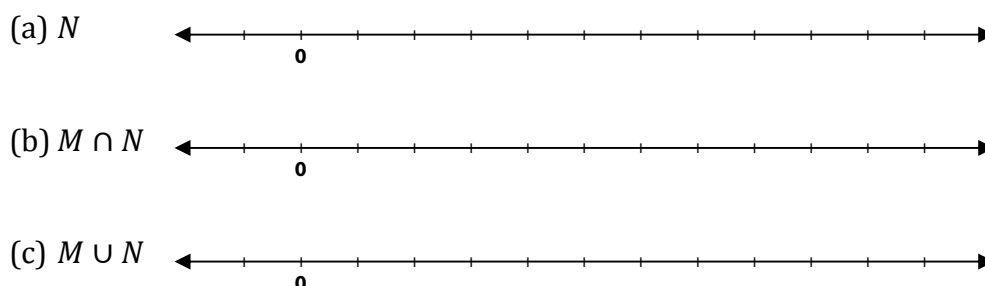
Q4. Given $A = \{2, 3, 5\}$, $B = \{2, 5, 3\}$ and $H = \{a, b, c\}$, complete the table below. T for true and F for false.

Statement	True or False
$2 \in A$	
$n(A) = 13$	
$A = B$	
$A \leftrightarrow H$	
$2 \notin H$	
$A \notin \mathbb{N}$	

Q5. Which of the sets $P = \{5, 6, 7\}$, $Q = \{1, 2, 3, 4\}$, $R = \{7, 5, 6\}$, $S = \{2, 4, 6, 8\}$ are:

- (a) Equal sets?
- (b) Equivalent sets?

Q6. Given set $M = \{x \in \mathbb{R}: x \geq 3\}$ and set $N = \{x \in \mathbb{R}: 1 \leq x < 7\}$, illustrate the solutions sets of following on the number lines provided.



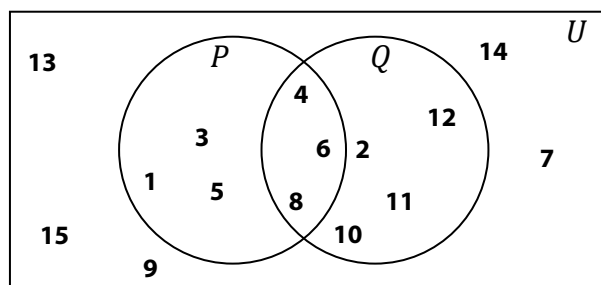
Q7. Given $n(E \cap F) = 0$, what specific words describe sets E and F ?

.....

Q8. If $A = \{x : x < 4\}$, $B = \{x : x \in \mathbb{Z}^+\}$ and $C = \{x : x \geq 7\}$, then circle the correct size of these sets:

- (a) $A \cap B$ Empty Finite Infinite
- (b) $A \cup B$ Empty Finite Infinite
- (c) $A \cap C$ Empty Finite Infinite
- (d) $B \cap C$ Empty Finite Infinite

Q9. Use the Venn diagram below to determine the following:



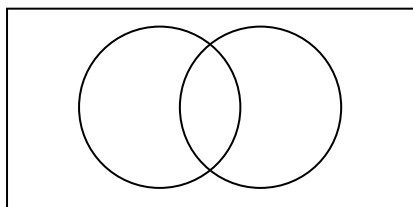
- (a) P
- (b) $P \cap Q$
- (c) $n(P \cup Q)$
- (d) $(P \cup Q)'$

Q10. In a group of 20 students, 14 play the piano or violin, 8 are only pianists and 5 play both.

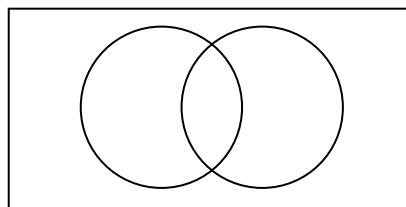
(a) Illustrate this information on a Carroll diagram, and (b) determine how many are only violinists.

Q11. Label these Venn diagrams to illustrate the following sets and shade the appropriate areas:

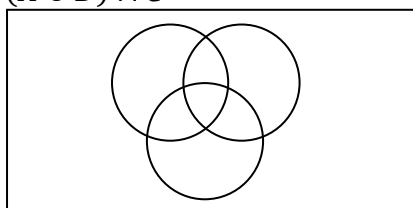
(a) $A' \cup B$



(b) $A \cap B'$



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



(d) $(A \cap B \cap C)'$

