Student exercises 1

NB! This is not an assignment for submission. This is to test your knowledge.
Unit 1,2 and 3 (without solutions)
Number systems, rational/real and sets

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1. Which of these numbers below are prime numbers

29	3	9	2	11	15	22

a) 29, 3, 9 and 11
b) 2, 3 and 22
c) 2, 29, 11 and 3
d) 15, 2, 3 and 22

2. What is the value of 0!
a) 1
b) 0
c) -1
d) not possible

3. The set of all non-negative integers less than 9 can be represented by
a) $\{x \mid x \in Z^{\geq}, 0 \leq x \leq 9\}$
b) {1,2,3,4,5,6,7,8}
c) $\{x \mid x \in Z^{\geq}, 0 \leq x < 9\}$
d) $\{x \mid x \in Z^{+}, 0 < x < 9\}$

4. Questions 4 to 9 relate to the following sets.
Suppose U = {2, π, 3, $\sqrt{5}$, {8}, 8} is a universal set with the following subsets:
A = {2, π}, B = {2, $\sqrt{5}$}, C = {$\sqrt{5}$, {8}, 3}

Determine A $\cup$ C
a) {2, π, 3, $\sqrt{5}$, 8}
b) {2, π, 3, $\sqrt{5}$, {8}}
c) {π, 3, $\sqrt{5}$, {8}, 8}
d) {2, π, $\sqrt{5}$, {8}, 8}

5. Which one of the following sets represents B $\cap$ C
a) {2, 3}
b) {$\sqrt{5}$}
c) {3,{8}}
d) {2}

6. Which one of the following sets represents B' - C
a) {3}
b) {3, {8}}

c) $\{\pi, 8\}$
d) $\{\pi,\{8\}\}$

7. Which one of the following sets represents (A ∩ C) ∪ B
a) $\{2\}$
b) $\{2, \sqrt{5}\}$
c) $\{2, \sqrt{5}, \emptyset\}$
d) $\emptyset$

8. Which of the following operations will yield a set whose elements are all irrational?
a) A + B
b) A' - C
c) (A ∪ B) ∪ C'
d) B' + A

9. Which statement below is $\underline{NOT}$ true
a) The set B + C has three elements. Two of which are prime numbers
b) The cardinality of the set B' is 4
c) $\{2, \sqrt{5}\} \subset$ B
d) $\{3, \sqrt{5}\} \subseteq$ C

10. Suppose a set X has 5 elements.
The cardinality of the power set of X $|\mathcal{P}(X)| =$
a) 20
b) 12
c) 5
d) 32

11. Suppose Y = $\{1, 2, \{1\}\}$. Determine $\mathcal{P}$(Y):
a) $\{\emptyset, \{1\}, \{2\}, \{\{1\}\},\{1,2\}, \{1,\{1\}\}, \{2,\{1\}\}, \{1,2,\{1\}\}\}$
b) $\{\{1\}, \{2\}, \{1,2\}, \{1,2,\{1\}\}\}$
c) $\{\emptyset, \{1\}, \{2\}, \{1,2\}\}$
d) $\{\emptyset, \{1\}, \{2\}, \{1,2\}, \{1,2,\{1\}\},\{2,\{1\}\}\}$

12. Which one of the following is a subset of $\mathcal{P}$(Y)
a) $\{1,2,\{2\}\}$
b) $\{\{\{1\}\}\}$
c) $\{1,2,\{1\}\}$
d) $\{\{2\}, 1\}$

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