ALBERTA MATH 30-2 · UNIT 1 · 25 QUESTIONS

Set Theory and Logic — Practice Test

This practice test was made by AI and there may be mistakes. If a question or answer looks wrong, use the Flag a mistake button to let Brett know so he can fix it.

1 **The universal set is U = {1, 2, …, 12}. If A is the set of multiples of 3 in U, then A is**

- A {1, 3, 5, 7, 9, 11}
- B {3, 6, 9, 12}
- C {3, 6, 9}
- D {2, 4, 6, 8, 10, 12}

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2 **A set contains 6 elements. The number of subsets of the set is**

- A 12
- B 36
- C 64
- D 720

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3 **Given U = {1, 2, …, 10} and B = {2, 3, 5, 7}, the complement of B is**

- A {2, 3, 5, 7}
- B {1, 4, 6, 8, 9}
- C {4, 6, 8, 9, 10}
- D {1, 4, 6, 8, 9, 10}

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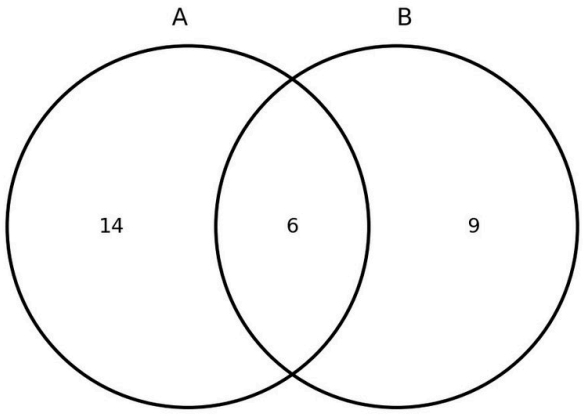
4 **If A = {2, 4, 6, 8, 10} and B = {4, 8, 12}, then A ∩ B is**

- A {4, 8}
- B {2, 4, 6, 8, 10, 12}
- C {2, 6, 10}
- D {12}

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5

The Venn diagram below shows sets A and B. The number of elements in A ∪ B is _____ Record your answer as a whole number.



Question 5

The Venn diagram below shows sets A and B. The number of elements in $A \cup B$ is ____ Record your answer as a whole number.

ANSWER _____

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6 **The set $A \cap B'$ consists of the elements that are**

- **A** in A or in B
- **B** in both A and B
- **C** in A but not in B
- **D** in neither A nor B

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7 **Which pair of sets is disjoint?**

- **A** P = {2, 4, 6} and Q = {4, 5, 6}
- **B** P = {1, 3, 5, 7} and Q = {2, 4, 6, 8}
- **C** P = {5, 10, 15} and Q = {10, 20, 30}
- **D** P = {7, 8, 9} and Q = {9, 10, 11}

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8 **For two sets A and B, n(A) = 31, n(B) = 20, and n(A ∩ B) = 8. The number of elements that are in A only is**

A 39

B 8

C 20

D 23

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9 **The negation of the statement All students in the class passed the test is**

A Some students in the class did not pass the test

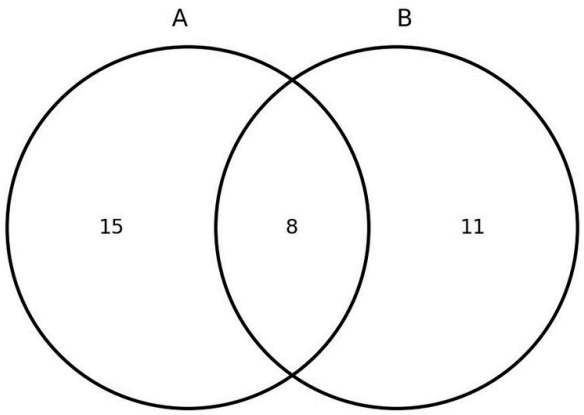
B No students in the class passed the test

C No students in the class did not pass the test

D Some students in the class passed the test

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10 **The Venn diagram below shows the numbers of students in two sets, A and B. The number of students who are in A ∪ B is _____ Record your answer as a whole number.**



Question 10

The Venn diagram below shows the numbers of students in two sets, A and B. The number of students who are in $A \cup B$ is ____ Record your answer as a whole number.

ANSWER

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11 **The converse of the statement If a number is divisible by 6, then it is divisible by 3 is**

A If a number is not divisible by 3, then it is not divisible by 6

B If a number is divisible by 3, then it is divisible by 6

C If a number is not divisible by 6, then it is not divisible by 3

D A number is divisible by 6 if and only if it is divisible by 3

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12 **A conditional statement is always logically equivalent to its**

A converse

B inverse

C negation

D contrapositive

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13 **In a Venn diagram with three sets, the regions contain the following numbers of elements: A only 12, B only 9, C only 7, A and B only 5, A and C only 4, B and C only 3, all three sets 2, and none of the sets 6. The total number of elements in the universal set is ____ Record your answer as a whole number.**

Question 13

In a Venn diagram with three sets, the regions contain the following numbers of elements: A only 12, B only 9, C only 7, A and B only 5, A and C only 4, B and C only 3, all three sets 2, and none of the sets 6.

The total number of elements in the universal set is ____ Record your answer as a whole number.

ANSWER _____

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14 **Given the true statement If a polygon is a square, then it has four equal sides, which of the following statements must also be true?**

A If a polygon has four equal sides, then it is a square

B If a polygon is not a square, then it does not have four equal sides

C If a polygon does not have four equal sides, then it is not a square

D If a polygon has four equal sides, then it is not a square

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15 In a Venn diagram, the set (A ∪ B)′ represents the region that is

Question 15

In a Venn diagram, the set $(A \cup B)'$ represents the region that is

A) outside both A and B

B) inside both A and B

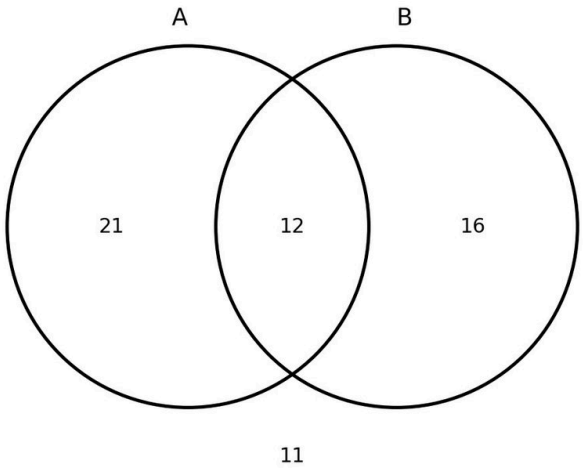
C) inside only A

D) inside at least one of A and B

- **A** outside both A and B
- **B** inside both A and B
- **C** inside only A
- **D** inside at least one of A and B

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16 **The Venn diagram below shows sets A and B. The number of elements in A ∩ B is _____ Record your answer as a whole number.**



Question 16

The Venn diagram below shows sets A and B. The number of elements in $A \cap B$ is ____ Record your answer as a whole number.

ANSWER _____

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17 **Which value is a counterexample to the statement All prime numbers are odd?**

A 3

B 5

C 7

D 2

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18 **If A = {3, 6, 9, 12} and B = {2, 3, 6, 9, 12, 15}, then which statement is true?**

A $B \subseteq A$

B $A \subseteq B$

C $A \cap B = \varnothing$

D $n(A) = n(B)$

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19 **In a three-set Venn diagram, the number of elements in A and B only is 8, in A and C only is 6, in B and C only is 5, and in all three sets is 4. The number of elements in exactly two of the sets is ____ Record your answer as a whole number.**

Question 19

In a three−set Venn diagram, the number of elements in A and B only is 8, in A and C only is 6, in B and C only is 5, and in all three sets is 4. The number of elements in exactly two of the sets is ____ Record your answer as a whole number.

ANSWER _____

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20 **The rule for the school picnic is that rain cancels it. Written as an if-then statement, the hypothesis is**

A It is raining

B The picnic is cancelled

C It is not raining

D The picnic is not cancelled

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21 **For any set A, the set $A \cap A'$ is equal to**

A U

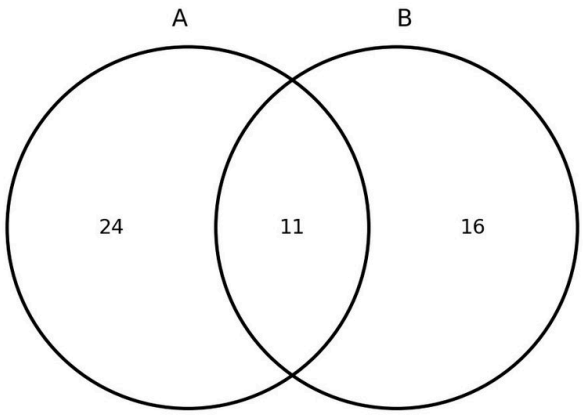
B A

C $\varnothing$

D A'

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22 **The Venn diagram below shows sets A and B. The number of elements that are in exactly one of the two sets is _____ Record your answer as a whole number.**



Question 22

The Venn diagram below shows sets A and B. The number of elements that are in exactly one of the two sets is ____ Record your answer as a whole number.

ANSWER

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23 **An element x is in set A and set C, but not in set B. Which expression describes the region containing x?**

- **A** $A \cap B \cap C$
- **B** $A \cap C \cap B'$
- **C** $A \cup C \cup B'$
- **D** $(A \cap C)'$

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24 **All members of the chess club are students. Dana is a member of the chess club. Which conclusion is valid?**

- **A** Dana is not a student
- **B** Dana may or may not be a student
- **C** No conclusion can be drawn about Dana
- **D** Dana is a student

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25

A survey of 100 students asked about three sports. 45 play soccer, 38 play basketball, and 30 play volleyball. 18 play soccer and basketball, 14 play soccer and volleyball, 12 play basketball and volleyball, and 21 play none of the sports. The pairwise counts include the students who play all three sports. The number of students who play all three sports is ____ Record your answer as a whole number.

ANSWER

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ANSWER KEY

1. B
2. C
3. D
4. A
5. 29
6. C
7. B
8. D
9. A
10. 34
11. B
12. D
13. 48
14. C
15. A
16. 12
17. D
18. B
19. 19
20. A
21. C
22. 40
23. B
24. D
25. 10

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