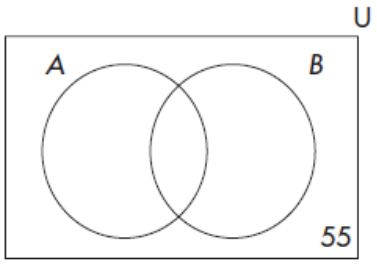
42 Look at the following Venn diagram.



There are 55 elements that do not belong to either set A or set B but do belong to the Universal set U. Set A contains 72 elements, set B contains 51 elements, and U contains 168 elements. How many elements are there in the set $A \cap B$?

43 Danny wishes to solve the equation $x^2 + 7x + 10 = 4$. Which of the following would be a correct step in solving this equation?

(A) $(x + 5)(x + 2) = 0$

(B) $(x + 3)(x + 2) = 0$

(C) $(x + 6)(x + 1) = 0$

(D) $(x + 10)(x + 1) = 0$

44 Which of the following is equivalent to $\dfrac{m^9p^{16} - m^6p^{12}}{m^3p^4}$?

(F) $m^3p^4 - m^2p^3$

(G) $m^6p^{12} - m^3p^8$

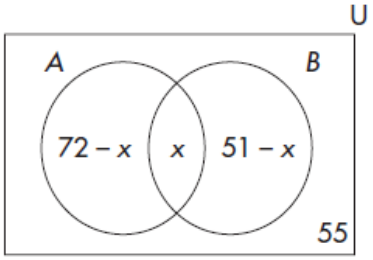
(H) mp

(I) $m^{12}p^{24}$

45 Charlene will write the expression $\left(\dfrac{a^{-13}b^{-7}}{a^{-5}b^{10}}\right)^{-2}$ as a^xb^y, where x and y are positive integers. What is the sum of x and y?

Answers

42 The correct answer is 10. Let x represent the number of elements in $A \cap B$. Then $72 - x$ represents the number of elements in A but not in $A \cap B$. Likewise, $51 - x$ represents the number of elements in B but not in $A \cap B$. With these substitutions, the Venn diagram would appear as follows.



Then $(72 - x) + x + (51 - x) + 55 = 168$. The left side of the equation can be simplified to $178 - x = 168$. Thus, $x = 10$.

43 **(C)**

By subtracting 4 from each side, Danny can write the given equation as $x^2 + 7x + 6 = 0$. Then, the left side factors as $(x + 6)(x + 1)$.

44 **(G)**

$\frac{m^9p^{16} - m^6p^{12}}{m^3p^4} = \frac{m^9p^{16}}{m^3p^4} - \frac{m^6p^{12}}{m^3p^4}$. In dividing monomials with like bases, subtract the corresponding exponents. Thus, the answer is $m^6p^{12} - m^3p^8$.

45 The correct answer is 50. $\left(\frac{a^{-13}b^{-7}}{a^{-5}b^{10}}\right)^{-2} = \frac{a^{26}b^{14}}{a^{10}b^{-20}} = a^{26-10}b^{14-(-20)} = a^{16}b^{34}$. Then the sum of the exponents is 50.