Problem Solving Sets & Relations

By

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Let $S = \{1, 2, 3, ..., 100\}$. The number of non-empty subsets $\underline{A \text{ of } S}$ such that the product of elements in \underline{A} is even, is (2019 Main, 12 Jan I)

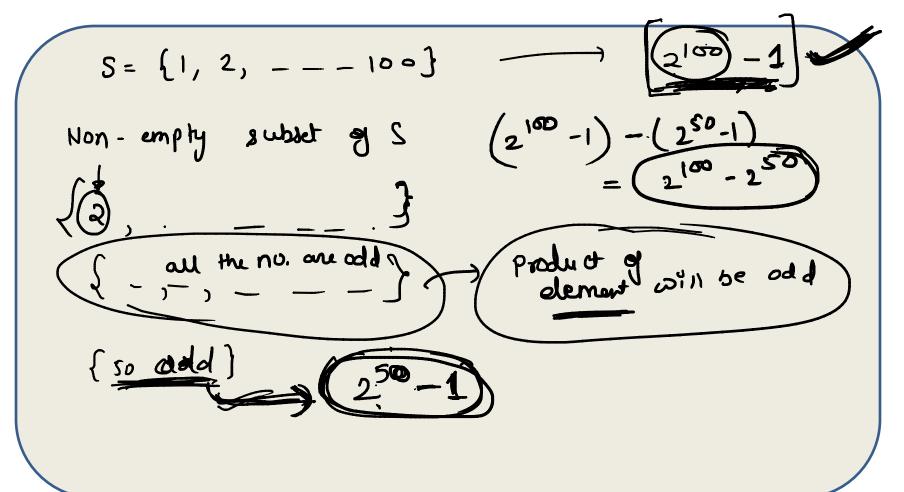
$$(2)$$
 2^{50} $(2^{50} - 1)$

(b)
$$2^{50} - 1$$

(c)
$$2^{50} + 1$$

(d)
$$2^{100} - 1$$

TO tel Man - empty subset



In a class of 140 students numbered 1 to 140, all even numbered students opted Mathematics course, those whose number is divisible by 3 opted Physics course and those whose number is divisible by 5 opted Chemistry course. Then, the number of students who did not opt for any of the three courses is

$$n(\mathfrak{P}) = 46$$

$$n(\mu\nu\nu\nu) = \frac{8}{4} + \frac{1}{4} + \frac{1}$$

If A and B are two sets containing four and two elements, respectively. Then, the number of subsets of the set $A \times B$ each having at least three elements (2015 Main)

- (b) 256
- (c) 275 (d) 510

$$A = \{ 9, b, c, d. \} - \{ 9 \}$$

$$B = \{ 1, 2 \} \cdot - \{ 2 \}$$

$$A \times B = \{ \frac{8}{2} \cdot \frac{8}{2} \cdot$$

$$\{a_1\}, (b, z) = -$$

$$\begin{bmatrix}
 2^{8} - [8] - [8] \\
 256 - 1 - 8 - 28
 \end{bmatrix}
 = 256 - 34 = 219$$

Let Z be the set of integers. If

$$A = \{x \in Z : 2^{(x+2)(x^2 - 5x + 6)} = 1\}$$

and $B = \{x \in \mathbb{Z}: -3 < 2x - 1 < 9\}$, then the number of subsets of the set $A \times B$, is (2019 Main, 12 Jan II)

- (a) 2^{12} (b) 2^{18}

(d) 2¹⁰

$$A = \{x \in Z : 2^{(x+2)}(x-3)(x^{-2}) = 4\}$$

$$-2A = \{2,-2,3\} - 3$$

$$-2A = \{0,1,2,3,4\} - 3$$

$$-2 < 2x < 10$$

$$-1 < x < 5$$

$$A = \{15 \text{ orden Pair}\}$$

If both the mean and the standard deviation of 50 observations x_1, x_2, \dots, x_{50} are equal to 16, then the mean of $(x_1 - 4)^2$, $(x_2 - 4)^2$, ..., $(x_{50} - 4)^2$ is

(2019 Main, 10 April II)



(c) 380 (d) 525

$$\frac{(\chi_{r_1})^2 + (\chi_{r_2} - \chi_{r_2})^2 - (\chi_{r_2} - \chi_{r_2})^2}{50}$$

$$\frac{(\chi_{r_1})^2 + (\chi_{r_2} - \chi_{r_2})^2 + (\chi_{r_2} - \chi_{r_2})^2}{50}$$

$$=) \frac{\chi_{r_1}^2 + \chi_{r_2}^2 - \chi_{r_2}}{50} + \chi_{r_2}^2 - \frac{8 \times 16}{50}$$

$$\frac{512}{512} + \frac{16}{50} - \frac{128}{50} - \frac{100}{50}$$

- → For any two statements p and q, the negation of the expression $p \lor (\sim p \land q)$ is (2019 Main, 9 April I)
 - (a) ~ p ∧ ~ q
- (b) $\sim p \vee \sim q$
- (c) p ∧ q

(d) $p \leftrightarrow q$