

A-Level Mathematics

Name: _____ Score: _____

1. For 10 values with $\Sigma x = 50$, what is the mean?

2. How many ways are there to choose 2 from 5 (${}^5C_2$)?

3. $P(A) = 0.5$, $P(B) = 0.4$ and $P(A \cap B) = 0.2$. Are A and B independent?
☐ Yes, because $P(A) \times P(B) = 0.2 = P(A \cap B)$
☐ No, because the values differ
☐ Yes, because they are mutually exclusive
☐ No, because $P(A) > P(B)$
4. For $X \sim B(10, 0.3)$, what is $E(X) = np$?

5. $X \sim N(50, 4)$ means $\mu = 50$, $\sigma = 2$. Standardize $x = 56$: what is $Z = (x - \mu)/\sigma$?

6. For 10 values, $\Sigma x = 50$ and $\Sigma x^2 = 300$. What is the standard deviation? ($\sqrt{(\Sigma x^2/n - \bar{x}^2)}$)

7. In a combination, the order of the chosen items:
☐ must be reversed
☐ does not matter
☐ must be alphabetical
☐ always matters
8. If A and B are mutually exclusive, then $P(A \cap B) = 0$.
☐ True ☐ False
9. In a probability distribution table, the probabilities must add up to 1.
☐ True ☐ False
10. The normal distribution curve is:
☐ a straight line
☐ a rectangle

- ☐ a symmetric bell shape
- ☐ always skewed right

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1. **5**

$$\text{Mean} = \Sigma x / n = 50 / 10 = 5.$$

2. **10**

$${}^5C_2 = 5!/(2!3!) = 120/(2 \times 6) = 10.$$

3. **Yes, because $P(A) \times P(B) = 0.2 = P(A \cap B)$**

$$P(A) \times P(B) = 0.5 \times 0.4 = 0.2, \text{ which equals } P(A \cap B), \text{ so they are independent.}$$

4. **3**

$$E(X) = np = 10 \times 0.3 = 3.$$

5. **3**

$$Z = (56 - 50)/2 = 6/2 = 3.$$

6. **2.24**

$$\sigma = \sqrt{(300/10 - 5^2)} = \sqrt{(30 - 25)} = \sqrt{5} \approx 2.24.$$

7. **does not matter**

Combinations ignore order; permutations count order.

8. **True**

Mutually exclusive events cannot both happen, so their intersection has probability 0.

9. **True**

A valid distribution has all probabilities summing to 1.

10. **a symmetric bell shape**

It is the symmetric bell-shaped curve centred on the mean μ .