Puzzle: The Card Draw

A standard deck of 52 playing cards is well shuffled. One card is drawn at random.

Question:
What is the probability that the card drawn is either a **red card** or a **king**?

✅ **Answer:**

A standard deck has:

- 52 cards total
- 26 **red cards** (13 Hearts + 13 Diamonds)
- 4 **kings** (one in each suit)

Now let's apply the **Addition Rule of Probability:**

$$P(\text{Red or King}) = P(\text{Red}) + P(\text{King}) - P(\text{Red and King})$$

- $P(\text{Red}) = \frac{26}{52}$
- $P(\text{King}) = \frac{4}{52}$
- There are 2 red kings (King of Hearts and King of Diamonds), so:
  - $P(\text{Red and King}) = \frac{2}{52}$

$$P = \frac{26}{52} + \frac{4}{52} - \frac{2}{52} = \frac{28}{52} = \boxed{\frac{7}{13}}$$

🎯 **Final Answer:**

$$\boxed{\frac{7}{13}}$$

Puzzle: The Painted Box

A cube has all its faces painted. It is then cut into **64 smaller equal cubes**.

Question:
How many of the smaller cubes will have **exactly one face painted**?

Step 1:

- The large cube is divided into $64 = 4^3$ smaller cubes
- So, the original cube has **4 divisions along each edge**

Step 2: Understanding cube layers:

Only the **cubes on the faces, not at the edges or corners**, will have **exactly one face painted.**

Each face of the cube is a **4×4 grid** = 16 cubes

- **On each face**, the cubes that are not at the edge form a (4 – 2) × (4 – 2) = 2 × 2 = 4 cube section (these are the inner face cubes)

Step 3:

- Each face contributes 4 such cubes with exactly one face painted
- A cube has 6 faces, so:

$$6 \times 4 = \boxed{24 \text{ small cubes have exactly one face painted}}$$

✅ Final Answer:

$$\boxed{24}$$

Done ↓
