Quiz: Question 2

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In order to see if A and B are independent events, we need to prove that $P(B|A) = P(A|B)$. To do this, we first need to find the areas occupied by A and B and divide the total area.

$$P(A) = \frac{36}{72} = 0.5 \tag{1}$$

$$P(B) = \frac{36}{72} = 0.5 \tag{2}$$

Now that we know, what these two probabilites are, we have to use the formula for conditional probability in order to prove that these two conditional probabilites are equal to one another.

$$P(B|A) = \frac{P(A \cap B)}{P(A)} \tag{3}$$

$$P(B|A) = \frac{0.5 * 0.5}{0.5} \tag{4}$$

$$P(B|A) = 0.5 \tag{5}$$

$$P(A|B) = \frac{P(A \cap B)}{P(B)} \tag{6}$$

$$P(A|B) = \frac{0.5 * 0.5}{0.5} \tag{7}$$

$$P(A|B) = 0.5 \tag{8}$$

$$P(B|A) = P(A|B) \tag{9}$$

Since both conditional probabilites are equal and are 50%, the events A and B are independent events.