Cambridge International AS & A Level

Mathematics 9709/52

Paper 5 Probability & Statistics 1 **May/June 2025**

Question No (3)

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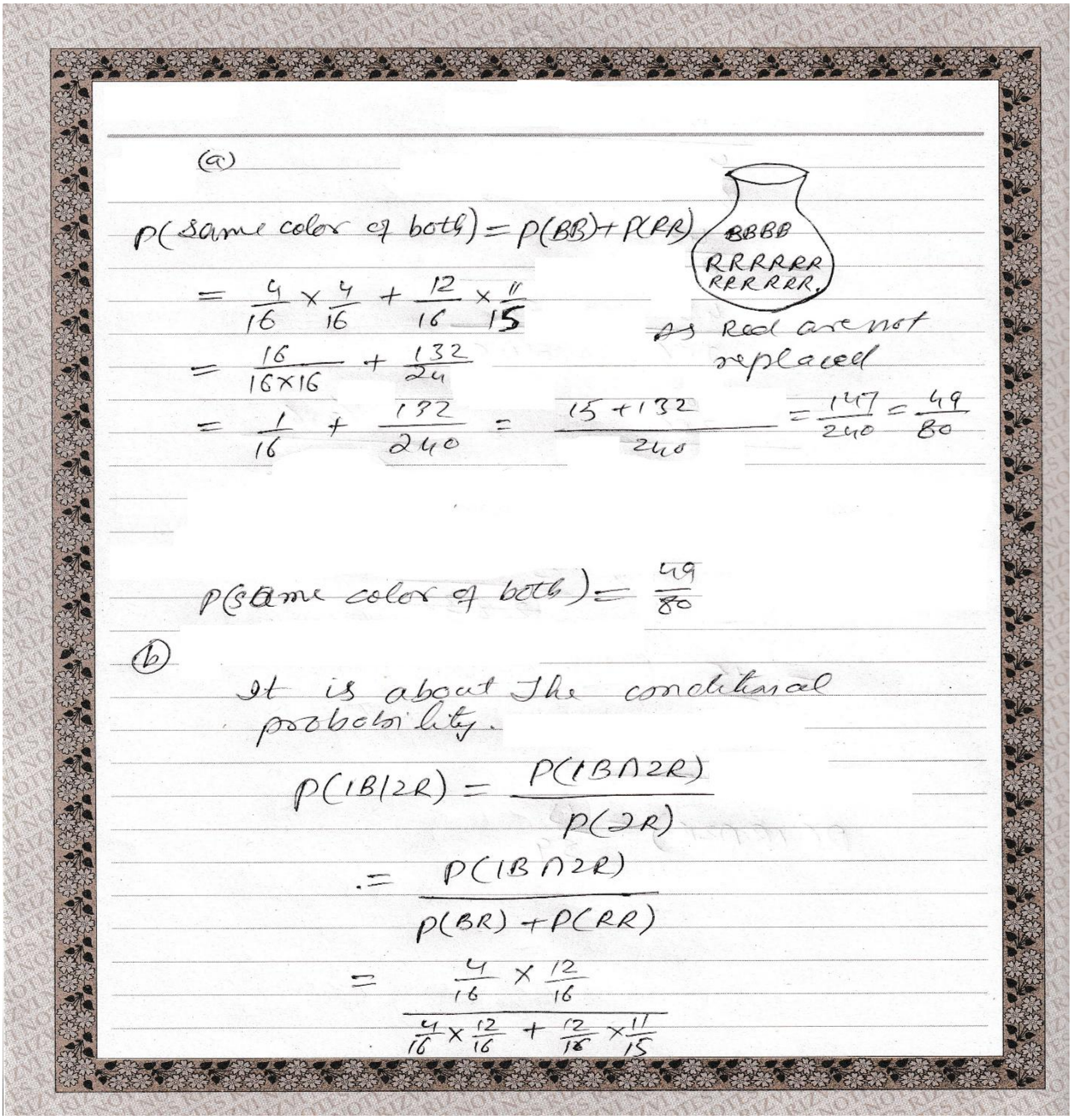
A bag contains 4 blue marbles and 12 red marbles. One marble is selected at random from the bag. If this marble is blue, it is replaced in the bag, but if it is red, it is not replaced. A second marble is now selected at random from the bag.

(a) Find the probability that both marbles selected are the same colour.

(b) Find the probability that the first marble is blue given that the second marble is red.

Solution:



$$= \frac{\frac{4}{16} \times \frac{12}{16}}{\frac{4}{16} \times \frac{12}{16} + \frac{12}{16} \times \frac{11}{15}}$$

$$= \frac{\frac{48}{256}}{\frac{48}{256} + \frac{132}{240}}$$

$$= \frac{\frac{48}{256}}{\frac{720 + 2112}{3840}} = \frac{48/256}{\frac{2832}{3840}}$$

$$= \frac{\cancel{48}^{1}}{\cancel{256}} \times \frac{\cancel{3840}^{15}}{\cancel{2832}_{59}}$$

$$= \frac{15}{59}$$

$$P(\text{IBNZR}) = \frac{15}{59}$$