

Build Tasks – Answers



1. Bag: 2 red, 1 blue (no replacement). Find $P(\text{2nd Red} \mid \text{1st Red})$.

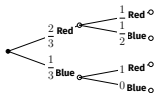


Solution

Branch after Red:

$$P = \frac{1}{2}$$

2. Using the same tree, find $P(\text{2nd is Red} \mid \text{1st was Blue})$.



Solution

Branch after Blue:

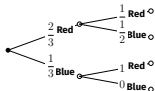
$$P = 1$$

3. What does $P(B \mid A)$ mean, in words?

Solution

The probability that B happens, given that A has already happened.

4. Using the tree, find $P(\text{Red then Red})$ by multiplying along the branches.



Solution

$$P(R, R) = \frac{2}{3} \times \frac{1}{2} = \frac{1}{3}$$

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5. $P(B) = 0.4$ and $P(B | A) = 0.4$.
Are A and B independent?

Solution

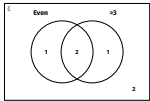
Yes – the condition does not change $P(B)$, so A and B are independent.

6. $P(B) = 0.4$ but $P(B | A) = 0.7$.
Are A and B independent? Explain.

Solution

No – $P(B | A) \neq P(B)$, so A changes the chance of B : dependent.

7. Die: $A = \text{even}$, $B = > 3$. Using the overlap, independent?



Solution

$P(A) = \frac{1}{2}$ vs $\frac{2}{3}$:
dependent.

8. Why does comparing $P(B)$ to $P(B | A)$ test for independence?

Solution

If they are equal, A has no effect on B ; if different, B depends on A .