

Grades 7-8 (S), 9-12 (A)

Duration: 10-20 min

Tools: one 9 pcs Set / pair

Individual / Pair work

Keywords: Probability, Favourable outcome, Total outcome

616 - Pick a Pair



MATHS / PROBABILITY



LOGIFACES
METHODOLOGY
Erasmus+

TEACHER

Logifaces

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DESCRIPTION

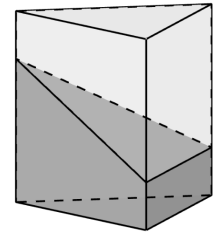
Students should use all blocks from the 9 pcs Set.

LEVEL 1 Students arrange the blocks into 5 regular prisms (see exercise [602 - Pairing 9pcs](#)), then find the probability that a randomly chosen prism has

- height 3
- height 4

LEVEL 2 (from grade 10) Students choose two different blocks at random and find the probability that the selected pair can be joined to form a regular prism of

- height 3
- height 4 (For example the blocks 113 and 331 are chosen, see the figure).



SOLUTIONS / EXAMPLES

LEVEL 1 The total number of outcomes is the number of the regular prisms, which is 5. For the first question, there is 1 favourable outcome compiled from the blocks 112 and 122, hence the probability is $\frac{1}{5} = 0.2$.

For the second question, there are 3 favourable outcomes compiled from the blocks 113 and 133, or 123 and 123, or 132 and 132, hence the probability is $\frac{3}{5} = 0.6$.

LEVEL 2 The questions can be answered by considering either ordered or unordered pairs. We present the details of the solution for ordered pairs, but at the end of the solution, the numbers corresponding to the unordered pairs are given as well.

There are 9 blocks in the set. Hence the total outcome is the number of ordered pairs, which is $9 \times 8 = 72$. We use the notation (a,b) for the ordered pair of a and b (note that $(a,b) \neq (b,a)$).

GUIDELINE FOR THE TEACHER At this point, it is worth noting that while considering ordered (or unordered) pairs, the blocks of the same type must be distinguished. One way to explain this is the following: if we colour one of the blocks 123 red, the probabilities must remain the same, but in this case the two blocks can be clearly distinguished. In the following, we distinguish the blocks of the same type by using the notations 123a, 123b, 132a and 132b.

For the first question, the favourable outcomes are (112, 122) and (122, 112), hence the probability is $\frac{2}{72} = \frac{1}{36} \approx 0.0278$.

For the second question, the favourable outcomes are (113, 133), (133, 113), (123a, 123b), (123b, 123a), (132a, 132b) and (132b, 132a), hence the probability is $\frac{6}{72} = \frac{1}{12} \approx 0.0833$.

The questions can be answered also by considering unordered pairs. In that solution, the probabilities are the same, but the total outcome is 36, and the numbers of the favourable outcomes are 1 and 3, respectively.

PRIOR KNOWLEDGE

The traditional model of probability

RECOMMENDATIONS / COMMENTS

Exercise [602 - Pairing 9pcs](#) is recommended before this exercise to find the possible pairs of blocks that can be combined into a regular prism of height 4.