



# MATHS

## BOOKS - PSEB

### MATHEMATICAL MODELLING

#### Exercise

1. Consider the following situation. A problem, dating back to the early 13th century, posed by Leonardo Fibonacci asks how many rabbits

you would have if you started with just two and let them reproduce. Assume that a pair of rabbits produces a pair of offspring each month and that each pair of rabbits produces their first offspring at the age of 2 months. Month by month the number of pairs of rabbits is given by the sum of the rabbits in the two preceding months, except for the 0th and the 1st months.

Month	Pairs of Rabbits
0	1
1	1
2	2
3	3
4	5
5	8
6	13
7	21
8	34
9	55
10	89
11	144
12	233
13	377
14	610
15	987
16	1597

After just 16 months, you have nearly 1600 pairs of rabbits !



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2. In each of the problems below, show the different stages of mathematical modelling for solving the problems. An ornithologist wants to estimate the number of parrots in a large field. She uses a net to catch some, and catches 32 parrots, which she ringed and sets free. The following week she manages to net 40 parrots, of which 8 are ringed. : What fraction of her second catch is ringed ?



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3. In the problem below, show the different stages of mathematical modelling for solving the problem:- A T.V. can be purchased for ₹24000 cash or for ₹8000 cashdown payment and six monthly instalments of ₹2800 each. Ali goes to market to buy a T.V., and he has ₹8000 with him. He has now two options. One is to buy TV under instalment scheme or to make cash payment by taking loan from some financial society. The society charges simple interest at the rate of 18% per annum simple interest. Which option is better for Ali?



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## Example

1. (Rolling of a pair of dice) : Suppose your teacher challenges you to the following guessing game: She would throw a pair of dice. Before that you need to guess the sum of the numbers that show up on the dice. For every correct answer, you get two points and for every wrong guess you lose two points. What numbers would be the best guess?



2. Juhi wants to buy a bicycle. She goes to the market and finds that the bicycle she likes is available for ₹1800. Juhi has ₹ 600 with her. So, she tells the shopkeeper that she would not be able to buy it. The shopkeeper, after a bit of calculation, makes the following offer. He tells Juhi that she could take the bicycle by making a payment of ₹600 cash down and the remaining money could be made in two monthly instalments of ₹610 each. Juhi has two

options one is to go for instalment scheme or to make cash payment by taking loan from a bank which is available at the rate of 10% per annum simple interest. Which option is more economical to her?



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