# Unit 3 · Growth and Depreciation

HARDER WORKSHEET

Full marks 24

Name _____ Class _____ Roll no. _____ Date _____ Marks _____ / 24

## 1 Find the unknown [3]

Solve the following problem. Show your working.

A town's population grows at a fixed yearly rate. After 2 years it is 12,100 and after 4 years 14,641. Find the rate and the population at the start.

**Answer:** _____

## 2 When does it overtake? [3]

Answer the following question. Show your working.

Town A has 50,000 people and grows by 4% a year. Town B has 60,000 people and its population stays the same. After how many whole years will Town A first have more people than Town B?

**Answer:** _____

## 3 Is the claim true? [3]

Answer the following question. Give a reason.

A dealer says: "This machine loses 10% of its value every year, so in 5 years it will be worth half." Is he right? After how many whole years is it first worth less than half?

## 4 Spot the error [3]

Find the mistake in the working and correct it.

A village had 20,000 people. It grows by 5% a year, and 2,000 people moved in at the end of the first year. Mina found the population after 2 years as $(20000 + 2000) \times 1.05^2 = 24255$.

## 5 Show it [3]

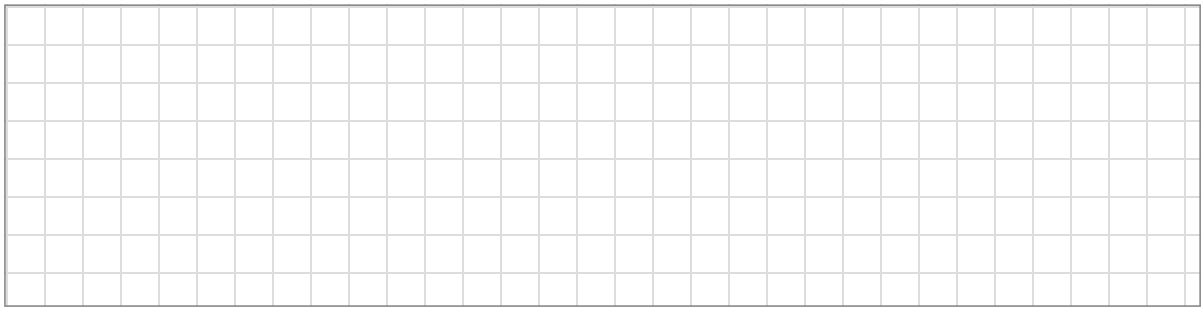
Answer the following question.

A price $P$ rises by $R$% one year and falls by $R$% the next. Show that it ends at $P(1 - R^2/10000)$, so it is always lower than at the start. How much lower is a Rs 1,000 price after 30% up and 30% down?

## 6 Work backwards [3]

Solve the following problem. Show your working.

A village grows by 5% a year. At the end of the first year 1,000 people moved away. At the end of the second year its population is 25,410. What was it at the start?

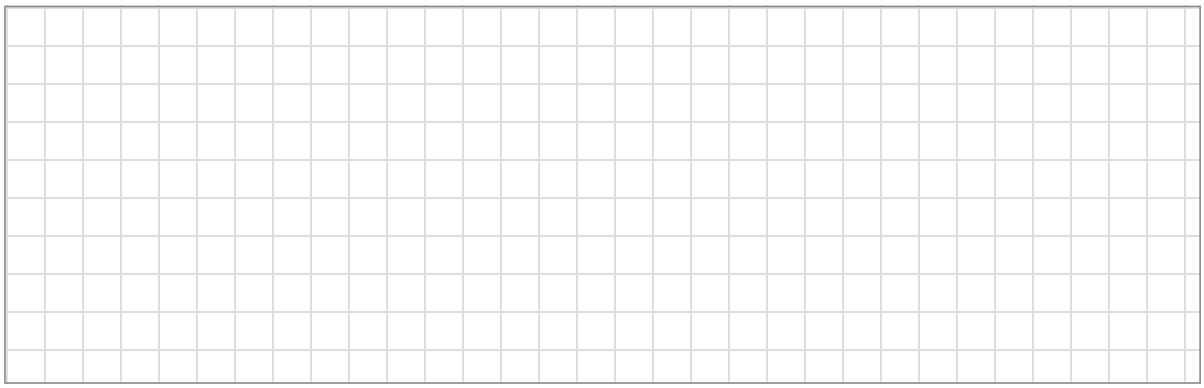


**Answer:** _____

## 7 In a real setting [4]

Solve the following problem. Show your working.

Nepal Rastra Bank reports that consumer prices rose by 7.74% in 2022/23 and 5.44% in 2023/24. A worker earned Rs 20,000 a month at the start of 2022/23, and her pay rose by 5% in each of those two years. At the end, could her pay buy more or less than at the start? By about what percentage?



**Answer:** _____

## 8 Make your own [2]

Answer the following question.

Choose a population and a yearly growth rate (a whole number) so that the population grows by exactly 2,100 people in 2 years. Show that your numbers fit.