

MATHEMATICS TOPICAL QUESTIONS

FRACTIONS

WORKED OUT EXAMPLES

Example 1:

What is the value of

$$\frac{3}{5} + \frac{1}{3} \text{ of } \left(\frac{1}{3} - \frac{1}{4} \right) \div \frac{5}{6} \times 1\frac{1}{5}$$

Apply **B O D M A S**

Solve bracket first $\frac{3}{5} + \frac{1}{3}$ of $\frac{1}{12} \div \frac{5}{6} \times 1\frac{1}{5}$

Followed by $\frac{3}{5} + \frac{1}{36} \div \frac{5}{6} \times 1\frac{1}{5}$

Then division $\frac{3}{5} + \left(\frac{1}{36} \times \frac{6}{5} \right) \times 1\frac{1}{5}$

Finally add $\frac{3}{5} + \frac{1}{25} = \frac{15+1}{25} = \frac{16}{25}$

Example 2:

Obiero uses $\frac{1}{5}$ of his shamba to grow maize and $\frac{3}{4}$ on wheat. He is left with 1 hectare. What is the size of his shamba?

Maize growing $\frac{1}{5}$

Wheat growing $\frac{3}{4}$

Land remaining = 1 hectare

Both maize and wheat = $\frac{1}{5} + \frac{3}{4} = \frac{4+15}{20} = \frac{19}{20}$

Fraction representing remaining land =

$$\frac{20}{20} - \frac{19}{20} = \frac{1}{20}$$

But $\frac{1}{20} = 1 \text{ hectare}$

$$\frac{20}{20} = ? \times \frac{20}{1}$$

= 20 hectares

QUESTIONS ON THE TOPIC

- The fraction $\frac{5}{13}, \frac{2}{5}, \frac{7}{18}$ and $\frac{11}{25}$ are arranged from the smallest to the largest. Write the correct order.
- Kamanda planted a quarter of his shamba with wheat, a third with maize and a half of the remainder with bananas. The rest he planted fodder. What fraction of the shamba was planted with fodder?
- In a certain school $\frac{4}{7}$ of the pupils are girls. One day when $\frac{1}{16}$ of the girls were absent, 180 girls were present. How many boys are there in the school?
- The fraction $\frac{5}{8}, \frac{2}{3}, \frac{19}{30}$ and $\frac{3}{5}$ are to be arranged from the largest to the smallest. Which is the correct order.
- In a hospital, a third of the patients have Malaria. Two fifths of the remainder have Pneumonia. How many patients are in that hospital if there are 100 patients in total?

- Karanja spent $\frac{7}{15}$ of his salary on food and $\frac{2}{3}$ of the remainder on school fees. He was left with sh. 3, 600. What was his salary?
- At a fundraising function there were 12096 people. Of these $\frac{3}{8}$ were men, $\frac{1}{6}$ were women and the rest were children. How many more adults than children were there in that function?
- What is the value of $\frac{2}{3}$ of $\left(\frac{1}{3} - \frac{1}{5} \right) \div \frac{2}{9}$?
- One day $\frac{1}{4}$ of the boys in a class were absent. A total of 12 pupils were absent that day. If 27 boys were present, how many girls were absent?
- What is the value of $\frac{1}{6} + \frac{3}{8}$ of $\frac{1}{3} \div \left(\frac{5}{8} - \frac{1}{4} \right) \times \frac{3}{4}$?
- What is the value of: $\frac{1\frac{1}{2} - \frac{1}{4} \times 1\frac{1}{3}}{1\frac{1}{3} + \frac{1}{6} \div \frac{1}{2}}$?
- A tank holds 1900 litres when it is $\frac{1}{3}$ full. How many more litres can it hold?
- A tank is $\frac{4}{9}$ full. When 2,100 litres of water are added, it becomes $\frac{7}{9}$ full. How many litres can the tank hold?
- Two taps can fill a tank in 8 hours. One of the taps can fill the tank in 12 hours. How long would the other tap take to fill the tank on its own?
- What is the value of $\frac{1}{8} \div \frac{1}{4} + 2 \left(1\frac{1}{2} + 1\frac{1}{4} \right) \div 3$?

MODE, MEAN AND MEDIAN

WORKED OUT EXAMPLES

Example 1:

The weights of 8 girls in a class are 48kg, 51kg, 55kg, 46kg, 57kg, 60kg, 42kg and 57kg. What is the mean weight of the girls?

$$\text{Mean} = \frac{\text{Total weight of girls}}{\text{No. of girls}}$$

$$= \frac{416}{8} = 52\text{kg}$$

Example 2:

The ages, in years of 7 pupils in a group are 15, 14, 13, 17, 16, 14 and 18. What is the median age of the pupil?

Median - is the number in the middle after arranging in ascending or descending order.

Arrange in ascending order 13, 14, 14, 15, 16, 17, 18

15 is the median.

Example 3:

The mean of seven numbers is 5. Six of the numbers are 6, 5, 6, 4, 5 and 4. What is the

First find the seventh number. Total of six given numbers

$$= 6 + 5 + 6 + 4 + 5 + 4 = 30$$

Number	mean	Total
7	x 5	= 35
6		= 30
1		= 5

Get the 7th number by subtracting the total of six from the total of seven.

The numbers are 6, 5, 6, 4, 5, 4 and 5

Mode - is the number that is most frequent. 5 occurs thrice.

5 is the mode.

QUESTIONS ON THE TOPIC

- Ten pupils obtained the marks recorded below: 34, 56, 49, 35, 21, 21, 35, 42, 49, 56. What was the median score?
- The mean of 8 numbers is $9\frac{5}{8}$. seven of these numbers are 9, 8, 11, 7, 10, 11, 7. What is the median of the eight numbers?
- The mean weight of 10 pupils is 32kg. the total weight of 7 pupils is 203kg. If the remaining 3 pupils weigh the same, what is the weight of each of the three pupils?
- The mean weight of four boys is 49kg. when the teacher joins them, their average weight becomes 52kg. What is the weight of the teacher?
- The mean of ten numbers is 8.4. Nine of these numbers are 9, 8, 8, 7, 12, 8, 9, 7 and 6. What is the value of the tenth number?
- The mean of eight numbers is 6.75. Seven of the numbers are 11, 8, 9, 6, 4, 3 and 5. What was the mode of the numbers?
- The table below shows the number of bananas sold per day for the six days in a kiosk.

Days of the week	MON	TUE	WED	THU	FRI	SAT
No. of bananas sold	44	—	24	20	32	28

The mean number of bananas sold per day for the whole week was 32 bananas. What was the median of the number of bananas sold that week?

- Mkulima keeps dairy cows. He delivers an average of 25 litres in the mornings. He also delivers milk in the evening. During the month of April, he delivered a total of 1350 litres. What was the average amount of milk delivered every evening?
- The mean of six numbers is 85. Five of the numbers are 66, 78, 86, 96 and 98. What is the mode of the six numbers?
- The average attendance of a class for five days was 28. The average attendance for the first three days was 26. On the fourth day, only 32 attended class. How many pupils attended class on the fifth day?

- The mean of six numbers is 12. Five of the numbers are 13, 11, 14, 15 and 9. What was the median of the six numbers?
- The mean of six numbers is $7\frac{2}{3}$. Five of these numbers are 6, 9, 4, 10 and 8. What is the mode of the six numbers?
- The ages in years of 8 pupils in a class are: 13, 15, 14, 12, 13, 16, 11 and 9. What is the median age of the pupils?
- Amwamba earned an average of sh. 240 per day from Monday to Saturday. His total earnings for Monday, Tuesday, Wednesday and Thursday was sh. 1,020. What was his total earning for Friday and Saturday?
- Eight schools were represented at an athletics meeting. There was an average of 180 pupils from 5 schools and an average of 220 from the remaining schools. If 698 of all pupils were girls, how many boys were there?

DECIMAL AND DECIMAL PLACES

WORKED OUT EXAMPLES

Example 1:

What is the value of $\frac{23.84 - (7.92 + 3.8)}{1.2}$

Solve what is in the bracket first $\frac{23.84 - 11.72}{1.2}$

Solve numerator first = $\frac{12.12 \left(\frac{1212}{100} \times \frac{10}{12} \right)}{1.2} = \underline{10.1}$

Example 2:

What is the value of $\frac{2.1 \times 0.35}{8.4}$

Write as fractions and solve

$\frac{21}{10} \times \frac{35}{100} \times \frac{10}{100} = \frac{875}{10000} = 0.0875$

QUESTION ON THE TOPIC

- What is the value of: $\frac{1.92 \times 0.004}{1.28}$?
- What is the value of: $\frac{4 + 2.5 \times 1.5 - 1.3}{5}$?
- What is the value of $6.4 \div 12$ correct to 2 decimal places?
- What number multiplies 0.9468 to give 9468?
- What is the value of: $\frac{15.46 - 9.08}{1.1 \times 0.4}$?
- What is the value of digit 5 obtained after working out the division $13.464 \div 16$?
- What is the value of $8 \div 0.02 + 1.35 \times 0.4$?
- What is the value of: $\frac{0.4 \times 8.54}{5.6}$?
- What is the value of: $\frac{\sqrt{0.64} \times \sqrt{3.24}}{\sqrt{0.0144}}$?
- What is the value of 19.9986 to 2 decimal places?

- What is the value of 7.69×8.7 correct to 2 decimal places?
- What is the value of $15 - 3.24 \times 0.07$?
- Find the value of 0.4308×20.5 .

15. Simplify $\frac{(0.4)^2 \times 0.84}{0.028}$

RATIO

WORKED OUT EXAMPLES

Example 1:

In a group of 300 pupils the ratio of Boys to Girls was 2:3. What is the new ratio if 10 boys and 20 girls left the group of pupils?

Find the number of boys and girls at the beginning.

$$\begin{array}{l} \text{Boys} : \quad \text{Girls} \\ 2 : \quad 3 = 5 \end{array}$$

$$\text{Boys} = \frac{2}{5} \times 300 = 120 \text{ boys}$$

$$\text{Girls} = \frac{3}{5} \times 300 = 180 \text{ girls}$$

10 boys left thus $120 - 10 = 110$ boys

20 girls left thus $180 - 20 = 160$ girls

New ratio is Boys : Girls

$$110 : 160$$

Simplify by dividing both by 10

$$11 : 16$$

Example 2:

The ratio of the weights of two girls is 3:4. If the heavier girl weighs 56kg, what is the difference of the weights of the two girls?

The heavier girl is ratio 4 which represents 56kg.

$$\text{The multiplying factor is } \frac{56}{4} = 14$$

Therefore the difference in ratio form is $4 - 3 = 1$

Thus difference = $1 \times 14 = 14$ kg

Example 3:

What is $2\frac{1}{2}\%$ expressed as a ratio in its simplest form?

$$2\frac{1}{2}\% = \frac{5}{500}$$

in ratio form 5:200 Simplify by dividing by 5 on both sides. = 1:40

QUESTIONS ON THE TOPIC

- Write the ratio 4 : 5 as a decimal.
- The prices by 25%. In what ratio did the prices rise?
- Simplify the ratio $\frac{2}{5} : \frac{1}{3}$
- Reduce sh. 18,000 in the ratio 2 : 3
- The mass of a patient increased from 64kg to 80kg. In what ratio did the mass increase?
- The ratio of men to women in a meeting is 4:7 while that of women to children is 2:3. What is the ratio of men to women to

- The ratio of cows to goats to sheep in a farm was 3 : 5 : 4 respectively. There are 408 animals in the farm. How many cows and goats remained after selling 27 cows and 56 goats?
- The prices of cooking gas rose by 15%. In what ratio did the prices rise?
- A shopkeeper has 250kg of beans and 360kg of maize. He sold 80kg of beans and 180kg of maize. What was the ratio of maize to beans that remained unsold?
- In what ratio is a number increased if it is increased by $\frac{1}{4}$ of itself?
- In what ratio is a number decreased if it is decreased by $\frac{1}{5}$ of itself?
- In a posho mill there are 180 bags of cereals. The ratio of maize to wheat bags was 5:4. What is the new ratio of maize to wheat if 4 bags of maize and 8 bags of wheat are sold?
- Kirwa and Mochama shared some money such that Kirwa got $\frac{5}{13}$ of the money shared out. What was the ratio of Kirwa's share to that of Mochama?
- After increasing in the ratio 8:5 the quantity of rice in a bag became 160kg. How much rice was in the bag before the increase?
- In a farm the ratio of cows to goats to sheep was 3:5:4. The owner sold some animals and the new ratio of cows to goats to sheep became 4:7:5. If at the beginning he had 228 animals and he sold 36 animals, how many goats did he sell?

NUMBERS

Reading and writing numbers in symbols and words and squares and square- roots

WORKED OUT EXAMPLES

Example 1:

Write seven million, thirty four thousand, one hundred and three in figures.

Seven million	7,000,000
Thirty four thousand	34,000
One hundred and three	103
	<u>7,034,103</u>

Example 2:

Write 8,042,505 in words

8,000,000	-	Eight million
42,000	-	Forty two thousand
505	-	Five hundred and five

Thus, 8,042,505 written in words is eight million, forty two thousand, five hundred and five.

QUESTIONS ON THE TOPIC

- Write eighty million eighteen thousand and eighteen in figures.
- Write 2014 13 in words

- The area of a square piece of land is 1 hectare. What is the measure of one of its sides?
- A rectangular plot measuring 54m by 24m has the same area as a square plot. What is the measurement of the side of the square plot?
- What is the square root of 1764 using prime factors?
- What is the sum of the square and the square root of 64?
- What is the square root of 5.76?
- What is the value of $\sqrt{12\frac{1}{4}} - \sqrt{2\frac{7}{9}} + \sqrt{2\frac{1}{4}}$
- What is the square root of 0.0256?
- What is the value of thirteen million four hundred and forty eight thousand three hundred and three less seven hundred and eighty five thousand nine hundred and ninety seven in figures?
- Write two hundred thousand and two, thirteen thousandths in figures.
- What is the sum of the first eighteen odd numbers?
- What is the value of $\frac{9^2(10^2 - 4^2)}{6^2 \times 3^2}$?
- The perimeter of a square plot is 144 metres. What is the area of the plot?

L.C.M AND G.C.D

- What is the L.C.M. of 15, 24 and 36.
- What is the G.C.D of 48, 96 and 144?
- Three bells ring at intervals of 36 seconds, 40 seconds and 48 seconds respectively. After how many minutes will they ring together again?
- Divide the L.C.M of 18, 30 and 48 by their G.C.D.
- Find the largest number which is a factor of each of the numbers 60, 84 and 120.
- Find the smallest number which can be divided into exact groups of 25, 40 and 60.
- What is the price of the cheapest item in a shop which can be paid for exactly in either sh. 200 notes or sh. 500 notes?
- Two schools have totals of 400 and 360 pupils respectively. Both schools are split into classes each of which contains an equal number of pupils. What is the largest possible number of pupils per class?
- A rectangular plot measures 104 metres by 56 metres. If posts are to be placed all round at equal intervals, what would be the least number of posts needed?
- If 30, 45 and 54 are each divided by the same number, the remainder is 6. What is the greatest possible value of the divisor?
- Three bells ring at intervals of 5 minutes, 8 minutes and 12 minutes respectively. They ring together at 11.25 a.m. At what time will they ring together again?

- A rectangular block 80cm by 60cm by 40cm is cut up into an exact number of equal cubes. Find the least possible number of cubes.
- Either by striding 84cm or by striding 96cm, I take an exact number of steps to walk across a road. Find the least width of the road in metres.
- What is the smallest number that can be divided by 15, 18 and 24.
- By how much is the L.C.M of 36 and 60 more than their G.C.D?

NUMBERS (Total values and place values)

WORKED OUT EXAMPLES

Example 1:

What is the place value of digit 5 in the number 4 1 5 8 6 0 3?

NUMBER 4 1 5 8 6 0 3

The place value of digit 5 is ten thousands.

Example 2:

What is the total value of digit 8 in the number: 3814579

Solution	3000000	The total value of digit
	800000	8 is 800000
	10000	
	4000	
	500	
	70	
	9	

QUESTIONS ON THE TOPIC

- What is the place value of digit 6 in 476325?
- What is the place value of digit 5 obtained after dividing $321.64 \div 16$?
- Which digit is in the hundred thousand position in 8346215?
- What is the place value of digit 4 in 3698.254?
- What is the sum of the total values of digit 3 and 9 in 5134962?
- How many times is the value of digit 2 greater than the value of digit 8 in the number 923486?
- What is the total value of digit 9 in the answer 13.64×5.3 ?
- What is the sum of the total values of digit 3 and 7 in 6431.257?
- What is the place value of digit 7 obtained after working out the division $2.0456 \div 8$?
- What is the product of the total value of 5 and 2 in 7563.421?
- What is the place value of the digit 6 in the number 76123458?
- What is the place value of digit 1 in the

- What is the place value of digit 3 in the square of 59?
- What is the value of digit 7 in 867421?
- What is the difference of the total values of the digits in hundred thousands position and ten thousands position in the number 25674321?

ROUNDING OFF NUMBERS AND DIVISIBILITY TESTS

- What is 48962 rounded off to the nearest thousand?
- What is 8899465 rounded off to the nearest ten thousands?
- What is 568.7963 to the nearest tenth?
- What is 799998 to the nearest ten?
- What is 879.2568 to the nearest hundredth?
- Multiply 438 by 965 and then round off your answer to the nearest thousands.
- What is 1999.984 to the nearest tenth?
- Find the product of 15.86×0.8 and round off your answer to the nearest hundredth.
- A number which is divisible by 6 is also divisible by both _____ and _____.
- A number is divisible by 10 if the last digit is _____.
- A number is divisible by 5 if the last digit is either _____ or _____.
- A number is divisible by 3 if the sum of its digits is divisible by _____.
- A number is divisible by 9 if the sum of its digits is divisible by _____.
- A number is divisible by 4 if the last _____ digits are divisible by 4.
- A number is divisible by _____ if the sum of the digits in the odd places and sum of the digits in the even places are equal or differ by a multiple of _____.
- A number is divisible by 8 if the last _____ digits are divisible by 8.

NUMBER SEQUENCE

WORKED OUT EXAMPLES

Example 1:

What is the next number in the sequence below?

$$65, 48, 33, 20, \underline{\hspace{2cm}}$$

$$65 - 48 = 17$$

$$48 - 33 = 15 \quad \text{Note that to get the next}$$

$$33 - 20 = 13$$

difference, subtract 2 from the

$$20 - x = 11 \quad \text{previous difference.}$$

$$x = 20 - 11 \quad x = 9$$

Example 2:

What is the next number in the sequence below?

$$8, 13, 21, 32, \underline{\hspace{2cm}}$$

$$13 - 8 = 5$$

$$21 - 13 = 8 > +3$$

$$32 - 21 = 11 > +3$$

$$x - 32 = 14$$

$$x - 32 = 14$$

$$x = 14 + 32$$

$$x = \underline{46}$$

Example 3:

What is the next number in the sequence below?

$$2^{3/4}, 3^{1/2}, 4^{1/4}, 5, \underline{\hspace{2cm}}$$

Write the mixed fractions as improper fractions and find their L.C.M.

$$\frac{11}{4}, \frac{7}{2}, \frac{17}{4}, \frac{5}{1} = \frac{11}{4}, \frac{14}{2}, \frac{17}{4}, \frac{20}{4}$$

$$= \frac{23}{4} = 5\frac{3}{4}$$

QUESTIONS ON THE TOPIC

What is the next number in the following patterns?

- 1, 5, 11, 23, 47, _____.
- 4, 11, 20, 31, 44, _____.
- 5, 13, 24, 38, 55, _____.
- 7, 8, 15, 23, 38, _____.
- 3, 10, 18, 27, _____.
- 2, 4, 8, 16, 32, _____.
- 138, 103, 72, 45, _____.
- 106, 81, 59, 40, _____.
- $4\frac{1}{8}, 3\frac{1}{2}, 2\frac{7}{8}, 2\frac{1}{4}, \underline{\hspace{2cm}}$.
- 65, 34, 21, 13, 8, _____.
- 1.3, 3.9, 11.7, 35.1, _____.
- 73.2, 68.9, 64.6, 60.3, _____.
- 25, 225, 625, 1225, 2025, _____.
- 1, 2, 6, 15, 31, _____.
- What is the sum of the next two numbers in the pattern. 2, 4, 8, 16, 32, _____, _____.

ALGEBRA

WORKED OUT EXAMPLES

Example 1:

Given that $xy = \frac{55 \times 0.7}{14}$ and $x = 0.5$,

what is the the value of y?

$$xy = 55 \times \frac{7}{10} \times \frac{1}{14}$$

$$xy = 2.75 \text{ but } x = 0.5$$

$$0.5y = 2.75$$

$$y = \frac{2.75}{0.5}$$

$$y = 5.5$$

Example 2:

What is the value of n in the equation.

$$\frac{8n}{3} + \frac{n}{4} = 44$$

Find L.C.M of 3 and 4 = 12

$$32n = 44$$

$$12$$

$$n = \frac{44 \times 12}{35}$$

$$n = 15\frac{3}{35}$$

QUESTIONS ON THE TOPIC

1. What is the value of x in the equation:

$$\frac{2x}{5} + \frac{3x}{10} = 21?$$

2. What is the value of m in the equation:
 $7m - 5 = 2(m + 15)?$

3. What is the value of y in the equation:

$$\frac{y}{2} + \frac{y+5}{3} = 5?$$

4. What is the value of k in the equation:

$$\frac{k}{8} - \frac{k+4}{12} = 1?$$

5. What is the value of n in the equation:
 $(2n + 6) + \frac{1}{4}(36n - 8) = 15?$

6. What is the value of t in the equation:

$$\frac{3t+6}{5} + 9 = 18?$$

7. What is the value of x in the equation:

$$\frac{5}{4} + \frac{8(x-10)}{4} = 10?$$

8. What is the value of n in the equation:

$$n - \frac{n+1}{2} = 5?$$

9. Solve for x in the equation: $\frac{x}{3} + \frac{2+x}{2} = 4$

10. What is the value of p in the equation:

$$\frac{p-1}{2} + \frac{p+1}{3} = \frac{p+4}{4}?$$

11. What is the value of y in the equation:

$$\frac{1}{4} + \frac{2y-2}{2} = 4?$$

12. What is the value of t in $t - 6 = \frac{t+2}{5}?$

13. Solve the equation $\frac{4}{7}(x-8) = 36$

14. What is the value of x in $\frac{x+2}{2} + \frac{3x+8}{10} = 12?$

15. What is the value of d in the equation:

$$\frac{4d}{8} + \frac{3d}{9} = 10?$$

SUBSTITUTION (ALGEBRA)

WORKED OUT EXAMPLES

Example 1:

What is the value of $3y(8z - 3x)$

when $x = y + 3$,

$y = 2$ and $z = x - y$

Substitute to get values of x and z thus

$$x = y + 3$$

$$z = x - y$$

$$x = 2 + 3$$

$$z = 5 - 2$$

$$x = 5$$

$$z = 3$$

Now substitute those values in the equation.

$$6(24 - 15)$$

$$6 \times 9 = 54$$

Example 2:

What is the value of the expression

$$\frac{x^2(4p - p^2)}{3px}$$

$$3px$$

given that $x = 5$ and $P = 2$

Substitute those values.

$$\frac{25(8-4)}{30} = \frac{25 \times 4}{30} = 3\frac{1}{3}$$

QUESTIONS ON THE TOPIC

1. If $a = \frac{b-c}{2}$ where $b = 4$ and $c = 2$, what is

the value of $2ab^2 - \frac{1}{2}bc$?

2. If the value of $a = 3$, $b = 8$ and $c = 5$, what is the value of $\frac{2a^2 - 3(b-c)}{b-c}$?

3. If $x = 6$, $y = 1$ and $z = 3$;

Evaluate $x(2-2y) + (2z+y)$?

4. If $b = 2$, $r = 6$ and $w = 4$. Find the value of

$$\frac{r^2 + b^2}{r(r^2 - 2w^2)}?$$

5. What is the value of: $xy + yz + \left(2x - \frac{1}{2}z\right)$

when $x = 8$, $y = \frac{1}{2}$ and $z = 4$?

6. What is the value of: $\frac{2a-b+c}{b-c}$ when $a = 4$,

$b = c + 2$ and $c = a - 1$?

7. What is the value of $\frac{8a(4b^2 - c^2)}{2ac + abc}$ if $a = \frac{1}{2}$,

$b = 3$ and $c = 4$?

8. What is the value of $\frac{a^2c - bc^2 + c^2}{b^2 - a}$ if $a = 3$,

$b = 2$ and $c = 1$?

9. If $x = 4$, $y = z$ and $z = 2$. What is the value of $\frac{2xz + xy}{2z^2}$?

10. What is the value of $\frac{5(ac - ab) - c}{2(ab - 2b) - 1}$ when

$a = 5$, $b = c - 4$ and $c = a + 3$?

11. What is the value of $\frac{2r^2 - 2(m-t)}{m-t}$ if $m = 4$,

$t = 2$ and $r = 3$?

12. If $a = 4$, $b = \frac{1}{4}a$, and $c = a + b$, find the value of

$$\frac{a^2 + c^2 + b^2}{b+c}$$

13. If $a = 6$, $b = \frac{1}{3}a + 2$ and $c = b^2$ evaluate;

$$a^2 + 8b \div c - 2b.$$

14. What is the value of $\frac{3(p-q)+r}{2p-q}$ given that

15. What is the value of $\frac{2}{3}$ of $\frac{3(x^2 - y^2)}{xw + 4}$ if $x = y^2$, $y = w + 1$ and $x = 4$.

PERCENTAGE INCREASE AND DECREASE

WORKED OUT EXAMPLES

Example 1:

Entrance fee of a show was decreased by 10% and later increased by 15%. If the original fee was sh.200 what is the new fee?

Before decrease 100%

Decrease 10%

After decrease 90%

After 10% decrease, the fee became $\frac{90}{100} \times 200$

= Sh 180

Sh.180 became the new fee thus:

New fee sh180 = 100%

15% increase = 15%

After increase = 115%

New fee = $\frac{115}{100} \times 180 = \text{sh. } 207$

Example 2:

The marked price of a suit was sh.1500. During a sale the price was reduced to sh.1200. What was the percentage decrease?

Percentage decrease = $\frac{\text{decrease} \times 100}{\text{original price}}$

= $\frac{300 \times 100}{1500} = 20\%$

Example 3:

A farmer wanted to keep 384 chicken and 256 rabbits. He later decided to decrease the number of chicken by 25% and to increase the number of rabbits by 25%. How many animals did he keep altogether?

Decrease 384 chicken by 25%: $\frac{75}{100} \times 384 = 288$

chicken.

Increase 256 rabbits by 25%: $\frac{125}{100} \times 256 = 320$

rabbits.

Altogether he has $288 + 320 = 608$ animals.

QUESTIONS ON THE TOPIC

- The price of maize per bag increased from sh. 2,160 to sh. 2,700 per bag. What was the percentage increase?
- After an increase of 18%, Juma's salary became sh. 10,030. What was his salary before the increase?
- A school spent sh. 648,000 on food in the year 2009. The following year the school spent 10% less on food than the previous year. How much money did the school spend on food in 2010?

decrease in yield from 2007. How many bags of maize had they harvested in 2007?

- Mbugua weighed 80kg. After exercising his weight was reduced by 5%. A month later he lost a further 5%. What was his weight at the end of that month?
- The marked price of a laptop computer was sh. 23,200. After a price increase the marked price of the computer became sh. 26,100. What was the percentage increase?
- The number of people who voted during the referendum in a certain constituency dropped from 120,000 voters to 115,200 voters. What was the percentage decrease?
- The number of people infected with H.I.V and AIDS in a province decreased from 23,400 new cases to 19,500 after a vigorous campaign. What was the percentage decrease in infection?
- The marked price of a Kaunda suit was sh. 4,000. During a sale the price was reduced to sh. 3,200. What was the percentage decrease in price?
- The level of water in a dam increased by 15% each day. If the level of water was 6,000cm, what was the level after two days?
- The value of a car depreciated by 10%. A year later the value depreciated further by 15%. If the value of the car now is sh. 612,000, what was the value of the car at the beginning?
- The value of a plot was sh. 450,000 and a year later it was valued at sh. 697,500. What was the percentage increase in the value of the plot?
- If the price of a pair of shoes is increased by 25%. The increase in the price is sh. 450. What is the new price of the shoes?
- The length of a square plot was increased by 10% on each side. What was the percentage increase in its area?
- What amount when increased by 40% and then reduced by 25% becomes sh. 8,400.

PROFIT AND LOSS

WORKED OUT EXAMPLES

Example 1:

Sheila bought 450 eggs at 80 cents per egg and sold them at sh.1.00 each. What was her percentage profit?

Buying Price = 80 cents

Selling Price = sh.1.00 or 100 cents

sh.1 = 100 cents

Profit = Selling Price - Buying Price.
= 100 cents - 80 cents
= 20 cents.

Profit percentage = $\frac{\text{Profit}}{\text{Buying price}} \times 100$
= $\frac{20 \text{ cents}}{80 \text{ cents}} \times 100$
= 25%

Example 2:

A trader bought a jacket for sh.600. He then sold it for sh.720 after giving a discount of 10%. What percent profit would he have made if no discount was given?

Buying Price = sh.600

Selling price before discount 100%
discount 10%

Selling price after discount 90% = sh.720

Selling price before discount 100% = ?

$$= \frac{100 \times 720}{90}$$
$$= \text{sh.}800$$

Profit would have been $800 - 600 = \text{sh.}200$

Profit % = $\frac{P \times 100}{B.P}$

$$= \frac{200 \times 100}{600}$$
$$= 33\frac{1}{3}\%$$

QUESTIONS ON THE TOPIC

1. Kerubo bought 40 trays of eggs at sh. 200 per tray. She then sold each egg at sh. 8. If a tray holds 30 eggs, what percentage profit did she make?
2. Kiplenge bought a cow for sh. 33,600. He later sold it making a loss of 20%. For how much did he sell it?
3. A fruit vendor bought 240 pineapples at sh. 480 for every 8 pineapples. He sold them at sh. 64 each. How much profit did he make?
4. A shopkeeper bought 144 mangoes at sh. 5 each. 30 mangoes got spoilt during transportation. She sold the remaining at 6 mangoes for sh. 40. What profit did she make?
5. Kimani bought a car and later sold it for sh. 240,000 making a loss of 25%. At what price had he bought the car?
6. A fruit vendor spent sh. 850 to buy 84 bananas, 35 mangoes and 78 oranges. He paid sh. 150 for transport. During transportation, 6 bananas, 3 mangoes and 3 oranges got spoilt. He then sold the remaining fruits as follows:
3 bananas for sh. 15
4 mangoes for sh. 40
1 orange for sh. 5
What was his percentage profit?
7. Kibet sold a T.V for sh. 8,640 and made a loss of 10%. What was the cost price of the T.V?
8. There is a 15% loss when an item is sold at sh. 340. At what price should it be sold in order to make a profit of 10%?
9. When an item is sold at sh. 480 a profit of 20% is realized. How much more profit is realized if the percentage profit is 30%.
10. Mama mboga spent sh. 1450 to buy 150 onions, 150 mangoes and 150 tomatoes.

got spoilt. She then sold the remaining fruits and onions as follows:

1 onion for sh. 5

5 mangoes for sh. 20

3 tomatoes for sh. 10

What was her percentage gain or loss?

11. A trader bought a T.V set for sh. 8,000. He then sold it for sh. 9,200 after giving a discount of 8%. What percentage profit would he have made if no discount was given?
12. By selling an article for sh. 875, a trader incurred a loss of $12\frac{1}{2}\%$. For how much should he sell the article in order to get a profit of $12\frac{1}{2}\%$?
13. A bookshop buys books from a publisher at a price which is 30% less than the marked price. What profit does the bookshop make on a book marked sh. 840?
14. Njeri and Wambui sell mangoes. One day each of them bought 300 mangoes at the same price. Njeri sold her's at four mangoes for sh. 14. Wambui sold her's at six mangoes for sh. 15. If Njeri made a profit of sh. 150, what loss did Wambui make?
15. Anarita bought a second hand hairdryer for sh. 40,000. She used sh. 12,000 to repair the hairdryer. She later sold the hairdryer at sh. 54,600. What was the percentage profit?

SIMPLE INTEREST

WORKED OUT EXAMPLES

Example 1:

Njuguna deposited sh.1,200 in a bank. At the end of 9 months he withdrew all his money from the bank. The total amount withdrawn was sh.1,350. What interest per cent per annum did this bank pay?

Principal sh.1,200
Time 9 months or $\frac{3}{4}$ year
Amount sh.1,350
SI = P - A
= 1,350 - 1,200
= sh. 150

$$\text{Rate} = \frac{\text{Simple Interest} \times 100}{\text{principal} \times \text{time}}$$
$$= \frac{150 \times 100 \times 4}{1200 \times 3}$$
$$= 16\frac{2}{3}\%$$

Example 2:

Wambui deposited sh.4,200 in a bank which gave interest at the rate 10% per annum. How much money altogether did he have at the end of 8 months?

$$\text{Simple interest} = \frac{P \times r \times t}{100}$$
$$= 4,200 \times \frac{10}{100} \times \frac{8}{12} = \text{sh.}280$$

$$\begin{aligned}\text{Amount} &= \text{Principal} + \text{simple interest} \\ &= 4,200 + 280 \\ &= \text{sh. } 4,480\end{aligned}$$

QUESTIONS ON THE TOPIC

- Karimi invested a certain amount of money in a business that paid simple interest at the rate of 15% per annum. At the end of nine months he withdrew sh. 1,125 which was the money had earned. How much money had he invested?
- Koome borrowed sh. 15,000 from a bank at a simple interest rate of 12% per annum. How much did he pay back altogether at the end of 3 years?
- Imelda deposited sh. 12,000 in a bank that paid simple interest at the rate of 15% per annum for a period of 1½ years and then withdraw all her money. How much did she withdraw?
- What is the simple interest on sh. 8,400 for 3 months if interest is given at the rate of 5% per year?
- Mutuku deposited a certain amount of money in a bank that paid simple interest at the rate of 12% per annum. At the end of ten months he withdrew sh. 1,000 which was simple interest the money had earned. How much money had he deposited?
- How many years will sh. 4,800 take to earn sh. 1,176 at 7% per annum simple interest?
- What sum of money would yield sh. 2,400 at the rate of 15% p.a on simple interest for a period of 4 years?
- Omwega deposited sh. 18,000 in a bank that paid simple interest at a certain rate per annum. At the end of 8 months he withdrew sh. 1,240 which was the interest remaining after the bank deducted sh. 200 commission. At what rate per annum did the bank pay the interest?
- Amisi lent Mogusu sh. 14,500 to start a business. After 4 months, Mogusu gave Amisi sh. 14,935 as a refund of the money he had borrowed plus the interest earned. At what rate in percentage per annum did Amisi's money earn interest?
- Murungi took a loan of sh. 60,000. After 36 months he paid sh. 74,400. If this amount included simple interest, at what rate per annum was the interest charged?
- Ruto borrowed sh. 54,000 from a bank at a simple interest rate of 8½% per month. How much did he pay back altogether at the end of one year?
- Suleiman deposited a certain amount of money in a financial institution that paid interest at the rate of 5% per annum. At the end of 2 years 7 months he withdrew sh. 6,200 which was interest the money had

- Baraza deposited sh. 64,000 in a bank that paid simple interest at a certain rate per annum. At the end of 2 years 3 months, he withdrew sh. 15,340 which was interest remaining after the bank had deducted sh. 500 commission. At what rate per annum did the bank pay the interest?
- Lumumba took a loan of sh. 76,000. After 18 months he paid sh. 82,840. If this amount included simple interest, at what rate per annum was the interest charged?
- A certain amount of money was deposited in the bank. The money earned interest at the rate of 5% per annum. If the amount at the end of one year was sh. 15,750, what was the principal?

DISCOUNTS

WORKED OUT EXAMPLES

Example 1:

A man paid sh.425 for an article after getting a 15% discount. What was the original price of the article?

$$\begin{aligned}\text{Original price} &= 100\% \\ \text{Discount} &= 15\% \\ \text{After discount} &= 85\% \\ \text{After discount } 85\% &= \text{sh. } 425 \\ \text{Original price } 100\% &= ? \\ \frac{100 \times 425}{85} &= \text{sh. } 500\end{aligned}$$

Example 2:

Mbugua bought goods worth sh.480. He gave the shopkeeper a sh. 500 note and was given a balance of sh. 50. What percentage discount was he allowed for the goods bought?

$$\begin{aligned}\text{Marked price} &= \text{sh. } 480 \\ \text{Buying price} &= 500 - 50 = \text{sh. } 450 \\ \text{Discount} &= \text{marked price} - \text{buying price} \\ &= \text{sh. } 480 - \text{sh. } 450 \\ &= \text{sh. } 30 \\ \text{Discount \%} &= \frac{\text{discount}}{\text{marked price}} \times 100 \\ &= \frac{\text{sh. } 30}{\text{sh. } 480} \times 100 \\ &= 6\frac{1}{4}\%\end{aligned}$$

QUESTIONS ON THE TOPIC

- The marked price of a suit is sh. 2,000. What is the percentage discount allowed if Mundia buys it at sh. 1,600?
- The marked price of an article was sh. 1,050. Momanyi paid sh. 910 for the article after being given a discount. What percentage discount did he get?
- Mbugua paid sh. 1,600 for an article, after getting a discount of 20% what would have been the percentage discount if Mbugua had paid sh. 1,500 for the article?
- Nyakundi paid sh. 2,000 for an item after

5. The marked price of a shirt was sh. 800. Jumba paid sh. 650 for the shirt after being given a discount. What percentage discount did he get?
6. The price of a pair of shoes was reduced by sh. 420. This represented a 15% discount. What was the price of the shoes after the discount?
7. Kimaru paid sh. 8,170 for a mobile phone after getting a discount of 5%. How much less would he have paid had he been given a discount of 8%?
8. A hawker bought a jembe for sh. 450. He then sold it for sh. 540 after giving a discount of 10%. What percentage profit would he have made if no discount was given?
9. Chemos bought goods worth sh. 780 from a shop. He gave the shopkeeper a sh. 1,000 note and was given a balance of sh. 313.60. What percentage discount was he allowed for the goods bought?
10. During a sale, a shopkeeper gave a discount of $12\frac{1}{2}\%$ for any item in the shop. Wamalwa got a discount of sh. 150 for lantern lamp. What was the price of the lamp before the discount?
11. The marked price of an article was sh. 960. Farida bought the article after she was given a 20% discount. What balance did she get from a thousand shillings note?
12. The price of a Coat was reduced by sh. 144. This represented 8% discount. What was the price of the coat after the discount?
13. Kitui was allowed 10% cash discount on a radio. If the discount allowed was sh. 1,500, how much did he pay for the radio?
14. Mugo paid sh. 25,900 for a computer after getting a discount of $7\frac{1}{2}\%$. How much more would he have paid had he been given a discount of 4%?
15. The price of a Camera was reduced by sh. 1,020. This represented 15% discount. What was the price of the Camera after the discount?

COMPOUND INTEREST

WORKED OUT EXAMPLES

Example 1:

Omonge took a loan of sh.15,000 at a compound interest of 12% per annum. How much money altogether did Omonge pay back after 2 years?

$$1\text{st year's interest} = 15000 \times \frac{12}{100} \times 1 = \text{Sh.}1,800$$

New principal = previous principal + interest 1st year

$$2\text{nd year's principal} = 15,000 + 1,800 = 16,800$$

$$2\text{nd year's interest} = 16,800 \times \frac{12}{100} \times 1 = \text{sh.}2,016$$

$$\text{Amount after 2 years} = \text{sh.}16,800 + 2,016 = \text{sh.}18,816$$

Example 2:

Tom kept sh.3,000 in a bank that pays compound interest at the rate of 10% per annum for $1\frac{1}{2}$ years. What was the total interest charged during that period?

$$1\text{st year's interest} = 3,000 \times \frac{10}{100} \times 1 = \text{sh.}300$$

$$\text{New principal} = \text{Amount} = 3,000 + 300 = \text{sh.}3,300$$

$$\frac{1}{2}\text{ year's interest} = 3,300 \times \frac{10}{100} \times \frac{1}{2} = \text{sh.}165$$

$$\begin{aligned} \text{Total interest} &= \text{Interest 1st year} + \text{Interest } \frac{1}{2} \text{ year} \\ &= 300 + 165 \\ &= \text{sh.}465 \end{aligned}$$

QUESTIONS ON THE TOPIC

1. Mwanzala deposited sh. 24,000 in a bank that paid compound interest at the rate of 12% p.a. How much money was in his account at the end of two years?
2. Amina was given a loan of sh. 60,000. She repaid the loan after two years with compound interest at the rate of 14% p.a. How much money did she pay altogether?
3. Maitha borrowed sh. 30,000 for a period of two years. He was charged compound interest at the rate of 15% per year. How much interest did he pay altogether?
4. A money lender charges compound interest at the rate of 18% per month. He lent out sh. 15,000 and was repaid all the money plus interest after two months. How much money did he get altogether?
5. Omingo deposited sh. 25,000 in a bank which paid compound interest at the rate of 14% per annum. If Omingo withdrew all his money at the end of $1\frac{1}{2}$ years, how much money did he withdraw?
6. A businessman deposited sh. 44,000 in a bank which paid compound interest at the rate of 15% per annum. At the end of one year, he withdrew sh. 12,600. What was the amount he had in the bank at the end of the second year?
7. Faith was given a loan of sh. 64,000. She repaid the loan after $1\frac{1}{2}$ years with compound interest at the rate of 25% p.a. How much money did she pay altogether?
8. Kigen agreed to loan Mwanisha sh. 32,000 at a compound interest rate of 15% per annum. How much interest altogether did Mwanisha pay Kigen after $1\frac{1}{2}$ years?
9. Odhiambo agreed to loan Akinyi sh. 20,000 at a compound interest of 12% per annum. How much money altogether did Akinyi pay Odhiambo after two years?
10. Mwikali deposited sh. 15,000 in a bank that paid compound interest at the rate of 22% per annum for a period of $1\frac{1}{2}$ years and then withdrew all her money. How much did she

11. Gakii deposited sh. 70,000 in a bank that paid compound interest at the rate of 12% p.a. If she withdrew sh. 38,400 at the end of the first year, how much money did she have in the bank at the end of 1½ years?
12. Maina borrowed sh. 16,000 for a period of two months. He was charged compound interest at the rate of 25% per month. How much interest did he pay altogether?
13. Larrison deposited sh. 25,000 in a bank that paid compound interest at the rate of 16% p.a. How much money was in her account at the end of 9 months?
14. Amos deposited sh. 18,000 in a bank which paid compound interest at the rate of 15% per annum. At the end of one year, he deposited another sh. 10,500. What was the amount he had in the bank at the end of the second year?
15. Wanjiku borrowed sh. 45,000 for a period of two years. She was charged compound interest at the rate of 12% per year. How much interest did she pay altogether?

HIRE PURCHASE

WORKED EXAMPLES

Example 1:

Kamau bought a bed on hire purchase terms. He paid a deposit of sh.350 and five equal monthly instalments of sh. 120. Njoroge paid sh. 750 cash for a similar bed. Find the difference in the amounts of money they paid.

Kamau

$$\begin{aligned} \text{- Hire purchase} &= \text{deposit} + \text{total monthly} \\ &\text{instalments.} \\ &= \text{sh.350} + (5 \times \text{sh.120}) \\ &= \text{sh.950} \end{aligned}$$

$$\text{Njoroge - Cash} = \text{sh.750}$$

$$\text{Difference} = \text{sh.950} - \text{sh.750} = \text{sh. 200}$$

Example 2:

The cash price of a radio is sh.6,000. Wairimu bought it on hire purchase terms. The total amount she paid was 30% more than the cash price. She paid a deposit of sh.1,200 and remainder in 15 equal monthly instalments. How much did she pay per instalment?

$$\begin{aligned} \text{Cash price} &= \text{sh.6,000} \\ \text{Hire purchase} &= \frac{130}{100} \times 6,000 = \text{sh.7,800} \end{aligned}$$

$$\begin{aligned} \text{Total monthly instalments} &= \text{Hire purchase} - \text{deposit} \\ &= \text{sh.7,800} - 1,200 \\ &= \text{sh.6,600} \end{aligned}$$

$$\begin{aligned} \text{1 monthly instalment} &= \frac{\text{Total monthly instalments}}{\text{No. of months}} \\ &= \frac{6,600}{15} \end{aligned}$$

QUESTIONS ON THE TOPIC

1. The market price of T.V Cabinet is sh. 25,000. Dzoro bought the cabinet on hire purchase terms. The hire purchase price was 20% more than the marked price. He paid a deposit of sh. 12,000 and 10 equal monthly instalments. What was each monthly instalment?
2. The cash price of a machine was sh. 57,740. Anoli bought it on hire purchase terms. The amount he paid was 15% more than the cash price. He paid a deposit plus 12 monthly instalments of sh. 4,200 each. How much deposit did he pay?
3. The cash price of a car is 1.4 million shillings. Bosibori bought it on hire purchase terms. The total amount she paid was 18% more than the cash price. She paid a deposit of sh. 175,000 and the remainder in 20 equal monthly instalments. How much was each instalment?
4. Ndambuki bought a T.V set on hire purchase terms. He paid a deposit of sh. 4,200. The remaining amount was paid in 7 equal monthly instalments. He paid a total of sh. 13,020. How much was each monthly instalment?
5. The hire purchase terms of a cupboard is a deposit of sh. 5,280 and 6 monthly instalments of sh. 1,080. The hire purchase price was 120% of the cost price while the cash price is 8% more than the cost price. What is the cost price of the cupboard?
6. The hire purchase price for a generator is made up of sh. 12,000 deposit and 18 equal monthly instalments of sh. 3,600 each. Oduol was given a discount of 20% on the hire purchase price on paying cash for the generator. How much did he pay?
7. The cash price of a video camera is sh. 23,400. The hire purchase price is 20% more than the cash price. Rita bought it on hire purchase terms. She paid a deposit of sh. 5,616 and 12 equal monthly instalments. How much was each monthly instalment?
8. The hire purchase price of a video machine was 120% of the cash price. Agwambo bought the video machine on hire purchase terms by paying a deposit of sh. 3,600 plus 9 monthly instalments of sh. 1,200 each. What was the cash price of the video machine?
9. The hire purchase price for a play station is 30% more than the cash price. Karisa bought the play station on hire purchase terms by paying a deposit of sh. 10,190 and the remaining in eight equal monthly instalments. If the cash price was sh. 21,500 how much was each monthly instalment?

total amount he paid was 30% more than the cash price. He paid a deposit of sh. 11,960 and the remainder in 16 equal monthly instalments. How much was each instalment?

11. The hire purchase price of a sofa set is 30% more than the cash price. The cash price is sh. 45,000. Abdi paid sh. 1,625 as a monthly instalment for 2 years. How much had he paid as deposit?
12. The cash price of a T.V set is sh. 21,870. The hire purchase price is 30% more than the cash price. Njenga bought the T.V on hire purchase terms. He paid a deposit of sh. 8,181 and 9 equal monthly instalments. How much was each monthly instalment?
13. The marked price of a solar panel is sh. 18,000 and the hire purchase is thirty percent more than the marked price. If Cherop paid 9 monthly instalments of sh. 1,800 each. How much deposit did she pay?
14. Wanjala bought a T.V set on hire purchase terms. He paid a deposit of sh. 2,800 and 15 equal monthly instalments of sh. 600. If the cash price of this T.V was three quarters of the hire purchase price, what was the cash price?
15. The hire purchase price of a machine is 35% more than the cash price. The cash price is sh. 28,000. Omedo paid sh. 4,000 as a monthly instalment for 6 months. How much had he paid as deposit?

COMMISSION

WORKED EXAMPLES ON THE TOPIC

Example 1:

In one month an agent sold 3 plots at sh.50,000. He charged a commission of 3% for the sale of plots. How much money did he get?

$$3 \text{ plots at sh.50,000} = 3 \times 50,000$$

$$\begin{aligned} \text{Value of sale} &= 3 \text{ plots} \times 50,000 \\ &= \text{sh.150,000} \end{aligned}$$

$$\begin{aligned} \text{Commission got} &= \frac{3 \times 150,000}{100} \\ &= \text{sh.4,500} \end{aligned}$$

Example 2:

Kagwi a salesman earns a salary of 4,800 plus a 8% commission on sales above sh.20,000. In one month he sold goods worth sh.50,000. How much money did he receive that month?

$$\text{Sales above sh.20,000 is } (50,000 - 20,000)$$

$$\text{Sales above sh.20,000 are sh.30,000}$$

$$\text{Commission} = \frac{8}{100} \times 30,000 = \text{sh.2,400}$$

$$\begin{aligned} \text{Total earnings} &= \text{Commission} + \text{Basic salary} \\ &= \text{sh.2,400} + \text{sh.4,800} \end{aligned}$$

QUESTIONS ON THE TOPIC

1. A salesman earns a salary of sh. 2,000 per month. He is also paid a commission of 2% of the value of goods he sold above sh. 10,000. In one month he sold items worth sh. 38,500. How much money did he earn that month?
2. A salesman earns a salary of sh. 6,800 plus a 12% commission on sales above sh. 15,000. In one month the salesman sold goods worth sh. 45,000. How much money did the salesman receive that month?
3. In one month an agent sold 3 houses at sh. 750,000. He charged a 5% commission for the sale of houses. What commission did he get?
4. A salesman was paid a monthly salary of sh. 8,500. He was also paid a commission of 5% for all the goods sold above sh. 15,000. In one month he earned a total of sh. 9,250. What was the value of goods sold that month?
5. A salesgirl earns a salary of sh. 8,400 plus a 7% commission on sales above sh. 40,000. In one month she earned a total of sh. 10,500. What was the value of goods she sold?
6. A salesman was paid a monthly salary of sh. 12,000. He was also paid a commission of 15% for all the goods he sells above sh. 50,000. In one month he earned a total of sh. 18,000. What was the value of goods sold that month?
7. A salesgirl earns a salary of sh. 5,500 per month. She is also paid commission of 5½% of the value of goods sold above sh. 50,000. In one month she received a total of sh. 8,250. What was the value of goods sold?
8. A salesman earns a salary of sh. 3,700 plus 15% commission on sales above sh. 10,000. In one month he sold goods worth sh. 40,000. How much money did he receive that month?
9. In one month an agent sold 6 houses at sh. 400,000 each. He charged a 3½% commission for the sale of houses and paid 20% of the commission to his workers. How much money did he remain with?
10. A saleslady earns a basic salary of sh. 6,000. For any sales above sh. 40,000, she is paid a commission. In one month she sold items worth sh. 65,000 and earned a total of sh. 6,750. What was her percentage commission?
11. A salesman earns a basic salary of sh. 12,000 per month plus 4% commission for the sale of goods he sells above sh. 80,000. In one month, he sold goods worth sh. 120,000. How much did he earn that month altogether?
12. Seruni earns a basic salary of sh. 15,000

also paid a 0.75% commission for any sales above sh. 90,000. In one month he sold 72,400 packets of biscuits at sh. 60 per packet. What was his total earning that month?

13. A salesman is paid a salary of sh. 12,500 per month plus a commission of $3\frac{1}{4}\%$ on sale of goods above sh. 60,000. In one month he was paid a total of sh. 14,125. How much was the sale of goods?
14. A house was sold for sh. 6,350,000 through an agent. The owner of the house received sh. 6,064,250. What percentage commission did the agent get?
15. A saleslady earns a basic salary of sh. 10,000. For any sales above sh. 50,000, she is also paid a commission. In one month she sold items worth sh. 200,000 and earned a total of sh. 14,500. What was her percentage commission?

PROPORTIONS

WORKED OUT EXAMPLES

Example 1:

12 workers can offload a lorry in 9 hours. How many more worker are required so as to do the job in 6 hours?

More workers will take less time, thus inverse proportion.

Workers	Hours
12	9
?	6
	$\frac{12 \times 9}{6} = 18 \text{ workers}$
	6
	18 - 12 = 6 more workers

Example 2:

Karimi earns sh.3,750 after working for 15 days. How much money would he received if he works for 23 days?

The more days he works, the more he earns, thus direct proportion.

Earnings	Days
sh.3,750	15
?	23

with direct proportion, you cross-multiply
 $\frac{3,750 \times 23}{15} = \text{sh.5,750}$

QUESTIONS ON THE TOPIC

1. Seven men can dig a trench in 16 days. If the trench is required to be done in four days, how many more men are needed to do the work?
2. Komu earns sh. 5,400 after working for 24 days. How much money should he receive if he is absent for 6 days?
3. Twenty people working at the same rate would complete some work in 12 days. How

many days would fifteen people need to complete the same work?

4. Odhiambo has enough money to last for 21 days if he spends sh. 250 a day. How long will his money last if he spends sh. 350 a day?
5. Twenty bags of chicken feed are enough to feed chickens for 15 days. How many more bags are needed so as to feed the chickens for 45 days?
6. Twenty four workers can complete a certain job in 18 days. After working for 8 days, 9 workers do not turn up, how much longer will the work take to be completed?
7. Ten pupils working at the same rate would complete sweeping the school hall in 30 minutes. After sweeoiing for 12 minutes, two more pupils join them. How long did they take to sweep the hall?
8. A businessman hires 7 people to complete a piece of work in $3\frac{1}{2}$ hours. If 2 people do not turn up, how long will it take to complete the work?
9. 18 workers can dig a trench in 12 days. After working for 4 days two workers left. How long did the work take to be completed?
10. Seven taps can take 5 hours to fill a tank with water. How much longer will 5 similar taps take to fill the tank?
11. Ten men can do a piece of work in eighteen days. How many more men must there be to finish the work in fifteen days?
12. In a factory, 2 machines fill 450 packets of milk in 15 minutes. How many packets will 7 such machines fill in the same period?
13. It takes 16 people 21 days to plough 30 hectares. How many more days would it take 12 people to plough the same land if they are working at the same rate?
14. A certain job is completed by 75 people in 16 days. If only 60 people turned up for the job, how many more days will it take them to complete the job?
15. Thirty six workers can dig a field in twenty eight days. How many more workers are required so as to do the work in 21 days?
16. There is enough food for 360 pupils for 90 days. How long will the same food take if it is given to 405 pupils?

PYTHAGOREAN RELATIONSHIP /RIGHT ANGLED TRIANGLES

QUESTIONS ON THE TOPIC

1. From which of the following sets of lines can a right angled triangle be drawn?
 - A. 0.3cm, 0.4cm, 0.7cm
 - B. 0.4cm, 0.5cm, 0.6cm
 - C. 0.9cm, 1.2cm, 1.5cm
 - D. 0.9cm, 1.6cm, 2.5cm