LEGIT EDUCATION CONSULTANT

P.7 MATHEMATICS

LESSON NOTES AND ACTIVITIES

TERM 2

RATIOS AND PERCENTAGES

NAME:----------

RATIOS

Expressing rations as fractions

1. (a) Express the ratio 14 : 35 as a ration in its lowest form.

   Ratio = 14:35

   Fraction = $\frac{14}{35}$

   $= \frac{14 \div 7}{35 \div 7}$

   $= \frac{2}{5}$

Trial questions

(b) Express 1 : 2 as a fraction

(c) Express 10 : 25 as a fraction.

Activity

Express the following as fractions in their lowest form.

a) 2: 3

b) 4:8

c) 7:21

d) 6: 9

e) 25 :75

f) 24 : 60

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Expressing fractions as ratios

1. (a) Express $\frac{12}{16}$ as a ratio

Fraction = $\frac{12}{16}$

= $\frac{12\div4}{16\div4}$

= $\frac{3}{4}$

Ratio = 3:4

(b) Write $\frac{80}{100}$ as a ratio in its lowest form

ACTIVITY

Expressing the following fractions as ratios.

a) $\frac{2}{7}$

b) $\frac{25}{50}$

c) $\frac{9}{30}$

d) $\frac{45}{120}$

Expressing quantities as ratios

1. Henry has 12 books and John has 20 books. What is the ratio of Henry's books to John's books?

Henry : John

12 : 20

Fraction = $\frac{12}{20}$

= $\frac{12\div4}{20\div4}$

= $\frac{3}{5}$

Ratio = 3:5

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NOTE: Ratios must be simplified to simple fractions

ACITVITY

1. In a class, there are 20 boys and 30 girls. Write the ratio of;

   a) Boys to girls

   b) Girls to boys

2. In a village, there are 200 males and 400 females. What is the ratio of;

   a) Males to the total number of villagers

   b) Females to the total number of villagers

3. In a meeting of 80 guests, 36 took Mirinda and the rest took Fanta. What is the ratio of guests who took;

   a) Fanta to Mirinda

   b) Mirinda to the total number of guests

MORE ABOUT EXPRESSING RATIOS

Examples:

1. What is 300m as a ratio of 1km?

   1km = 1000m

   300m : 1km

   300m :1000m

   fraction = $\frac{300m}{1000m}$

   = $\frac{3}{10}$

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ratio = 3:10

2. Express $\frac{1}{2} : \frac{1}{4}$ as a single ratio.

$\frac{1}{2} : \frac{1}{4} = (\frac{1}{2} x4): (\frac{1}{4} x 4)$

$= (1x2): (1x1)$

$= 2: 1$

3. Express $\frac{1}{3}$ to $\frac{3}{4}$ as a ratio.

4. Given that 6:7 = 18: r. find the value of r

$\frac{6}{7} = \frac{18}{r}$ $= 7r \times \frac{6}{7} = \frac{18}{r} \times 7r$

$6r = 18 \times 7$

$6r = 126$

$\frac{6r}{6} = \frac{126}{6}$

$r = 21$

5. Find the missing ratio in 5:y = 15:18

6. Find the missing ratios in 2:5:7 = x: 15:y

$\frac{2}{5} = \frac{x}{15}$ $= 15 \times \frac{2}{5} = 15 \times \frac{x}{15}$

$3x2 = x$

$6 = x$

$X = 6$

Value of y

2:5:7 = x:15:y

2:5:7 = 6:15:y

First approach

$\frac{5}{7} = \frac{15}{y} = 7y \times \frac{5}{7} = 7y \times \frac{15}{y}$

$yx5 = 7x15$

$5y = 105$

$\frac{5y}{5} = \frac{105}{5}$

$Y = 21$

You van also find y using the ratios below

2:5:7 = x:15:y

2:5:7 = 6:15:y

$\frac{2}{7} = \frac{6}{y} = 7y \times \frac{2}{7} = 7y \times \frac{6}{y}$

$Yx2 = 7x6$

$2y = 42$

$\frac{2y}{2} = \frac{42}{2}$

$y = 21$

ACTIVITY

1. Write 120cm to 40cm as a ratio.

2. Express 1 week to 14 days as a ratio.

3. Express $\frac{2}{3}$ to $\frac{3}{5}$ as a ratio.

4. Express 20 minutes as a ratio of 1 hour.

5. What is the ratio of 10m to 20cm?

6. Find the ratio of 12kg to 240g.

7. Find the ratio of 50ml to 1 litre

8. Express $\frac{1}{2}$ to $\frac{3}{5}$ as a ratio.

9. In a class of 50 pupils, 35 are girls. Find the ratio of boys to girls.

10. In a caucus, $\frac{2}{5}$ are ladies, What is the ratio of ladies to gentlemen

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11. Express the following as a single ratio;

a) $\frac{2}{7} : \frac{4}{7}$

b) $\frac{2}{3} : \frac{4}{7}$

c) $\frac{1}{6} : \frac{9}{10}$

d) $\frac{5}{7} : \frac{14}{10}$

12. Find the value of m in m:3 = 8:12

13. Find the missing ratio in x:6:4 = 9:y:12

INCREASE IN GIVEN RATIO.

a) To increase means to make something bigger or larger.

b) The big ratio stands for bigger quantity while the small ration stands for smaller quantity.

c) When increasing, the ratio will be expressed as a fraction with the bigger part as a numerator and the smaller part as a denominator

LEGIT

Examples

1. Increase shs. 1500 in the ratio of 6:5

Fraction of given ratio = $\frac{6}{5}$

New value = $\frac{6}{5}$ x ~~shs.1500~~ b

= 6 x shs.300

= shs.1800

New value	Old value
6	5
	Shs.1500

5 parts rep shs.1500

1 part rep $\frac{shs.1500}{5}$

1 part rep shs. 300

6 parts rep 6 x shs. 300

6 parts rep shs.1800

2. There are 630 pupils at Summit p/s. what will be the number if it increased by 9:7

Fraction of given ratio = $\frac{9}{7}$

New value = $\frac{9}{7}$ **x ~~630~~**

= 9 x 90 pupils

= 810 pupils

New value	Old value
9	7
	630

7 parts rep 630

1 part rep $\frac{630}{7}$

1 part rep 90 pupils

9 parts rep 9 x 90 pupils

9 parts rep 810 pupils

Evaluation

1. Increase 2400 in the ratio of 3:2

2. The length of a wire is 12m. if it is increased in the ratio of 5:4, what will be the new length of the wire?

3. The price of a radio was increased from shs.20,000 in the ratio of 7:5. What is the new price of the radio?

4. The population of njeru town council increased from 1200000 people in the ratio of $\frac{1}{2} : \frac{2}{3}$. What is the new population of Njeru town council?

5. What number becomes 100 when decreased in the ratio of 4:5?

6. Before the lockdown, a kilogram of posho was shs.2400 but it increased in the ratio of 5:4 during the lockdown, how much was the cost of posho during the lockdown?

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7. The number of nurses in Uganda has increased from 250,240 by 2011 in the ratio of $\frac{4}{5}$ to $\frac{3}{4}$. Find the number of nurses in Uganda now.

DECREASE IN GIVEN RATIO.

a) To decrease means to make something smaller

b) The big ratio stands for bigger quantity while the small ration stands for smaller quantity.

c) When decreasing, the ratio will be expressed as a fraction with the smaller part as a numerator and the bigger part as a denominator

Examples:

1. Decrease shs. 2000 in the ratio of 3:5

Fraction of given ratio = $\frac{3}{5}$

New value = $\frac{3}{\cancel{5}}$ x shs.$\cancel{20}$00

= 3 x shs.400

= shs. 1200

New value	Old value
3	5
	Shs.2000

5 parts rep shs.2000

1 part rep $\frac{shs.2000}{5}$

1 part rep shs.400

3 parts rep 3 x shs.400

3 parts rep shs.1200

3. A lady's salary was decreased in the ratio of 1:2. What is her new salary if her old salary was shs. 300,000

Fraction of given ratio = $\frac{1}{2}$

New value = $\frac{1}{\cancel{2}}$ x shs.$\cancel{300}$,000

= 1 x shs.150,000

= shs. 150000

New value	Old value
1	2
	Shs.300000

2 parts rep shs.300000

1 part rep $\frac{shs.300000}{2}$

1 part rep shs.150000

1 parts rep 1 x shs.150000

1 parts rep shs.150000

ACTIVITY

1. Decrease 4949 in the ratio of 4:7

2. Decrease 3600 in the ratio of 2:9

3. The number of pupils in the school decreased in the ratio of 3:8. if the number of pupils was 5600, find the number of pupils in the school.

4. Decrease 600 litres of petrol in the ratio of 1:5

5. Decrease 7000kg in the ratio of 4:7.

LEGIT

6. The price of cowboy last year was shs.10000. This year. The price reduced in the ratio of 3:4. find the price of the cowboy.

7. The price of a pair of shoes is shs.40000. The price decreased in the ratio of 3:4. Find the new price of the pair of shoes

8. Decrease 3920000 in the ratio of 4:7

9. In a certain country, covid 19 killed people from 35 million in the ratio of 6:7, find the new number of people after covid 19.

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10. Due to the lockdown, the vehicle on the road reduced from 6000 vehicles in the ratio of $\frac{1}{4} : \frac{1}{2}$, find the new number of vehicles on the road.

CALCULATING RATIO OF INCREASE.

Examples

a) Increased from/to, means compare the given two quantities to obtain the ratio.
b) Increase by, means add to the old quantity before comparing to get the ratio.

Examples

1. The number of pupils increased from 2000 to 2800 pupils. In what ratio did the number of pupils increase?

New value increased to	Old value
Shs.2800	Shs.2000

Fraction $= \frac{\boldsymbol{New\ value}}{\boldsymbol{old\ value}}$

$= \frac{\boldsymbol{\cancel{shs.}2800}}{\boldsymbol{\cancel{shs.}2000}}$

$= \frac{\boldsymbol{28}}{\boldsymbol{20}}$

$= \frac{\boldsymbol{28 \div 4}}{\boldsymbol{20 \div 4}}$

$= \frac{\boldsymbol{7}}{\boldsymbol{4}}$

Ratio = 7: 4

2. A man's house rent increased from shs.80,000 to shs. 120,000. In what ratio did the rent increase?

3. Kamuge farm institute had 2000 sheep before tsetse flies. After the control of tsetse flies, the number has increased by 1000 sheep. In what ratio has the number increased.

New value increased by 1000 sheep	Old value
2000 sheep +1000 sheep =3000 sheep	2000 sheep

Fraction $= \frac{\boldsymbol{New\ value}}{\boldsymbol{old\ value}}$

$= \frac{\mathbf{3000}}{\mathbf{2000}}$

$= \frac{\mathbf{3}}{\mathbf{2}}$

Ratio = 3: 2

4. A man's salary increased by shs.150000 from shs.400000. in what ratio has his salary increased?

Activity

1. School fees was shs. 200000 last year and it increased to shs.2400000. in what ratio did the fees increase?

2. KCC increased its numbers of workers from 300 to 500. In what ratio did the number of workers increase?

LEGIT

3. The population of kumi village increased was 12,000,000 last year. This year the population is by 4,000,000. In what ratio did the population increase?

4. The price of a loaf of bread was increased shs. 3300 to shs.3600. in what ratio did the price of bread increase?

5. The number of cars in the park was 2000 and it increased by 3500 cars. In what ratio did the number of cars increase?

6. The number of infant deaths increase from 2000 per months by 400. In what ratio did the number of deaths increase?

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CALCULATING RATIOS OF DECREASE

1. The enrolment in the school had decreased from 900 to 300. In what ratio did the enrolment decreased?

New value decreased to	Old value
300	900

Fraction $= \frac{New\ value}{old\ value}$

$= \frac{3\,\cancel{0}\,\cancel{0}}{9\,\cancel{0}\,\cancel{0}}$

$= \frac{3}{9}$

$= \frac{3 \div 3}{9 \div 3}$

$= \frac{1}{3}$

Ratio = 1: 3

2. Last year, the school library had 480 books. This year, the number of books decreased by 60 books. By what ratio did the books decrease?

New value decreased by 60	Old value
480 -60 = 420 books	480 books

Fraction $= \frac{New\ value}{old\ value}$

$= \frac{4\,2\,\cancel{0}}{4\,8\,\cancel{0}}$

$= \frac{42}{48}$

$= \frac{42 \div 6}{48 \div 6}$

$= \frac{7}{8}$

Ratio = 7: 8

ACTIVITY

1. A man's salary decreased from shs.6000 to shs. Shs.12000. in what ratio did the salary decrease?

2. The cook decreased the weight of posho from 16kg to 20kg a day. In what ratio did the weight decrease?

3. The price of a bicycle reduced from shs. 80000 by 120000. In what ratio did the pice decrease?

4. The bus fare fom Lira to Kampala was shs. 80,000. It was decreased to shs. 70,000. In what ratio did was the bus fare decreased?

5. The new born babies in the hospital was 12000 in a year. The number of new born babies decreased by 8000. In what ratio did the new born baby decrease?

LEGIT

6. The number of Christmas parties reduced from 600 by 120. In what ratio did the Christmas parties reduce?

7. In a school, the number of teachers reduced from 80 by 10 teachers. In what ratio did the number reduce?

SHARING IN GIVEN RATIOS

a) To share means divide.
b) The bigger ratio stands for bigger share and the smaller ratio stands for smaller share.

Examples

1. Share 18mangoes in the ratio of 4:5

1st share	2nd share	Total
4	5	9

First share = $\frac{4}{9}$ x shs. 18 mangoes
= 4 x 2 mangoes
= 8 mangoes

Second share = $\frac{5}{9}$ x shs. 18 mangoes
= 5 x 2 mangoes
= 10 mangoes

OR

Second share = (18 -8) mangoes
= 10 mangoes

1st share	2nd share	Total
4	5	9
		18 mangoes

9 parts rep 18 mangoes
1 part rep $\frac{18}{9}$ mangoes
1 part rep 2 mangoes
First share (2 parts) = 4 x 2 mangoes
= 8 mangoes
Second share (5 parts) = 5 x 2 mangoes
= 10 mangoes

OR

Second share = (18 -8) mangoes
= 10 mangoes

LEGIT

2. A,B and C shared shs.3,600,000 sweets in the ratio of 5:3:4 respectively.

a) How many sweets did each get?

A	B	C	Total
5	3	4	12

A got = $\frac{5}{\cancel{12}}$ x shs.$\cancel{36}$00000

= 5 x shs. 300000

= shs. 1,500,000

B got = $\frac{3}{\cancel{12}}$ x shs.$\cancel{36}$00000

= 3 x shs. 300000

= shs. 900,000

C got = $\frac{4}{\cancel{12}}$ x shs.$\cancel{36}$00000

= 4 x shs. 300000

= shs. 1,200,000

A	B	C	Total
5	3	4	12
			Shs.3,600,000

12 parts rep shs. 3,600,000

1 part rep $\frac{shs.3,600,000}{12}$

1 part rep shs. 300,000

A got (5 parts) = 5 x shs. 300000

= shs. 1,500,000

B got (3 parts) = 3 x shs. 300000

= shs. 900,000

C got (4 parts) = 4 x shs. 300000

= shs. 1,200,000

b) How much more money did A get than C?

Shs. 1,500,000 – shs. 1,200,000 = shs.300,000

ACTIVITY

1. Share shs. 9000 mangoes in the ratio of 4:5.

2. Dan and Mike shared money in the ratio of 3:5 respectively. If they shared shs.160000. how much did each get?

LEGIT

3. Peter and Charles shared shs.40000 in the ratio of 2:3. By how much did Charles get than Peter?

4. Alinda, Nelson and Preston shared shs.180,000 in the ratio of 2:3:4 respectively. How much did each get?

5. A sum of shs. 48000 was shared among three brothers Martin, Mathew and Mathias in the ratio of 2:4:6.
   a) How much more did Mathias get than Martin?

   b) If Mathew spent $\frac{2}{3}$ of his share, how much did he remain with?

LEGIT

6. 6000 bags of flour were shared between three schools P,Q and R in the ratio of $\frac{1}{4}:\frac{1}{6}:\frac{1}{2}$

   a) How many bags did each school get?

   b) How many more bags did Q get than R?

7. Three brothers shared a piece of land of 52 acres in the ratio of $\frac{1}{4}:\frac{1}{3}:\frac{1}{2}$. How many acres did each get?

LEGIT

APPLICATION OF RATIOS

Examples

1. The ratio of girls to boys in the school is 10:5 respectively. If there are 35 boys in the class,

a) How many girls are in the class?

Girls	Boys	Total
10	5	15
	35	

5 parts rep 35

1 part rep $\frac{35}{5}$

1 part rep 7

Number of girls (10 parts) = 10 x 7

=70 girls

b) How many pupils are in the class

Total number of pupils (15 parts) = 15 x 7

= 105 pupils

OR

Number of pupils = No. of girls + No. of boys

= 35 girls + 70 boys

= 105 pupils

2. The ratio of mangoes to apples in a basket is 2:3. If there are 24apples, how many mangoes are in the basket?

3. John, Jolly and Joan shared pocket money in the ratio of 2:3:5 respectively. If Joan got shs.45000 more than John, how much was the total amount?

Patience	Hope	Fortunate	total	Difference (Joan – John)
5	3	2	10	5-2 = 3
				Shs.45000

3 parts rep shs. 45,000

1 part rep $\frac{shs.45{,}000}{3}$

1 part rep sh.15000

Total amount (10 parts) = 10 x shs. 15000

= shs.150000

LEGIT

4. A,B and C shared a certain amount of money in the ratio of 4:3:6 respectively. If C gets shs. 80000 more than A,
   a) How much did each get?

   b) How much money was shared?

ACTIVITY

1. A and B shared a sum of money in the ratio of 3:4. If A gets shs.12000,
   a) How much money did B get?

   b) How much money is shared?

LEGIT

2. A, B and C contributed money to buy a ball in the ratio of 3:4:5 respectively, if C contributed shs.10,000, how much did the ball cost?

3. A father gave money to his sons Moses, James and Peter in the ratio of 2:3:4 respectively. If James got shs. 60000,
   a) How much more did Peter get than Moses?

   b) How much money did the father give out?

4. A father gave a certain amount of money to his two sons David and Musa in the ratio of 5:8. If Musa got shs. 3000 more than David.
   a) How much money did each get?

LEGIT

b) How much money did the father give out?

5. Tina and Joan shared a certain amount of money in the ratio of 3:7, if Tina got shs. 8000 less than Joan,
   a) How much money did Joan get?

   b) How much money did they share?

6. A father gave a certain amount of money to his sons and daughter Tom, Peter and Sarah in the ratio of 2:3:6. If Sarah gets shs. 6000 more than Tom,
   a) How much money did each get?

   b) How much money was shared?

LEGIT

7. In a P.7 class, for every 2 girls, there are 3 boys. If there are 30 more boys than girls, how many pupils are in that class?

8. The ratio of 2 angles on a straight line is 2:3. Find the size of each angle.

9. Angles in a triangle are in the ratio of 3:4:5. What are the angles?

10. In a certain school, the ratio of boys to girls is 4:5 respectively. One day,15% of the boys and 20% of the girls were absent and 5 books were given to each pupil who was present that day. How many books were given out if there were 360 pupils at the school?

LEGIT

PROPORTIONS

Direct proportions

With direct proportion, one pair of ratios is given and the question is to find the part of the second pair of ratios.

Examples:

1. 3 chairs cost shs. 9000. What will be the cost of 6 chairs?

3 chairs	6 chairs
Shs.9000	

3 chairs cost shs.9000

1 chairs costs $\frac{shs.9000}{3}$

6 chairs cost $\frac{shs.9000}{3}$ x 6

6 chairs cost shs.9000x2

6 chairs cost shs.18000

2. The cost of 6 litres of milk is shs.7200. What is the cost of 5 litres of the same milk?

3. 9 dresses can be made from 6 metres of clothes. How many metres are can I use for 27 dresses?

ACTIVITY

1. 8kg of maize four cost shs.32000. what is the cost of 5kg of maize flour.

LEGIT

2. If 5 meters of a cloth make 2 shirts. How many metres of a cloth are needed to make 8 shirts?

3. A school uses 200 litres of water everyday. How many days will the school need to use 24000 litres?

4. 2 bags weigh 70kg. what is the weight of 5 bags?

5. 6 pens cost shs. 5400. What is the cost of 9 pens?

6. A school has 25 pupils in each class. How many pupils are there in the 7 classes?

LEGIT

PROPORTIONS

MORE ON DIRECT PROPORTIONS

1. $\frac{2}{3}$ of the books in the Library are MTC text books. How many books are in the library if there are 240 MTC text books.

MTC	OTHERS	Total
2	1	3
240		

2 parts rep 240 text books

1 part rep $\frac{240}{2}$ text books

1 part rep 120 text books

Total number of books (3 parts) = 3 x 120 textbooks

= 360 textbooks

2. Suzan's vehicle consumes 3 litres of petrol every 10km. if each litre costs shs.3500. how much money does he need to buy petrol that will cover a distance of 40km?

ACTIVITY

1. Our teacher's car uses four litres of petrol for every 50km.
   a) How much petrol does he need to travel a journey of 225km?

   b) If a litre costs shs.3900, how much money does he use to cover that journey?

LEGIT

2. Ronaldo's car consumes 2 litres of petrol every 10km and Messi's car consumes 3 litres pf petrol every 12km. if they both cover a distance of 180km,
   a) How much more petrol will Messi's car consume than Ronaldo's car?

   b) If a litre of petrol costs shs.3550. how much less money will Ronaldo's use in a journey than Messi?

3. A tap was opened for 5 minutes and water of 40 litres poured into the tank. How long will it take to fill a tank whose capacity is 1080 litres using the same tap? (give your answer in hours)

LEGIT

PROPORTIONS

Inverse/indirect proportions

Inverse proportion is indirect proportion where one quantity increases, another quantity decreases.

1. 6 men take 10 days to do a job. How long will 12 men take to do the same job?

6men	12 men
9days	

6men take 10 days
1 man takes (6x10) days
1 men takes 60days
12 men take $\frac{60}{12}$ days
12 men take 5days

2. 9 boys take 10 days to slash a school. How many boys are needed to do the same piece of work in only 6 days?

3. 3 men can do a piece of work in 10 hours. How many more men are needed to do the same work in 5 hours?

3men	**?**
10 hours	**5 hours**

10 hours rep 3 men
1 hour rep (10x3) men
1 hour rep 30men
5 hours rep $\frac{30}{5}$ men
5 hours rep 6 men

More men needed = 6men -3men
= 3men

4. 4 children can dig the school garden in 16 days. How many more men are needed so that the garden is dug in 2 days?

ACTIVITY

1. 5 men can paint a house in 6 hours. How many men are needed to do the same work in 2 hours?

2. 30 workers tarmac a road in 9 months. If the road is to be completed in 6 months, how many more workers are needed?

3. 9 men take 14 days to build a house. How long will 7 men take to build the same wall?

4. 9 men can build a wall in 14 days. How long will it take 7 men to build the same wall?

LEGIT

5. It takes 6 hours for 5 girls to peel cassava which can feed 900 pupils. How many girls can peel the same amount of cassava in one day?

6. There is enough food to last 20 days for 60 girls. How long will the same food last if there were 100 girls?

7. 5 men can dig a shamba in 8 days each earning shs.2000 per day. How much money will be required to pay the men who will do the same job in only 4 days?

8. A house was built by 6 men in 12 days each earning shs. 4500 per day.
   a) How much did the six men earn to complete the house?

LEGIT

b) How long will 9 men take working at the same rate?

PERCENTAGES

The meaning of percentages

Percent means out of a hundred. If we say 10% (ten percent) of the pupils are girls, we mean ten out of 100 pupils are girls.

10% means 10 out of 100 which can be written as a fraction as $\frac{10}{100}$. The symbol of percentage is %

Expressing percentages as fractions.

Example:

1. Write 40% as a fraction in its lowest form.

$40\% = \frac{40}{100}$

$= \frac{4}{10}$

$= \frac{2}{5}$

2. Write $66\frac{2}{3}\%$ as a fraction in its lowest term

$66\frac{2}{3}\% = 66\frac{2}{3} \div 100$

$= \frac{200}{3} \div \frac{100}{1}$

$= \frac{200}{3} \times \frac{1}{100}$

$= \frac{\cancel{200}}{\cancel{300}}$

$= \frac{2}{3}$

3. Write $22\frac{1}{2}\%$ as a fraction in its lowest form

$22\frac{1}{2}\% = 22\frac{1}{2} \div 100$

$= \frac{45}{2} \div \frac{100}{1}$

$= \frac{45}{2} \times \frac{1}{100}$

$= \frac{45}{200}$

$= \frac{45 \div 5}{200 \div 5}$

$= \frac{9}{40}$

ACTIVITY

1. Convert the following percentages to fractions

a) 50%

LEGIT

b) 75%

c) 24%

d) $37\frac{1}{2}\%$

e) $16\frac{2}{3}\%$

LEGIT

CHANGING FRACTIONS TO PERCENTAGES

Example

1. Express $\frac{4}{5}$ as a percentage

   $\frac{4}{5}$ x 100%

   4 x 20%

   80%

2. Write $\frac{2}{3}$ as a percentage

   $\frac{2}{3}$ x100% = $\frac{200\%}{3}$ 200÷3 = 66rem2

   $=66\frac{2}{3}\%$

3. Write $\frac{1}{8}$ as a percentage

   $\frac{1}{8}$ x100% = $\frac{100\%}{8}$ **100% ÷8 = 12 rem 4**

   $= 12\frac{4}{8}\%$ reduce $\frac{4}{8}$ to get $\frac{1}{2}$

   $= 12\frac{1}{2}\%$

ACTIVITY

1. Change these fractions to percentages

   a) $\frac{1}{2}$

b) $\frac{3}{5}$

c) $\frac{9}{20}$

d) $\frac{7}{40}$

e) $\frac{6}{8}$

CHANGING PERCENTAGES TO DECIMALS

Examples:

1. Express 40% as a decimal

$$40\% = \frac{40}{100}$$
$$= \frac{4}{10}$$
$$=0.4$$

2. Express 1.2% as a decimal

$$1.2\ \% = 1.2 \div 100$$
$$= \frac{12}{10} \div \frac{100}{1}$$
$$= \frac{12}{10} \times \frac{1}{100}$$
$$= \frac{12}{1000}$$
$$= 0.012$$

3. Write $12\frac{1}{2}\%$ as a decimal

ACTIVITY

1. Change these percentages to decimals.

a) 40%

b) 50%

c) 2.5%

d) 1.5%

e) $67\frac{1}{2}\%$

f) $6\frac{1}{2}\%$

LEGIT

CHANGING DECIMALS TO PERCENTAGES

Examples

Change the following decimals to percentages

a) 0.3

$0.3 = \frac{3}{10} \times 100\%$

$= 3 \times 10\%$

b) 0.87

c) 0.125

$0.125 = \frac{125}{1000} \times 100\%$

$= \frac{125}{10} \times 1\%$

$= \frac{125\%}{10}$

$= 12.5\%$

d) 2.2

Activity

Change the following decimals to percentages

a) 0.7

b) 0.37

c) 0.026

d) 1.8

e) 0.763

LEGIT

Expressing ratios as percentages

Expressing the following as percentages

a) 2:5

$\frac{2}{5}$ X ~~1~~00%

2 X 20%

40%

b) 3:10

c) 7:8

$\frac{7}{8}$ X 100%

$\frac{700\%}{8}$

$\frac{700\% \div 4}{8 \div 4}$

$\frac{175\%}{2}$

$87\frac{1}{2}\%$

d) 5:6

ACTIVITY

Express the following as percentages

a) 1:2

b) 3:4

c) 7:10

d) 2:3

e) 2:6

LEGIT

Expressing percentages as ratios

Expressing the following as ratios.

a) 60%

$60\% = \frac{60}{100}$

$= \frac{6}{10}$

$= \frac{6 \div 2}{10 \div 2}$

$= \frac{3}{5}$

b) $37\frac{1}{2}\%$

c) $33\frac{1}{3}\%$

b) 20%

c) 75%

d) $62\frac{1}{2}\%$

e) $83\frac{1}{3}\%$

ACTIVITY

Express the following percentages as ratios

a) 50%

LEGIT

Finding parts of a percentage

Examples

1. If 80% of a class are boys, what percentage are girls?

Boys	Girls	Total
80%		100%

Percentage of girls = 100% - 80%
= 20%

2. Musisi covered 30% of his journey by car and 50% by bus. What percentage of the journey remained?

ACTIVITY

1. A child ate 45% of the cake. What percentage of the cake remained?

2. If 10% of a mixture is water and 35% is milk, what percentage is the other content?

3. A child read 25% of a book on Monday, 38% on Tuesday and 16% on Wednesday. What percentage is left to be read?

LEGIT

COMPARING QUANTITIES USING PERCENTAGE

Examples

1. There are 20% more boys than girls in the class.
   a) What is the percentage of boys?

Let the percentage of girls be g

Girls	Boys (more by 20%)	Total
g	g+20%	100%

g +g +20% =100%
2g +20% = 100%
2g +20%-20% = 100% - 20%
2g = 80%

$\frac{2g}{2} = \frac{100\%}{2}$

$g = 40\%$

The number of girls = 40%

   b) What is the percentage of girls?

Boys = g +20%
= 40% +20%
=60%

OR

Boys = 100% - 40%
=60%

2. A family spends 40% less on clothing than school fees.
   a) What percentage is spent on clothing?

Let the percentage of school fees be s

School fees	Clothing	Total
s	s-40%	100%

s +s – 40% = 100%
2s – 40% = 100%
2s -40%+40% =100% + 40%
2s = 140%

$\frac{2s}{2} = \frac{140\%}{2}$

$s = 70\%$

Clothing = s -40%
=70% -40%
=30%

   b) What percentage was spent on school fees?

School fees = s
=70%

OR

Boys = 100% - 30%
=70%

ACTIVITY

1. There are 10% more men than women in the meeting.
   a) What percentage are women?

   b) What percentage are men?

2. There are 30% more old students than new students in a school.
   a) What is the percentage of new students?

   b) What is the percentage of old students?

3. A school spends 18% less on stationery than food.
   a) What percentage is spent on stationery?

LEGIT

b) What percentage is spent on food?

4. A school spends 50% less on soap than sugar.
   a) What percentage is spent on sugar?

   b) What percentage is spent on soap

EXPRESSING QUANTITIES AS PERCENTAGES

Examples

1. Alinda had 20 hens. He sold 15 of them.
   a) What percentage of hens did he sell?

Sold	Remain	Total
15	20-15 = 5	20

Percentage of sold hen = $\frac{15}{20} x\ 100\%$

= 15 x 5%

=75%

   b) What percentage of hens remained?

Percentage of remaining hen = 100% -75%

= 25%

LEGIT

ACTIVITY

1. Kyle got 8 questions wrong out of 40 questions.
   a) What percentage was correct?

   b) What percentage was wrong?

2. Mukiibi got a total of 300 points out of 500 points.
   a) What percentage did Mukiibi get?

   b) What percentage did Mukiibi fail?

3. There are 20 players in a team. 4 play tennis, 11 play football and the rest play both.
   a) What percentage of the players play tennis?

   b) What percentage of the players play football?

LEGIT

c) What percentage of the players play both?

4. 30 out 50 pupils in class are girls and the rest are boys.
   a) What is the percentage of girls in the class?

   b) What is the percentage of boys in the whole class?

EXPRESSING ONE QUANTITY AS A PERCENTAGE OF ANOTHER.

NOTE;

1 dozen = 12 items
1 gross = 144 articles
1 kg = 1000 grams
1 hour = 60 minutes
1 metre = 100cm
1 litres = 1000ml
1 year = 12 months
1 week = 7 days

EXAMPLES

1. Express 30 as a percentage of 60.

$\frac{30}{60}$ x 100% = $\frac{30}{6}$x10%

= 5 x 10%

=50%

2. Express 200m as a percentage of 800m

3. Write 200g as a percentage of 1kg

1kg = 1000g

Percentage = $\frac{200g}{1000g}$ x 100%

= 2 x 10%

= 20%

4. Express 8 articles as a percentage of 2 dozens

5. Express 20cm as a percentage of 4m

4. What percentage of 1 hour is 15 minutes?

ACTIVITY

1. Write 60 as a percentage of 80

5. Write 40cm as a percentage of 2m.

2. Express 300g as a percentage of 3kg.

6. Express 72 objects as a percentage of 1gross.

3. What percentage of shs.240 is shs. 60?

7. What percentage of a year is 3 months?

LEGIT

FINDING QUANTITIES EQUIVALENT TO PERCENTAGES

Examples:

1. What is 20% of shs.2500?

   20% of shs 2500 = $\frac{20}{100} x\ shs.2500$

   = 20 x shs. 25

   = shs. 500

2. What is 25% of 300 people?

3. What $12\frac{1}{2}$% of 800 people?

4. What is $\frac{1}{5}$ as a percentage of $\frac{1}{4}$?

ACTIVITY

What is;

1. 10% of 300?

2. 45% of 480 books?

3. 90% of 360 eggs?

4. $16\frac{2}{3}$% of 2100?

LEGIT

5. $33\frac{1}{3}$% of 3000 pencils?

6. Express $\frac{1}{2}$ as a percentage of $\frac{2}{5}$

FINDING PERCENTAGES OF QUANTITIES INVOLVING CONVERSION

Examples:

1. What is 20% of 1kg?

   1kg = 1000g

   20% of 1 kg = 20% x 1kg

   = $\frac{20}{100}$ x 1000g

   = 20 x 10g

   = 200g

2. What is 40% of 5 dozens of books?

2. 20% of a kg?

3. 90% of 3 hours?

Activity

What is;

1. 25% of 1 metre?

4. 80% 0f 4km?

LEGIT

5. 40% of 1litre?

Sharing quantities using percentages

Examples

1. In a school of 400 pupils, 30% are boys and the rest are girls.
   a) What is the percentage of girls?

Boys	Girls	Total
30%		100%
		400

Percentage of girls = 100% -30%

= 70%

b) How many boys are in the class?

Approach 1

Boys	Girls	Total
30%		100%
		400

100% rep 400 pupils

1% rep $\frac{400}{100}$ pupils

1% rep 4 pupils

Number of boys (30%) = 30 x 4

=120 boys

Approach 2

Using boys percentage

Number of boys = 30% x 400

= $\frac{30}{100}$ x 400

= 30 x 4

=120boys

c) How many girls are in the class?

Number of girls = 400 pupils – 120 boys

= 280 girls

Or

Since 1 part rep 4 pupils

Number of girls (70%) = 4 x 70 girls

=280 girls

Approach 2

Using girls percentage

Number of boys = 70% x 400

= $\frac{70}{100}$ x 400

= 70 x 4

=480boys

2. In a school of 500 pupils, there are 10% more girls than boys.
   a) Find the percentage of boys in the school.
      Let the percentage of boys be b

Boys	Girls (10% more)	Total
b	b+10%	100%

b+b +10% =100%
2b +10% = 100%
2b +10% -10% = 100% -10%
2b = 90%
$\frac{2b}{2} = \frac{90\%}{2}$
$b = 45\%$

   b) How many girls are in the school?

Boys	Girls (10% more)	Total
b	b+10%	100%
45%	45% +10% =55%	500

100% rep 500 pupils
1% rep $\frac{500}{100}$ pupils
1% rep 5 pupils
Number of girls (55%) = 55 x 5
=275 girls

Approach 2
Using girls percentage
Number of girls = 55% x 500
= $\frac{55}{100}$ x 500
= 55 x 5
=275 girls

   c) How many more girls than boys are in the school?
Number of girls = 275
Number of boys =500 -275
=225
Number of more boys than girls = 275 -225
=50

OR
Percentage of more girls than boys =10%
1% rep 5 pupils.
Number of more men than girls = 10 x 5
=50 girls

3. In a staff, 40% are females and the rest are males. If there are 24 male, how many members are in the staff?

4. In a football team of 30 players, 20% are below 18 years and the rest are above 18 years.
   a) How many players are below 18 years?

   b) How many more players are above 18 years than below 18 years?

ACTIVITY

1. In a class of 60 pupils, 10% are absent and the rest are present.
   a) How many pupils are absent?
   b) How many pupils are present?

2. On a farm of 200 heads of cattle, 45% of them are heifers and the rest are bulls. How many bulls are on the farm?

LEGIT

3. A school has 360 textbooks. 30% of them are English text books, 20% are Science text books and the rest are Maths textbooks.
   a) How many mathematics books does the school have?

   b) If 10% of the maths books are for lower primary, 40% for upper primary and the rest for middle primary, how many maths books are for middle primary?

4. 350 people attended a conference. 30% were Asians, 40% Africans, 20% Americans and the rest were British.
   a) How many Americans attended the conference?

   b) How many Africans attended the conference?

LEGIT

c) How many Britons attended the conference?

5. A family spends 40% more on school fees than clothing. If the family's total income is shs. 100,000,
   a) Find the percentage spent on clothing?

   b) How much does the family spend on school fees?

   c) How much does the family spend on clothing?

6. After covering 60% of the journey, Amina got an accident. If she was left with 30km to go, how far had she gone from the starting point?

LEGIT

FORMING AND SOLVING EQUATIONS INVOLVING PERCENTAGES

Examples:

1. If 20% of a number is 80, what is the number?

The original number percentage is 100%

20%	100%
80	

20% rep 80

1 % rep $\frac{80}{20}$

1% rep 4

The number (100%) = 100 x 4

=400

Let the number be n

20% of n = 80

20% x n = 80

$\frac{20n}{100}$n = 80

$\frac{20n}{100}$ x 100 = 80 x 100

20n = 800

$\frac{20n}{20}$ = $\frac{8000}{20}$

n =400

The numbe is 400

2. 40% of the pupils in a school are girls. If there are 200 girls in the school, how many pupils are in the school?

3. In a poultry farm, the percentage of layers is 30%. If there are 280 broilers, how many birds are on the farm?

4. If 10% of a number is 48, what is 50% of the number?

The original number percentage is 100%

10%	**100%**
48	

10% rep 48

1% rep $\frac{48}{10}$

100% represent $\frac{48}{10}$ x10~~0~~

100% represent (48x10)

100% represent 480

The number is 480

50% of the number = 50% x 480

= $\frac{50}{100}$ x 48~~0~~

= 5 x 48

=240

5. If 5% of a number is 2000, what is 30% of a number

ACTIVITY

1. 60% of a number is 120. What is the number?

2. 25% of a number is 200. What is the number?

LEGIT

3. 40% of a number is 800. What is 15% of the same number?

4. 15 % of my salary is shs.450000. What is 25% of my salary?

5. 16% of the number of pupils in a class is 48. How many pupils are in the class?

6. There are 240 pupils in a field. This is 40% of the total number of pupils in the field. How many pupils are in the field?

LEGIT

7. In a group , 40 % of the people are men and the rest are women. If the number of women is 120. How many people are in the group?

8. 30% of the farmers in the village grow rice and the rest grow cassava. There are 210 people who grow cassava. How many farmers are in the village?

9. Nalongo saves 35% of her salary per month. If she saves shs.14000. How much does she earn altogether?

10. 30% of my salary is spent on food and I save shs.21000. What is my salary?

LEGIT

11. 50% of my salary is equivalent to 40% of David's salary, if David salary is shs.50000. What is my salary?

12. Tom has 300 cows and this is 60% of the animals on the farm. What is 20% of the animals on the farm?

LEGIT

MORE ON FINDING REMAINING PERCENTAGES

EXAMPLES

1. There are 10% more boys than girls in a class.
   a) What is the percentage of girls?
      Let the percentage of girls be m

Girls	Boys(more by 10%)	Total
m	m+10%	100%

m+m +10% =100%

2m +10% = 100%

2m +10% -10% = 100% -10%

2m = 90%

$\frac{2m}{2} = \frac{90\%}{2}$

$m = 45\%$

b) If there are 90 girls, how many pupils are in that class?

Girls	Boys(more by 10%)	Total
m	m+10%	100%
45%	45%+10% =55%	
90		

45% represent 90 pupils

1% represents $\frac{90}{45}$

Number of pupils(100%) = $\frac{90}{45} x\ 100$

= 2 x 100

=200 pupils

2. Out of David's shirts, 20% are green, 30% of the remainder are blue and the remaining 28 shirts are red.

a) What percentage of the shirts are red?

Green	Remainder	Blue	Red	Total
20%	100% - 20% = 80%	30% of 80%		100%
			28	

Percentage of blue = 30% x 80%

= $\frac{30}{100}\ x\ 80\%$

= 3 x 8%

=24%

Percentage of red = 100% - (green +blue)

= 100% - (24%+20%)

= 100% - 44%

= 56%

b) How many shirts does he have?

Green	Remainder	Blue	Red	Total
20%	80%	24%	56%	100%
			28	

56% represent 28 clothes

1 % represents $\frac{28}{56}$

Number of shirts (100%) = $\frac{28}{56}$ x100

=$\frac{1}{2}$ x 100

= 50 shirts

3. A woman spends 50% of her money on rent, $\frac{1}{5}$ of the remainder on fees and saved the remaining shs. 15,000.
   a) What percentage of her money does she save?

   b) How much does she earn altogether?

4. Golola lost 8 points in a fight. If he had lost one more point, he would have lost 70% of the points he was to get at the end of the game. How many points was he working for?

5. A man spends 20% of his income on rent and $\frac{1}{5}$ of the remainder on food. If shs.4800 is left, what was his income?

LEGIT

ACTIVITY

1. In a meeting, there are 20% more men than women.
   a) Find the percentage for women.

   b) If there are 40 more men than women, how many people are in the meeting?

2. Betty spent 50% of her monthly salary on rent, 25% of the remaining on medical care and saved shs. 240,000.
   a) What percentage did she save?

   b) How much was her monthly salary?

LEGIT

3. Bageya sold 50% of his daily milk collection from his farm. He gave out 40% of the remainder to his parents and the remaining 9 litres to his family.
   a) What percentage did he give to his family?

   b) How much milk does he collect every day?

4. Mr. Lindo spent 70% of his money on food, 50% of the remaining on other things. He was left with shs.6000. How much did he have at first?

5. Three people A,B and C shared a certain amount of money. A got shs.120,000, B got shs.18,000 and C got 40% of the money.
   a) How much was the total share?

LEGIT

b) How much did C get?

c) What percentage of the share did A get?

<u>INCREASING QUANTITIES BY PERCENTAGE.</u>

Example:

1. Increase shs.12000 by 20%

Original number percentage = 100%

Percentage increase = 100% +20%

New amount = 120% x shs.12000

$$= \frac{120}{100}\ x\ shs.12000$$

= 120 x shs.120

= shs.14400

<u>Approach 2</u>

Given percentage =20%

Increament = $\frac{20}{100}$**x shs.12000**

= 20 x shs.120

=shs. 2400

New amount = original amount + increment

= shs. 12000 + shs.2400

=shs. 14400

2. Increase 45 pupils by 25%

LEGIT

3. Increase 800 mangoes by $12\frac{1}{2}\%$

4. The number of pupils in a school last year was 500. This year the number increased by 20%.
   a) How many pupils increased this year?
   b) What is the number of pupils in the school?

5. There are 90 pupils in a class. The number increased by 10%. What is the new number of pupils in a class?

ACTIVITY

1. Increase shs.40000 by 10%

LEGIT

2. Increase 600kg by 80% and again by 50%

3. Increase 240 by $66\frac{2}{3}\%$

4. Nelson's salary was shs.120000. He was given a 24% increment. What is his new salary?

5. A school had 1200 textbooks in the library last term. This term, the number of books increased by 50%.
   a) How many books were added in the Library?

LEGIT

b) How many books are in the library this term?

6. The price a dress used to be shs. 12000 last week. This week it increased by $22\frac{1}{3}$%. Calculate the new price of the dress?

MORE ON INREASING IN PERCENTAGES

EXAMPLES

1. A number is increased by 20% to become 960, what is the number?

Approach 1

Original percentage	New percentage
100%	100% + 20% =120%
	960

120% represent 960

1% represent $\frac{960}{120}$

The number (100%) = $\frac{\cancel{960}}{\cancel{120}}$ x 100

= 8 x 100

= 800

Approach 2

Percentage increase =100%+20%

=120%

Let the original number be m

120% of m = 960

120% x m =960

$\frac{120m}{100}$ = 960

$\frac{120m}{100} x100 = 960\ x\ 100$

120m = 96000

$\frac{\cancel{120}m}{120} = \frac{\cancel{96000}}{\cancel{120}}$

$m = 800$

2. What number when increased by $12\frac{1}{2}$% becomes 6300?

3. Mukasa sold a phone at shs. 72,000 and gained a profit of 20%. Calculate his selling price.(answer as guided by the teacher)

Original percentage (Buying Price)	New percentage (Selling Price)
100%	100%+20% =120%
?	Shs.72000

NOTE

- **Buying price in percentage is always constant (original number) and its percentage is 100%.**
- **The selling price (new number) varies depending on the profit.**
- **Always use the full column to get what is asked**

Activity

1. What number when increased by 30% becomes 910?

LEGIT

2. What number when increased by $33\frac{1}{3}\%$ becomes 9000?

3. By selling an article at shs. 84,000, a traider gains a profit of 20%. Calculate the buying price of the radio.

4. By selling a TV set at shs. 960,000, teacher Dan gains a profit of 20%. Calculate the original price of the set of TV.

5. Joel sold his computer at shs. 146800 and made a profit of $22\frac{1}{3}\%$. Calculate his buying price.

LEGIT

6. Mr. Kirinya bought a plot of land and sold it at shs.4,000,000 making a profit of shs.$66\frac{2}{3}$%. calculate his buying price.

7. Kasisa bought a bicycle and sold it to Irumba. If Kasisa got a profit of shs. 60000 and this was 20% of his buying price. At what price did he buy the bicycle?

DECREASING QUANTITIES BY PERCENTAGES

Examples

1. Decrease shs. 2400 by 25%

Original number percentage = 100%

Percentage decrease = 100% -25%

New amount = 75% x shs.2400

= $\frac{75}{100}$ x shs. 2400

= 75 x shs.24

= shs.1800

Approach 2

Given percentage =25%

Decrease = $\frac{25}{100}$x shs.2400

= 25 x shs.24

=shs. 600

New amount = original amount - increment

= shs. 2400 + shs.600

=shs. 1800

2. Kagwa had 400 litres of milk. $12\frac{1}{2}$% of it was sold.
   a) How much milk was sold?

   b) How much milk remained?

3. A man's salary was 8000 Euros. It decreased by 10% last year and 5% this year. What is his current salary?

ACTIVITY

1. Decrease shs. 5000 by 20%

2. Decrease 4500 cows by 20% and then by 30%

LEGIT

3. Reduce 9000 litres of water by 10% and then by 15%

4. Preston had 700cows. He sold 35% of them.
   a) How many cows were sold?

   b) How many cows remained?

5. The population of a village was 720000 people. If $33\frac{1}{3}$% of them migrated to urban areas, how many people remained in the village?

LEGIT

6. The cost of 1 bag of maize flour is shs.60000. How much money will one pay if he's given a discount of 40%?

MORE ON DECREASING IN PERCENTAGES

1. What number becomes 96 when decreased by 20%?
   After decrease the original percentage was 100%
   After decrease it became (100%-20%) =80%

Before decrease	After decrease
100%	100% -20% =80%
	96

80% represent 96

1 % represent $\frac{96}{80}$

The number (100%) = $\frac{96}{80}$ x 10~~0~~

=12 x 10

=120

2. What amount becomes shs.1800 when decreased by 25%?

3. By selling a camera at shs.4000, a shopkeeper loses 20% of what he used to buy it. At what price did he buy it? (use the table to complete)

Original percentage (Buying Price)	New percentage (Selling Price)
100%	100% - 20% =80%
?	Shs.4000

LEGIT

4. What number when decreased by $37\frac{1}{2}\%$ becomes 225?

ACTIVITY

1. What number when decreased by 30% becomes 840?

2. When a number decreased by 25% becomes 600. What is the number?

3. If I sell an article at shs.35,000. I lose $12\frac{1}{2}\%$ of what I paid for it.
   a) How much should did I pay for the article?

   b) How much should I sell it in order to gain $37\frac{1}{2}\%$?

LEGIT

4. By selling a watch at shs. 45,000, I lose $37\frac{1}{2}$% of what I paid for it.
    a) How much did I pay for it?

    b) If I now sell it at shs. 81000. What would be my gain or loss in percentage?

5. By selling a shirt at shs. 144000, I lose 20% of the cost price.
    a) How much did I pay for it?

    b) If I now sell it in order to gain $33\frac{1}{3}$% profit. What should be my new selling price?

LEGIT

6. By selling an a radio at shs. 40000, a shopkeeper loses 20% of what he bought it.
    a) At what price did he buy the radio?

    b) What percentage profit must he have got if he sold it at shs.7000?

7. By selling a radio at shs.42000, I lose $12\frac{1}{2}$% of what I paid for it.
    a) What did he pay for it?

    b) If I now sell it for shs. 54000, what should be my gain or loss in percentage?

LEGIT

FINDING PERCENTAGE INCREASE AND DECREASE

NOTE:

- **Increase = new number – original number**
- **Percentage increase = $\frac{increase}{original\ number}$ x 100%**
- **Decrease = old number – new number**
- **Percentage decrease = $\frac{decrease}{original}\ x\ 100\%$**

Examples:

1. When 880 is increased by X% it becomes 990. Find x
   New number = 990
   Old number =880
   Increase = 990 -880
   =110
   Percentage increase = $\frac{11\cancel{0}}{88\cancel{0}}$ x100%
   = $\frac{11}{88}$ x 100% reduce $\frac{11}{88}$ to get $\frac{1}{8}$
   = $\frac{1}{8}$ x 100% divide 100 and 8 by the common factor 4
   = $\frac{1}{2}$ x 25%
   = $\frac{25\%}{2}$
   =$12\frac{1}{2}\%$
2. After decreasing 630 by a certain percentage. It becomes 378. Find the percentage decrease.

ACTIVITY

1. By what percentage will shs.8000 be increased to shs.9600?

2. By what percentage will shs.63000 be reduced to shs.28000?

3. When 480 men are increased by y% they become 540. Find y.

4. When 240 is decreased by m% it becomes 192. Find m.

5. A man's salary was shs.18000 but it was reduced to shs. 15,300. Find the percentage decrease?

6. By what percentage should 6 be decreased to 5?

LEGIT

MORE TRIAL NUMBERS ON PERCENTAGE INCREASE AND DECREASE

1. Increase 900% by 10% and then decrease the result by 30%

2. Decrease 3000 by 50% and decrease the result by 20%

3. In a certain school, the number of children increased by 20% and after a year, it decreased by 10%. If after decrease there were 324pupils, how many people where there in the beginning?

4. John bought a bull at shs. 600,000. He sold it to William at a profit of 20%, William sold it to Cathy at a loss of 10%. Find how much Cathy paid for the bull.

LEGIT

FINDING PERCENTAGE PROFIT OR LOSS

NOTE:

Profit = Selling Price – Buying price or cost price

Percentage profit = $\frac{profit}{Cost\ price}$ x 100%

Loss = Buying price/ cost price – Selling price

Percentage loss = $\frac{Loss}{Cost\ price}$ x 100%

EXAMPLES

1. A trader bought a dress at shs. 3200 and sold it at shs. 4000.
   a) What was his profit?
   Profit = selling price – buying price
   = shs. 4000 – shs. 3200
   = shs.800
   b) Find his percentage profit?
   Percentage profit = $\frac{profit}{Cost\ price}$ x 100%
   = $\frac{shs.800}{shs.3200}$ x 100%
   =25%

2. When I sell a watch at shs.28000 after buying it at shs.25000. What would be my percentage gain?

3. Patrick bought a goat at shs. 80000 and sold it at shs.60000. what was his percentage loss
   a) What was his loss.
   b) Find his percentage loss?

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4. The cost of a shirt is shs. 25000. Alinda sold it at shs.20000. Find her percentage loss.

ACTIVITY

1. The cost of a cloth is shs. 2800. A trader sells it at shs. 3000. Find the trader's percentage profit.

2. Nobert sold his cow for shs.47700. if the cost of the cow was shs.45000, find his percentage profit.

3. A carpenter costed a chair at shs. 2400. The head master paid shs. 3200. Find his percentage profit.

4. The cost of a litre of milk is shs. 1000. Lukwago sold it at shs. 900. Calculate his percentage loss.

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5. A man bought a motorcycle at shs. 600,000. After 1 year, he sold it at shs. 480,000. What was his percentage loss?

6. The cost of a book is shs.2500. A shopkeeper sold it at shs. 2000. What was his percentage loss?

FINDING DISCOUNT AND PERCENTAGE DISCOUNT

NOTE:

- Discount means deduction from the usual cost of an item.
- Discount may depend on customarily terms, situations, bargaining power etc.
- Discount = marked price- cash price
- Percentage discount = $\frac{Discount}{marked\ price}$ x 100%

Examples:

1. The marked price of a shirt was shs.20, 000. After a discount Umar paid shs.12,000.

a) How much was the discount?

Discount = marked price- cash price

= Shs.20,000 – shs.12000

= shs.8000

b) Find his percentage discount.

Percentage discount = $\frac{Discount}{marked\ price}$ x 100%

= $\frac{shs.8000}{shs.20,000}$ x 100%

= 4 x 10%

=40%

2. The marked price of a book is shs.4000. if a customer is offered a discount of $10\frac{1}{2}\%$, how much does he pay?

ACTIVITY

1. The marked price of a plot of land is shs.24 millions. David bought it at a discount of $12\frac{1}{2}\%$. How much did he pay?

2. A trader was given a discount of 10%. Calculate the cash price if the marked price was shs. 13,000.

3. Moses paid shs.18,000 for a hand bag after a discount of 10%. Calculate the marked price of the hand bag.

LEGIT

4. Mr. Mugabi bought a suit for shs.64,000. The marked price was shs.72,000. What was the percentage discount?

5. A set of chairs is marked shs. 250,000. If a customer is offered a 20% discount,
   a) Find his discount.

   b) How much does a customer pay?

LEGIT

FINDING SIMPLE INTEREST

NOTE: In the banking system,

- The money banked, borrowed or lent is the **principal (P)**
- The percentage used to calculate the interest is the **Rate (R)**
- The period in years that the principal is invested is the **Time (T)**
- The Additional amount offered or paid back is the **Interest (I)**
- **To find Simple Interest (SI), we use SI = Px Rx T**
- **To find Amount we add: principal + Simple Interes**
- If the time given is in months, we convert it to years by dividing by 12 months.

Examples:

1. A farmer deposited shs.8,000 in a bank that offers an interest rate of 10% per year. How much interest will a farmer get in 2 years?
   Principal = shs. 8000
   Time = 2 years
   Rate = 10%
   SI = P X T X R
   =shs. 8000 x 2 x 10%
   = shs. 8000 x 2 x $\frac{10}{100}$
   = shs. 80 x 2 x 10
   = shs.1600

2. A trader borrowed shs.200,000 from a bank at an interest rate of 5% per annum(per year).
   a) How much interest will he pay after 6 months?
   Principal = shs. 200,000
   Time = 6 months ($\frac{6}{12}$) $a\ year$;;;;;;;reduce $\frac{6}{12}$
   = $\frac{1}{2}$ a year
   Rate = 10%
   Simple Interest = P X T X R
   =shs. 200,000 x $\frac{1}{2}$ x 5%
   = shs. 200000 x $\frac{1}{2}$ x $\frac{5}{100}$
   = shs. 1000 x 1x 5
   = shs.5000

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b) What amount will the trader pay altogether?

Amount = P + SI
= shs. 200000 + shs.5000
= shs. 205,000

3. A man deposited shs. 4,000,000 in DFCU bank that offers a simple interest rate of $7\frac{1}{2}$% per annum for 4 months. Calculate his total amount at the end of the months.

Activity

1. Mwebesa borrowed shs.50000 from a school Sacco at a rate of 5% for 3 years.
   a) How much interest did he return?

   b) How much amount did the Sacco get after the end of 3 years?

2. Find the simple interest on shs.60,000 kept for 9 months in a post bank that offers an interest rate of 12% p.a

LEGIT

3. A teacher borrowed shs. 150,000 from a bank at a rat of 8% per annum. How much interest did he pay after 4 years?

4. How much amount is paid back on a loan of shs. 70,000 at a rate of 20% for 2 years?

5. A school deposited shs. 800,000 in a bank at a rate of 15%.
   a) How much interest will the school get after 8 months?

   b) How much will the school have on its account after 4 years?

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6. Teacher Dan deposited shs. 100,000 on a savings account for $2\frac{1}{2}$ years at an interest of 10%
   a) How much interest did he get?

   b) What amount did he find on his account?

7. In a bank the cost of a share is shs.1200. If Jonathan bought 50 shares at a rate of 15% per annum for 3 months, how much money did he get from the bank after 3 months?

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RELATIONSHIP BETWEEN INTEREST, PRINCIPAL, TIME, RATE AND AMOUNT.

- **Simple interest = P x R% x T**

  = P x $\frac{R}{100}$ x T

- **Principal = $\frac{SI\ x\ 100}{T x\ R}$**
- **Time = $\frac{100\ x\ SI}{P x R}$**
- **Rate = $\frac{100\ x\ SI}{P\ x\ T}$**

Examples;

1. At what rate per annum will shs.400,000 yield an interest of shs.24000 after 2 years?

   Rate = $\frac{100\ x\ SI}{P\ x\ T}$

   = $\frac{\cancel{100}\ x\ shs.\cancel{24000}}{shs.\cancel{400000}\ x\ 2}$

   = $\frac{24}{8}$

   = 3%

2. A man borrowed shs.500,000 for 6 months. Aty the end of that period, he paid a total amount of shs.515,000. At what rate per annum was he paying?

3. In which time will shs.50,000 yield an interest of shs. 15,000 at 31% per annum?

4. An interest of shs. 50,000 was realized after borrowing a sum of money for 5 years at 10% per annum. How much was borrowed?

5. Ali paid an interest of shs.18,00 at a rate of 5% per year for 8 months. Find how much he borrowed.

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