5. The sum of three consecutive even numbers is 30. If the middle number is p, find the numbers.
6. The sum of four consecutive even numbers is 204. Find the numbers.
7. The sum of three consecutive even numbers is 60. If the middle number is (p-2) find the numbers.
8. The three consecutive even numbers are (t – 2), (t – 4) and (t – 6). Find the numbers if their sum is 30.

4.7. Finding Consecutive Counting Numbers

Examples of counting numbers = {1, 2, 3, 4, 5, 6, 7, 8, 9 .....}

Example 1

The sum of three consecutive counting numbers is 39. Find the numbers if the 2nd number is t+1.

Let the first number = t

1st Number	2nd Number	3rd Number	Sum
t	t + 1	t + 2	39

$t + t + 1 + t + 2 = 39$

$t + t + t + 1 + 2 = 39$

$3t + 3 = 39$

$3t + 3 - 3 = 39 - 3$

$\frac{{}^{1}\cancel{3}t}{{}_{1}\cancel{3}} = \frac{\cancel{36}^{12}}{\cancel{3}_{1}}$

$t = 12$

$t + 1 = 12 + 1 = 13$

$t + 2 = 12 + 2 = 14$

The numbers are 12, 13 and 14

Activity

1. The sum of three consecutive counting numbers is 27. Find the numbers.
2. The sum of three consecutive counting numbers is 57. What are the numbers?
3. The sum of three consecutive counting numbers is 141. If two of the numbers are 48 and 47. Find the third number.
4. The sum of three consecutive counting numbers is 75. If two of the numbers are 25 and 26. Find the third number.
5. The sum of three consecutive counting numbers is 54. If the middle number is p.
   a) Find the value of p. b) What are the numbers?
6. The sum of three consecutive counting numbers is 18. If the numbers are y, y+1 and y+2
   a) Find the value of y. b) What are the numbers?
7. The sum of three consecutive counting numbers is 30. If the middle number is (p-2)
   a) Find the value of p b) Find the numbers
8. The sum of four consecutive counting numbers is 62, if the numbers are (t + 4), (t+3), (t+2) and (t+1).
   a) Find the value of t. b) What are the numbers?
9. The sum of three consecutive counting numbers is 21. If the third number is p;
   a) Find the value of p. b) Find the product of the 1st number and the third number.
10. Three consecutive counting numbers sum up to 39. If the smallest number is (m-2)
    a) Find the value of m. b) Work out their product

4.8. Finding the Consecutive Counting Numbers

A consecutive number is a set of numbers that we use to learn how to count 1, 2, 3, 4, 5, 6.....the difference between two consecutive counting numbers is 1. The difference between 1 and 2 is 1. All consecutive counting number behave like that i.e if the first number is p.

1st No.	2nd No.	3rd No.	4th No.	5th No.	6th No.
P	P+1	P+2	P+3	P+4	P+5

If the value of p is 7. Find the value of the next consecutive counting numbers

1st No.	2nd No.	3rd No.	4th No.	5th No.	6th No.
P	P+1	P+2	P+3	P+4	P+5
7	7+1	7+2	7+3	7+4	7+5
7	8	9	10	11	12

The six consecutive counting numbers are 7, 8, 9, 10, 11 and 12.

Example 1

The sum of three consecutive odd numbers is 81. What are the numbers if the first number is p^2.

1st No.	2nd No.	3rd No.	Sum
P^2	P^2+2	P^2+4	81

Solution

$P^2+P^2+2+P^2+4 = 81$

$P^2+P^2+P^2+2+4 = 81$

$3P^2+6 = 81$

$3P^2+6-6 = 81-6$

$\frac{3p2}{3} = \frac{75}{3}$

$\sqrt{p^2} = \sqrt{25}$

$P = 5$

b) What are the numbers?

1st No.	2nd No.	3rd No.
P^2	P^2+2	P^2+4
5×5=25	5×5+2=27	5×5+4=29

The numbers are 25, 27 and 29

Example 2

The sum of three consecutive even numbers is 186. If the largest number is m^2,

a) Find the value of m.

1st No.	2nd No.	3rd No.	Sum
$m^2 - 4$	$m^2 - 2$	m^2	192

$m^2 - 4+m^2 - 2+m = 186$

$m^2+m^2+m^2 - 42 = 186$

$3m2 - 6 = 186$

$3m^2 - 6+6 = 186+6$

$\frac{3m^2}{3} = \frac{192}{3}$

$\sqrt{m^2} = \sqrt{64}$

$m = 8$

b) What are the numbers?

1st No.	2nd No.	3rd No.
m^2-4	m^2-2	m^2
8×8-4=60	8×8-2=62	8×8=64

The numbers are 60, 62 and 64

Activity

1. The sum of two consecutive odd numbers is 164. Find the numbers if the first number is g^2.
2. The sum of two consecutive even numbers is 102. What are the numbers is if the second number is p^2+2?

3. The sum of four consecutive odd numbers is 112. Find the numbers if the second number is (p^2+2).
4. When three consecutive counting numbers are added, their result is 72. Find the numbers if the first number is y^2.
5. The sum of two consecutive counting numbers is 451. The biggest number is g^2+1,
   a) Find the value of g. b) What are the numbers?
6. If the sum of three consecutive counting numbers is 195, given the smallest number is m^2,
   a) Find the value of m. b) List the numbers.
7. The sum of four consecutive odd numbers is 48. Given the largest number is p^2+6,
   a) Find the value of p. b) Write down the numbers
8. Two numbers t^2 and t^2+2 sum up to 340.
   a) What is the value of t? b) List the numbers

4.9. Finding Consecutive Multiples of Different Numbers

Example 1

The sum of 3 consecutive multiples of seven is 84. Find the numbers

1st No	2nd No	3rd No	Sum
y	$y+7$	$y+14$	84

$$y + y + 7 + y + 14 = 84$$
$$y + y + y + 7 + 14 = 84$$
$$3y + 21 = 84$$
$$3y + 21 - 21 = 84 - 21$$
$$\frac{3y}{3} = \frac{63}{3}$$
$$y = 21$$

The numbers are 21, 28 and 35

Activity

1. The sum of 3 consecutive multiples of 6 is 72.
   (a) If the second number is r, find the value of r. (b) Find their range
2. The sum of 3 consecutive multiples of 3 is 36. If the middle number is m.
   (a) Find the value of m. (b) Find their range
3. The sum of 4 consecutive multiples of 4 is 72. What are the numbers if the biggest number is p.
4. The mean of three consecutive multiples of 12 is 36. Find the numbers.

4.10. Finding Consecutive Numbers When Given Median

The median of six consecutive odd numbers is 18. Find the numbers.

Name the smallest odd number.

Let the first odd number be g.

1st no.	2nd no.	3rd no.	4th no.	5th no.	6th no.
g	g+2	g+4	g+6	g+8	g+10

The two middle numbers are (g+4) and (g+6). To find their median add them together and divide by 2.

$\frac{g+4+g+6}{2} = 18$

$\frac{g+g+4+6}{2} = 18$

$2^1 \times \left(\frac{2g+10}{2_1}\right) = 18 \times 2$

$2g+10 = 36$

$2g+10-10 = 36-10$

$\frac{2g}{2} = \frac{26}{2}$

$g = 13$

1st	2nd	3rd	4th	5th	6th
g	g+2	g+4	g+6	g+8	g+10
13	13+2	13+4	13+6	13+8	13+10
13	15	17	19	21	23

The numbers are 13, 15, 17, 19, 21 and 23.

Example 2

The median of four consecutive even numbers is 19. List the numbers.

Name the smallest even number.

Let the smallest even number = p

1st no.	2nd no.	3rd no.	4th no.
p	p+2	p+4	p+6

There are two median numbers p+2 and p+4.

$\frac{p+4+p+4}{2} = 19$

$\frac{p+p+2+4}{2} = 19$

$2 \times \left(\frac{2p+6}{2}\right) = 19 \times 2$

$2p+6 = 38$

$2p+6-6 = 38-6$

$\frac{2p}{2} = \frac{32}{2}$

$P = 16$

p	p+2	p+4	p+6
16	16+2	16+4	16+6
16	18	20	22

The numbers are 16, 18, 20 and 22.

Example 3

If the median of four consecutive counting numbers is 8½. Work out the numbers.

Let the smallest counting number = t.

$\frac{t+1+t+2}{2} = 8\frac{1}{2}$

$\frac{2t+3}{2} = \frac{17}{2}$

$\frac{2^1 \times 2t+3}{2_1} = \frac{17}{2_1} \times 2^1$

$2t+3 = 17$

$2t+3-3 = 17-3$

$\frac{2t}{2} = \frac{14}{2}$

$t = 7$

1st	2nd	3rd	4th
t	t+1	t+2	t+3
7	7+1	7+2	7+3
7	8	9	10

The numbers are 7, 8, 9 and 10

Activity

1. The median of four consecutive odd numbers is 8. List the numbers.
2. If the median of six consecutive odd numbers is 10. Find the numbers.
3. The median of four consecutive odd numbers is 16. Find the numbers.
4. The median of two consecutive odd numbers is 22. Work out the numbers.
5. The median of two consecutive odd numbers is 28. List down the numbers.
6. The median of four consecutive even numbers is 21. Find the numbers.

L.C.M = product of ratios × G.C.F
L.C.M = 2×3×10
L.C.M = 60

Example 2

The ratio of three number is 3:4:5 respectively their GCF is 8,

a) Find the numbers (Multiply each ratio by the GCF.

Ratio	3	4	5
Method	3×8	4×8	5×8
Number	24	32	40

b) L.C.M = product of the ratios ×G.C.F
L.C.M = 3×4×5×8
L.C.M = 480

Activity

1. The ratio of two numbers is 3:4 respectively if their greatest common factor is 6,
   a) Find the numbers. b) Calculate their L.C.M.
2. If the ratio of two numbers is 5:7 respectively their G.C.F is 5.
   a) Work out the numbers. b) What is their lowest common multiple?
3. Given that the ratio of two numbers is 5:8 respectively. Find their lowest common multiple is the greatest common factor is 6.
4. The ratio of three numbers is 4:5:6 respectively. If their G.C.F is 4,
   a) Find the numbers. b) What is their L.C.M?
5. The greatest common factor of three numbers is 12. If the numbers are in the ratio of 2:3:5 respectively.
   a) Work out the three numbers.
   b) Calculate the L.C.M of the three numbers.
6. Three numbers are in the ratio of 4:5:7. Their greatest common factor is 10. Calculate their lowest common factor.
7. Three numbers are in the ratio of 2:3:4 respectively. If their L.C.M is 36.
   a) Find their G.C.F b) What are the numbers.
8. The ratio of two numbers is 3:4, their L.C.M is 36.
   a) Find the numbers. b) Calculate their G.C.F

14. A pump filled a barrel in 8 minutes and another one emptied it in 10minutes. How long would it take to fill it if the two pumps were opened at the same time?
15. A tap was opened for 5 minutes and 40 litres of water poured into the tank. How long would it take to fill the tank whose capacity is 1080 litres using the same tap (Give your answer in hours)

5.12. More of Application of Fractions

Example 1

A tank was $\frac{4}{5}$ full of water, when $\frac{1}{4}$ of the water in the tank was drawn, 1500litres remained. Find the capacity of the tank when full.

(i) Find the fraction of water.	Fraction of water remained in the tank	Capacity of the tank
$\frac{1}{4}of\frac{4}{5}=\frac{1}{4_1}\times\frac{4^1}{5}$ $=\frac{1}{5}$	$\frac{4}{5}-\frac{1}{5}=\frac{3}{5}$	3parts rep 1500L 1part rep $\left(\frac{1500}{3}\right)L$ 1 part rep 500L 5 parts rep (500×5) 5parts rep 2500L

Example 2

A tank is $\frac{5}{6}$ full of water. When $\frac{1}{6}$ of the water in the tank was added, 300litres of were needed to fill the tank. Calculate the capacity of the tank when completely full.

Fraction of water added	*New fraction*	*Fraction needed to fill the tank*
$\frac{5}{6}\times\frac{1}{6}=\frac{5}{36}$	$\frac{5}{6}-\frac{5}{36}$ $\frac{30+5}{36}=\frac{35}{36}$	$\frac{36}{36}-\frac{35}{36}=\frac{1}{36}$

Capacity of the tank
1 part rep 300litres
36parts rep (300×36)L
36parts rep 10800L

The capacity of the tank is 10800litres.

Example 3

A tank is 75% full of water when 25% of the water was drawn, 200litres of water remained.

a) Workout the capacity of the tank when full.

Percentage of water removed	Fractions of water remained	
$\frac{\cancel{25}^3}{\cancel{100}_4}\times\frac{25^1}{100}$ $\frac{3}{16}$	$\frac{75}{100}-\frac{3}{16}=\frac{3}{4}-\frac{3}{16}$ $\frac{12-3}{16}=\frac{9}{16}$	$\frac{9}{16}$ parts represent 7200L 1part represents $\left(\frac{7200}{9}\right)L$ 1part represents 800litre 16parts represent (800×16)L 16parts represent 12800litres Capacity of tank 12800litres

Method 1

Uganda Crane losing match.

$$\begin{array}{r} 1 - 0.7 \\ 1.0 \\ -\ 0.7 \\ \hline 0.3 \end{array}$$

The probability of losing the march is 0.3.

Method 2

Uganda Crane losing the match.

$$1 - \frac{7}{10}$$

$$\frac{10}{10} - \frac{7}{10} = \frac{3}{10}$$

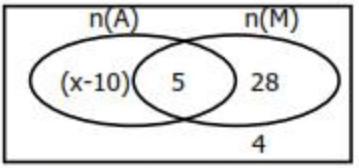
$$\frac{3}{10} = 0.3$$

The probability of Uganda Cranes losing is 0.3.

Activity 1:11

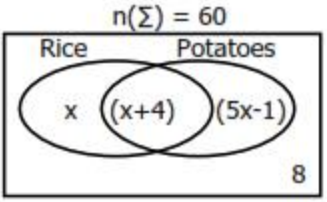
1. The probability of Harry Kane scoring a winning goal in the Euro 2024 is $\frac{7}{12}$. What is the probability of Harry Kane failing to score a winning goal?
2. The probability of picking a boy at random to lead prayers at the school assembly is $\frac{17}{20}$. What is the probability of picking a girl to lead the prayers?
3. The probability of picking a he-goat from a goat farm is $\frac{3}{4}$. Find the probability of picking a she goat.
4. Mr. Byaruhanga' family has 18 people. $\frac{2}{3}$ of people are below 12 years of age.
   a) What is the probability of picking a person above 12 years to go and fetch water?
   b) How many people are above 12 years of age?
5. In a class, there are 13girls and 17boys. What is the probability of picking a boy to clean a chalkboard?
6. A fruit seller had a basket of fruits, 8 apples, 12 paw paws and 15 lemons.
   a) What is the probability of picking a lemon from the basket at random?
   b) Find the probability of picking a paw paw at random from the basket.
7. A basket is full of oranges and mangoes. The probability of picking an orange at random from the basket is $\frac{3}{8}$.
   a) What is the probability of a mango at random?
   b) If there are 15 mangoes in the basket, find the total number of fruitd in the basket.
8. In a school of 480 pupils, the probability of picking a girl to scrab the toilet is $\frac{3}{8}$.
   a) How many boys are in the school?
   b) What is chance of picking a boy to scrap the toilet?
9. The probability of picking a Moslem student from primary seven is 0.15.What is the probability of picking a student from other dominations?
10. There are 36pupils in primary seven who like rice and bananas.
    a) If the probability of picking a pupil who like bananas is 0.75, what is the probability of picking a pupil who like rice?
    b) How many pupils like bananas?

4. Study the Venn diagram below and answer the following questions;



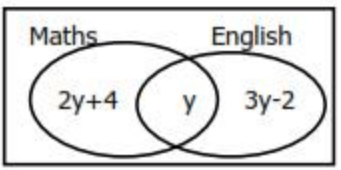
a) If the number of pupils who like apples (A) only were 24. Find the value of x.
b) Find the total number of pupils in the whole class.

5. The Venn diagram below shows the number of farmers who grow different crops in a community farm.



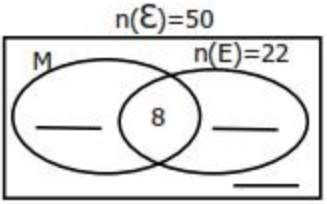
a) Find the value of x.
b) How many farmers grow Potatoes?

6. The Venn diagram below shows the number of pupils who like maths and English in primary seven.



a) If 22 pupils like English, find the value of y.
b) How many pupils like Maths only?
c) How many pupils are in the class altogether?

8. In a class of 50 pupils, 8pupils passed both Maths and English. 22pupils passed English,(y+8)pupils passed Math only while (y – 2)pupils passed neither.
(a) Use the information above to complete the Venn diagram.



(b) Find the value of y.
(c) How many pupils passed only one subject?

Activity 1:14 More about Application of Set Concepts

1. In a sports club (2n+4) people like playing football (F)only, 40 people like playing volley ball (V), 12 like playing both football and volley ball while (n+2) people like playing other games.

2.13. Finding the missing Bases

To find the missing base, the most important part is to change all the units to denary.

Example 3

Find base K: $205_k = 115_{eight}$

$(2xk^2) + (0xk^1) + (5xk^0) = (1x8^2) + (1x8^1) + (5x8^0)$

$2xk^2 + 0 \times k + 5 \times 1 = 1 \times 8 \times 8 + 1 \times 8 + 5 \times 1$

$2k^2 + 5 = 77$

$2k^2 + 5 - 5 = 77 - 5$

$\frac{{}^{1}\cancel{2}k^2}{\cancel{2}_1} = \frac{\cancel{72}^{36}}{\cancel{2}_1}$

$k^2 = 36$

$\sqrt{k^2} = \sqrt{36}$

$k = 6$

K is base six

Activity 2.13

Find the unknown base in each of the following numbers;

1) $22_q = 15_{nine}$ 2) $55_a = 50_{nine}$ 3) $104_n = 29_{ten}$ 4) $34_t = 22_{ten}$

5) $106_x = 42_{ten}$ 6) $x^2 = 17_{nine}$ 7) $y^2 = 61_{eight}$ 8) $m^2 = 121_{six}$

9) $p^2 + p^2 = 32_{ten}$ 10) $24_m = 14_{ten}$ 11) $22_x = 15_{nine}$

12) Give that $t^2 + t^2 = 112_{five}$. Find the value of t.

2.14. More About Finding the Unkown

Example 1

$1p3_{five} = 102_{six}$, find the value of p.

$(1\times5^2)+(p\times5^1)+(1\times6^2)+(0\times6^1)+(2\times1)$

$1\times5\times5+5p+3 = 1\times6\times6+0+2$

$25+5p+3 = 36+2$

$25+3+5p = 38$

$28+5p = 38 - 28$

$28 - 28+5p = 38 - 28$

$\frac{5p}{5} = \frac{10}{5}$

$P = 2$

Example 2

$142_{five} = 11x_{six}$. Find the value of x.

$1\times5^2+4\times5+2\times1=(1\times6^2)+(1\times0^1)+(2\times1)$

$1\times5\times5+4\times5+2\times1=1\times6\times6+1\times6+x\times1$

$25+20+2=36+6+x$

$47=42+x$

$47 - 42=42x - 42 + x$

$5 = x$

$x = 5$

Activity

1. Solve for y; if $y^4_{six} = 121_{three}$
2. Find the value of b; if $34_{five} = 10b_{four}$
3. Solve for w, if $1w3_{four} = 43_{six}$
4. Solve for y; if $2y4_{five} = 69$.
5. If $g14_{five} = 73_{eight}$, find the value of g.
6. Given that $1g4_{five} = 39$. Solve for g.

Example 3

Write 405 in standard form

$405 \div 10 = 40.5$

$40.5 \div 10 = 4.05$

$405 = (4.05 \times 10^2)$

Example 4

Express 125.8 in scienfic notation

$125.8 \div 10 = 12.58$

$12.58 \div 10 = 1.258$

$125.8 = (1.258 \times 10^2)$

Activity

Write the following in standard/scientific notation.

1) 4000	2) 600	3) 1000	4) 1200	5) 1800	6) 240
7) 980	8) 14560	9) 1234	10) 245.2	11) 871.25	12) 36.8
13) 100.7	14) 48.2	15) 7.2	16) 5.4		

3.4. Expressing Numbers Less Than One in Scientific Notation/Standard Form

Procedure:

- ✓ Expressing numbers less than 1, we multiply the given number by 10 until one counting number digit is got on your left or the side of whole numbers.
- ✓ Count the number of times you multiplied.
- ✓ The final answer should be in terms of $(b \times 10^n)$

Example 1

Express 0.048 in standard form.

$0.048 \times 10 = 0.48$

$0.48 \times 10 = 4.8$

$0.048 = (4.8 \times 10^{-2})$

Example 2

Write 0.0064 in scientific notation.

$0.064 \times 10 = 0.64$

$0.64 \times 10 = 6.4 \times 10$

$0.0064 = (6.14 \times 10^{-3})$

Activity

Write the following in standard form/scientific notation.

1) 0.24	2) 0.84	3) 0.072	4) 0.096
5) 0.008	6) 0.0006	7) 0.00028	8) 0.0042
9) 0.0074	10) 0.000124	11) 0.2005	12) 0.08

3.5. Finding the Number Expressed in Standard or Scientific Notation

Procedure:

Express the number as a common fraction.

State the meaning of the given power.

i.e. $10^3 = 10 \times 10 \times 10$

$10^5 = 10 \times 10 \times 10 \times 10 \times 10$

$10^{-3} = \frac{1}{10 \times 10}$

$10^{-5} = \frac{1}{10 \times 10 \times 10 \times 10 \times 10}$

Compute the numbers correctly.

Example 1

2.43×10^2

$\frac{243}{100} \times 10 \times 10$

$\frac{243}{\cancel{100}} \times \cancel{100}$

$= 243$

Example 2

Write in short 4.8×10^4

$\frac{48}{10} \times 10 \times 10 \times 10 \times 10$

$\frac{48}{\cancel{10}_1} \times 10000$

$48 \times 1000 = 48000$

Example 3

Write the number in short

3.2×10^{-2}

$\frac{32}{10} \times \frac{1}{10 \times 10}$

$\frac{32}{10} \times \frac{1}{1000} = \frac{32}{1000}$

$\frac{32}{1000} = 0.032$