

**PRIMARY SIX**

**LESSON NOTES**

**MATHEMATICS**

**TERM 3**

**FINITE SYSTEM**

**Revision about integers (P.5 work)**

**Addition in finite system: (Revision)**

1. Add the following:
2. Add the following:
3. 1 + 2 + 3 = \_\_\_\_ (finite 4)
4. 4 + 3 + 5 = \_\_\_\_ (finite 6)
5. 1 + 2 + 1 + 2 = \_\_\_\_ (finite 3)
6. 2 + 3 + 4 + 3 = \_\_\_\_ (finite 6)
7. 4 + 3 + 2 + 1 = \_\_\_\_ (finite 12)
8. 2 + 3 + 7 + 2= \_\_\_\_ (finite 11)
9. 2 + 4 + 3 + 4= \_\_\_\_ (finite 7)
10. 2 + 5 + 3 + 5 = \_\_\_\_ (finite 13)
11. 2 + 2 + 2+ 2 = \_\_\_\_ (finite 8)
12. 4 + 2 + 3 + 2 = \_\_\_\_ (finite 9)
13. 1 + 3 = \_\_\_\_ (finite 5)
14. 2 + 3 = \_\_\_\_ (finite 5)
15. 3 + 4 = \_\_\_\_ (finite 5)
16. 5 + 6 = \_\_\_\_ (finite 7)
17. 3 + 5 = \_\_\_\_ (finite 6)
18. 3 + 2 = \_\_\_\_ (finite 4)
19. 4 + 6 = \_\_\_\_ (finite 8)
20. 7 + 8 = \_\_\_\_ (finite 9)

**Activity**

1. **Subtract the following:**
2. 2 – 4 = p (finite 5)
3. 3 – 5 = q (finite 7)
4. 5 – 8 = m (finite 9)
5. 1 – 7 = d (finite 8)
6. 4 – 7 = q (finite 1)
7. 2 – 6 = a (finite 7)
8. 2 – 3 = p (finite 4)
9. 2 – 4 = m (finite 4)
10. 1 – 2 = z (finite 3)

**Solving equations involving finite system.**

Solve: 3 (p – 2) = 1 (finite 5)

3p – 6 = 1 (finite 5)

3p – 6 + 6 = 1 + 6 (finite 5)

3p + 6 – 6 = 7 (finite 5)

3p = 7 (finite 5)

3p = 7 + 5 = (finite 5)

3p = 12 (finite 5)

**P = 4**

**SUBTRACTION IN FINITE SYSTEM**

1. 2 – 3 = m (finite 5)

(2 + 5) – 3 = m (finite 5)

7 – 4 = m (finite 5)

3 = m

**m = 3**

1. a – 4 = 7 (finite 8)

a – 4 + 4 = 4 + 7 (finite 8)

a + 4 – 4 = 11 (finite 8)

a = 11 – 8 (finite 8)

**a = 3**

1. **Subtract the following;**
2. y – 3 = 6 (finite 7)
3. p – 3 = 4 (finite 5)
4. n – 5 = 4 (finite 7)
5. y – 6 = 5 (finite 7)
6. m – 7 = 4 (finite 9)
7. w – 8 = 5 (finite 10)
8. m – 4 = 5 (finite 7)
9. a – 3 = 5 (finite 6)

**Activity 1:**

**Activity 2:**

1. 4m = 6 (finite 7)
2. 3y = 5 (finite 7)
3. 2p = 3 (finite 5)
4. 3y = 3(finite 4)
5. 5n = 3 (finite 5)
6. 2w = 3 (finite 5)
7. 2r = 2 (finite 5)
8. 3d = 4 (finite 8)
9. 3m = 3 (finite 8)
10. 2p = 3 (finite 5)
11. 2(p – 2) = 1 (finite 3
12. 2(w – 1) = 4 (finite 6)
13. 4(m – 2) = 3 (finite 5)
14. 5(p – 1) = 2 (finite 7)
15. 6(y – 3) = 10 (finite 8)
16. 6(p – 4) = 10 (finite 12)
17. 3(y – 1) = 1 (finite 5)
18. 2(d – 3) = 2 (finite 7)
19. 2 (2m – 2) = 3 (finite 5)
20. 3(2r – 3) = 5 (finite 11)
21. 2(4y – 2) = 6 (finite 11)
22. 4(2p – 1) = 2 (finite 5)

**MULTIPLICATION IN FINITE SYSTEM**:

**DIVISION IN FINITE SYSTEM:**

Work out 1 ÷ 5 = m (finite 6)

1 + 6 ÷ 5 = m (finite 6)

7 ÷ 5 = m (finite 6)

6 + 7 ÷ 5 = m (finite 6)

13 ÷ 5 = m (finite 6)

13 + 6 ÷ 5 = m (finite 6)

19 ÷ 5 = m (finite 6)

19 + 6 ÷ 5 = m (finite 6)

25 ÷ 5 = m (finite 6)

**5 = m**

**m =5**

**APPLICATION OF FINITE 7:**

This applies in days of the week. A week has seven days.

0 – Sunday

1 – Monday

2 – Tuesday

3 – Wednesday

4 – Thursday

5 – Friday

6 – Saturday

Work out the following;

1. 4 x 6 = y (finite 7)
2. 5 x 4 = m (finite 8)
3. 2 x 3 = q (finite 4)
4. 6 x 4 = w (finite 9)
5. 12 x 11 = d (finite 13)
6. 3 x 22 = m (finite 5)
7. 22 x 32 = n (finite 11)
8. (2 x 7)2 = f (finite 9)
9. 4(4)2 = m (finite 9)
10. 43 = d (finite 7)

Divide the following:

1. 5 ÷ 3 = r (finite 7)
2. 4 ÷ 3 = m (finite 5)
3. 2 ÷ 4 = d (finite 5)
4. 2 ÷ 4 = n (finite 6)
5. 4 ÷ 4 = w (finite 8)
6. 3 ÷ 4 = y (finite 7)
7. 3 ÷ 2 = z (finite 5)
8. 3 ÷ 5 = p (finite 6)
9. 4 ÷ 2 = a (finite 6)

If today is Thursday, what day of the week will it be after 82 days?

4 + 82 = y (finite 7)

86 = y (finite 7)

86 ÷ 7 = y (finite 7)

12 rem 2

m = 2

**It will be a Tuesday.**

**Assignment.**

**Work out the following:**

1. If today is Tuesday, what day of the week will it be after;
2. 46 days
3. 172 days
4. 18 days
5. 281 days
6. If today is a Thursday, what day of the week will it be after;
7. 37 days
8. 462 days
9. 85 days
10. 164 days
11. If today is Friday, what day of the week will it be after;
12. 15 days
13. 250 days
14. 19 days
15. 170 days
16. If today is a Saturday, what day of the week will it be after;
17. 28 days
18. 111 days
19. 14 days
20. 96 days
21. If today is a Wednesday, what day of the week was it;
22. 22 days ago
23. 156 days ago
24. 14 days ago
25. If today is a Saturday, what day of the week was it?
26. 82 days ago
27. 246 days ago
28. 157 days ago
29. 47 days ago
30. If today is a Friday, what day of the week was it;
31. 37 days ago
32. 180 days ago
33. 12 days ago
34. 462 days ago

**APPLICATION OF FINITE 12:**

Finite 12 is applied in months of the year. A year has 12 months.

1. It is July now, which month of the year will it be after 2132 months?
2. It is April now; which month of the year was it 346 months ago
3. If this month is October, what month of the year will it be after 1242 months?
4. If this month is February, what month of the year of the year will it be after 218 months?
5. If this month is august, what month of the year will it be after 39 months?
6. It is March now, what month of the year will it be after 49 months?
7. It is September, what month of the year will it be after 156 months?
8. If this month is February, what month of the year was it 124 months ago?
9. It is May now; which month of the year was it 1434 months ago?
10. Kato was born 1341 months ago, in which month was he born, if it is august now?
11. It is June now, what month of the year was it 79 months ago?
12. It is January now, what month of the year was it 280 months ago?

**APPLICATION OF FINITE OF TIME (FINITE 12)**

This applies on 12-hour clock.

1. It is 7:00 am, what time will it be after 9 months from now?

7 + 9 = m (finite 12)

16 = m (finite 12)

16 ÷ 12 = 1 remainder 4

**4:00 pm**

1. It is 11:00 pm, what time will it be after 19 hours from now?

11 + 19 = p (finite 12)

30 = p (finite 12)

30 ÷ 12 = 2 remainder 6

**6:00 pm**

1. It is 5:00 pm now, what time will it be after 16 hours.

5 + 16 = d (finite 12)

21 = d (finite 12)

21 ÷ 12 = 1 remainder 9

**9:00 am**

1. It is 3:00 am, what time will it be after 32 hours from now?

3 + 32 = b (finite 12)

35 = b (finite 12)

35 ÷ 12 = 2 remainder 11

**11:00 am**

**Activity:**

1. It is 3:00 am now, what time will it be after 14 hours from now?
2. A meeting started at 8:00 am, it lasted for 8 hours. At what time did it end?
3. It is 6:00 pm now, what time will it be after 9 hours from now?
4. A train left Mombasa at 10:00 pm, it reached Kasese after 42 hours, at what time did it reach Kasese?
5. It is 5:00 am now, what time will it be after 17 hours from now?
6. We left Mbarara at 9:00 am and reached Kampala after 14 hours, at what time did we reach Kampala?
7. James left home for school at 8:00 am and reached school after 6 hours, what time did he reach school?
8. It is 7:30 am now, what time will it be after 7 hours?
9. It if is 10:00 am now, what time will it be after 28 hours?

**APPLICATION OF FINITE OF TIME (FINITE 24)**

This applies on 24-hour clock.

1. It is 5:00 pm now, what time will it be after 1340 hours?
2. It is 3:00 pm now, what time will it be after 78 hours?
3. It is 5:00 am now, what time will it be after 1240 hours?
4. It is 7:00 pm now, what time will it be after 343 hours?
5. It is 1800 hours, what time will it be after 2456 hours?

**Geometry 1 (angles)**

**Angles(REVIEW)**

**COMPLEMENTARY ANGLES.**

1. What is the complement of
2. What is the complement of
3. What is the complement of ()
4. What is the complement of
5. What is the complement of
6. What is the complement of
7. Two complementary angles are and what is the value of x
8. Two angles and add up to what is the size of each angle?
9. What angle is of its complement?
10. What angle is 8 times its complement angles?

**Supplementary angles**

Find the value of the unknowns

1. What is the supplement of
2. What is the supplement of
3. and are supplementary angles. Find the value of
4. One a straight line, one angle is twice the other angle. Find the size of the angles.
5. Two supplementary angles are
6. What angle is 5 times its supplements?

**Vertically opposite angles**

**Vertically opposite angles are equal.**

Solve for the unknowns

**Angles of triangles**

**Properties of triangles.**

1. **Angles in a triangle add up to**

This is called **interior angle sum** of a triangle.

**A**

**B**

**C**

**D**

**E**

**F**

**H**

**I**

**G**

1. **EXTERIOR ANGLES OF TRIANGLES**

Exterior angles of a triangle add up to

1. **The sum of two interior angles equals to one exterior angle.**

Find the value x

x

***y***

**PROPERTIES OF ISOSCELES TRIANGLES.**

* + - 1. An isosceles triangle has one line of folding symmetry.
      2. An isosceles triangle has two sides equal.
      3. An isosceles triangle has two base angles equal**.**

**Two sides equal.**

12cm

3(t-6)cm

18cm

3 ( t - 6) = 12

3 t - 18 = 12

3t - 18 + 18 = 12 + 18

3t = 30

2x - 4 cm

(x+11) cm

(x+6) cm

(y+6)cm

(4y – 3)cm

(5y)cm

21cm

(n+6)cm

**Two base angles are equal**

**Find the value of the unknowns**

2x = (Base angles are equal)

2x

m

m

**ANGLES ON PARALLEL LINES**

1. **Co-interior angles**

These are angles on same side of the transversal line but inside parallel lines.

Co – interior angles add up to

a

b

a + b =

x

**ACTIVITY**

x

**Co – exterior angles**

These are angles outside the parallel line but on the same side of a transversal line.

4x

3x +

Co-exterior angles add up to

5x +

3x

4x

4y

5y

3x

**ALTERNATE ANGLES**

**Alternate interior angles**

These are angles found on the either side of the transversal line but inside the parallel lines. They are also called Z angles because they form true or false letter Z. These angles are equal.

5x

a

b

3x

**Alternate exterior angles**

These are angles on the either side of the transversal line but outside the parallel lines.

Exterior angles are equal**.**

**Corresponding angles.**

Corresponding angles are equal.

**Recognizing angles formed by parallel lines**

m

m

**Angles on parallel lines and triangles**

**Find the value of the unknown angles**

**m**

***650***

***130O***

**G**

**D**

**C**

**X**

**F**

***72O***

***124O***

**E**

**A**

**B**

***p0***

***110O***

***4x0***

***2xO***

**CONSTRUCTION**

**Constructing perpendicular bisectors on line at given points**

Using a rular, a pencil and a pair of compasses only construct a perpendicular bisector from the points marked with letters to meet the lines drawn

**X**

**B**

**A**

**X**

**B**

**A**

**P**

**M**

**T**

**M**

**P**

**S**

**P**

**M**

**T**

**BISECTING ANGLES**

**CONSTRUCTING ANGLES**

Using a ruler, a pencil and a pair of compasses only construct the following angles

1. b. c. d. e. f

g. h. i. j. k. l.

**Constructing triangles (SSS)**

1. Using a ruler, a pencil and a pair of compasses only construct the following triangles when sides are given (sss)
2. Triangle ABC where AB = 7cm, BC =6cm and AC= 5cm
3. Triangle PQR where PQ = 8cm, QR = 7cm and PR = 6cm
4. Triangle QRS where QR = 4.5cm, RS=3.2cm and QS = 4cm
5. Triangle ZXY where ZY = 5cm, XY = 3cm and ZX = 4cm.
6. Triangle ABC, where BC= 5cm, XY = 3cm and ZX = 4cm.
7. Triangle PQR where PQ=6cm, PR = 8cm, and QR = 10cm
8. Equilateral triangle of sides 5cm.
9. Equilateral triangle of sides 5cm.
10. Equilateral triangle of diameter 9cm.

**TRIANGLES (SAS)**

1. Using a ruler, a pencil and a pair of compasses only construct the following triangles when given 2 Sides and 1 angle (SAS)
2. Triangle XYZ where XY = 7cm, angle X= and XZ = 5.5cm. Measure angle Z and Y.
3. Triangle PQR where PQ= 6cm, angle P = and PR = 5cm
4. Triangle ABC where AB = 6cm, AC= 5cm, BAC= and measure line BC
5. Triangle XYZ in which XY = 5.3cm YZ = 5cm and angle Y = Measure angle X and line XZ.
6. Triangle RST where RS = 8cm, angle R = and line RT = 9.5cm. Measure angle RST and line ST.
7. Triangle XYZ where XY = 6.5cm, angle X = and line XZ = 4cm. measure angle XYZ.

**TRIANGLES (AAS)**

1. Using a ruler, a pencil and a pair of compasses only construct the following triangles when given 2 angles and 1 side (AAS)
2. Triangle ABC such that line AB=6cm, angle BAC = and angle= .
3. Triangle ABC such that AB=6cm, angle ABC= , angle BAC= . Drop a perpendicular line from B to meet line AC at R.
4. Triangle KAB where KA= 5cm, BKA = and KAB = .
5. Triangle XYZ such that XY = 6.5cm, angle YXZ= and angle XYZ = . Drop a perpendicular line from point Z to meet line XY at p.
6. Triangle CAT where ACT = , CAT = and CA= 4cm.
7. Triangle XYZ in which XY= 6cm, angle YXZ= and ZYX =
8. Triangle XYZ where angle X = , angle Y = and line XY =5cm.

i). measure line XZ.

ii). Measure angle XZY

iii). Drop a perpendicular from Z to meet line XY at O

**CONSTRUCTING RHOMBUSES AND PARALLELOGRAMS**

Using a ruler, a pencil and a pair of compasses only construct the following.

1. A rhombus ABCD of side 5cm with diagonal AC =8CM and BD= 6cm
2. A parallelogram PQRS whose longer side QR is 7cm, angle Q= and a shorter side PQ= 4cm. Measure the diagonals.
3. A rhombus ABCD where AB = 6cm, diagonal AC = 10.4cm and line BD=6cm. Measure angle ABC.
4. A parallelogram PQRS where QR = 7cm, Q= and line PQ = 3.5 cm. Measure angle PRS.
5. A parallelogram EFGH where EF = 8cm, EH = 6cm and diagonals FH is 10 cm. Measure the diagonal EG
6. A parallelogram JKLM where JK = 8cm, angle J = and line JM = 4cm. Measure diagonal JL and KM
7. A quadrilateral ABCD where AB = 7cm, angle ABC = BAD = and BC = 3.5cm.
8. A parallelogram ABCD such that AB = 7cm, BC=5cm and angle ABC =

i). drop a perpendicular from D to meet AB at M

ii). Measure the line DM.

1. A parallelogram KLMN in which KL = 4cm, LM = 6cm and angle NKL = . Measure length of the diagonal KM.
2. Follow the instructions below and construct a parallelogram

* Draw a horizontal line AB of length 7cm
* Draw a perpendicular bisector of line AB, mark the point O where the bisector meets line AB, measure a length 3 cm from O along the bisector.
* Mark this point P. Join A to P. lines AP and AB form two sides of the parallelogram.

i). complete the parallelogram the parallelogram APCB.

ii). Measure OC

iii). Measure angle BOC.

1. The diagonals of a parallelogram bisect each other. Construct a parallelogram PQRT, given that PQRT given that PQ= 7cm PR=10cm and QT= 8cm. measure QR.

**PERIMETER OF POLYGONS**

**Revision**

**Find the perimeter of the following figures.**

20m

15m

12dm

15dm

9dm

8dm

6m

8m

20cm

25cm

16cm

7cm

8cm

**Area of triangles.**

10cm

25cm

9cm

Area =

=

=

=

=

20cm

15cm

10cm

Area =

=

=

=

=

8cm

5cm

15cm

5cm

10cm

Area =

=

=

=

=

**Find the area of a triangles.**

Activity

Find the area of the triangles bellow

5cm

12cm

13cm

16cm

10cm

9cm

10cm

12cm

14cm

17cm

9cm

20cm

10cm

**A**

**B**

**C**

**FINDING ONE SIDE OF A TRIANGLE WHEN COMBINED**

Find the value of h

**Area**

= **Area**

=

=

=

=

=

=

=

=

20cm

h

12cm

6cm

16cm

**Area**

= **Area**

=

=

=

=

=

=

=

=

12cm

9.6cm

b

Activity

Calculate the length of the lines marked with letters

8cm

x

10cm

8cm

4cm

h

15cm

12cm

8cm

h

15cm

12cm

20cm

6cm

24cm

Y

4cm

9cm

6cm

Y

**AREA OF QUADRILATERALS**

**Area of a square = Side X Side (S X S)**

**Area of a rectangle = Length X Width (L X W)**

**Area of a parallelogram = Base X Height**

**Area of a rhombus =**

**Area of a kite =**

**Area of a trapezium =**

**Revision on area of squares, rectangles and parallelograms**

**14cm**

**13cm**

**9cm**

Area = b x h

= 13cm x 14cm

=

**15cm**

Area = s x s

= 15cm x 15cm

=

**10cm**

**8cm**

Area = L x W

= 10cm x 8cm

=

**Activity**

Find the area of the following.

**10cm**

**9cm**

**12cm**

**5cm**

**20m**

**15m**

**9dm**

**8dm**

**5cm**

**9cm**

**8cm**

**14cm**

**10cm**

**8cm**

**8cm**

**5cm**

**7cm**

**AREA OF A RHOMBUS**

**5cm**

**13cm**

**5cm**

**12cm**

**12cm**

**Approach 1**

Area =

=

=

**Approach 2**

**Area of 1 congruent triangle.**

Area =

=

=

**Area of 4 congruent triangles**

**Area**

**Approach 1**

**Using diagonals.**

Area =

=

=

**Approach 2**

**Using triangles.**

**Area of 4 congruent triangles**

**Area**

**2cm**

**2cm**

**3cm**

**5cm**

**AREA OF A KITE.**

**Activity**

Find the area of the following.

**8cm**

**12cm**

**8cm**

**6cm**

**6cm**

**4cm**

**4cm**

**3cm**

**3cm**

**12cm**

**9cm**

**20cm**

**32cm**

**3.5cm**

**5cm**

**8cm**

**2cm**

**2cm**

**3cm**

**5cm**

**5m**

**3m**

**13cm**

**4cm**

**6cm**

**8cm**

**AREA OF TRAPEZIUMS**

**8cm**

**12cm**

**7cm**

**8cm**

**12cm**

**7cm**

**A**

**B**

**Approach 1**

**Area =**

**=**

=

**Approach 2**

**Area of rectangle A**

Area = L

= 8cm x 7cm

***= 56***

**Area of a triangle B**

Area =

=

=

=

=

**Total area** =area A + area B

=**56 +**

**=**

*(12 – 7)*

*5cm*

**Assignment**

**10cm**

**4cm**

**4cm**

**14cm**

**8cm**

**24dm**

**9dm**

**11dm**

**7dm**

Work out the area of the following

**17cm**

**15cm**

**11cm**

**8cm**

**10cm**

**7cm**

**12cm**

**15cm**

**10cm**

**5cm**

***Our greatest weakness lies in giving up, the most certain way to success is always to try just one more time***

**AREA OF REGULAR POLYGONS.**

**6cm**

**7cm**

**Area =**

**=**

**=**

**=**

**=**

**=**

**Area of a pentagon.**

**8cm**

**3cm**

**Area =**

**=**

**=**

**=**

**=**

**=**

**Area of an equilateral triangle**.

**AREA OF CIRCLES**

1. Calculate the area of a circle whose radius is 14cm

Area of a circle =

=

=

= 22 2cm 14 cm

=

**Activity**

**What is the area of the circle whose radius is;**

1. 28cm
2. 42cm
3. 21cm
4. 1.4cm
5. 3.5cm
6. 84cm

**FINDING ONE SIDE OF A POLYGON WHEN GIVEN THE** **AREA**

1. The area of a square is  **,**find the length of each side.

Area of a square =

2. The area of a rectangle is  **and its width is 6cm.** find the length.

**Area of a rectangle =**

7

49

1

7

7

(7 x ~~7~~)

7

1. The area of a parallelogram below is  **,find the height.**

Area of a parallelogram =

4. The area of a triangle is  **and its base is 6cm.** find the height.

**Area of a triangle =**

*h*

*12cm*

**h**

**6m**

**Assignment**

1. The area of a rectangle is and its length is 13cm. what is its length?
2. The area of a square is . find the length of each side.
3. A rectangular field has an area of . Its width is 9m

a). find its length.

b). what is its perimeter?

4. Find the perimeter of a square whose area is .

**FINDING THE AREA OF THE SHADED PARTS.**

***PART 1***

***RECTANGLES AND SQUARES.***

**1.**A table of size 90cm by 60cm was partly covered by a piece of cloth70cm by 50cm. What part of the table was uncovered?

**70cm**

**50cm**

**60cm**

**90cm**

**Area of a table**.

Area = L W

=

=

**Area of a cloth**.

Area = L W

=

=

**Un covered part**

-

1. A carpet is laid centrally on a floor of a room 10m by 8m. find the area of the carpet if it left 1m on all sides.

**carpet**

**8m**

**10m**

**1m**

**1m**

**1m**

**1m**

**width of a carpet**

Area = ( 8 – 1 - 1)m

= 6m

**length of a carpet**

8m

**Area of the carpet**

Area = LW

= 8m 6m

=

**Assignment.**

1. **Find the area of the shaded part.**

**25cm**

**15cm**

**20cm**

**30cm**

**3m**

**3m**

**4m**

**5m**

**50cm**

**80cm**

**1m**

**2m**

1. **Find the area of the unshaded part.**

**20m**

**30m**

**3m**

**3m**

**3m**

**3m**

**8m**

**10m**

**1m**

**1m**

**1m**

**1m**

**18m**

**20m**

**2m**

**2m**

**2m**

**2m**

1. **Find the area of the whole figure**

**70m**

**5cm**

**5cm**

**5cm**

**5cm**

**60cm**

**24cm**

**2cm**

**2cm**

**2cm**

**2cm**

**16cm**

**30cm**

**3cm**

**3cm**

**3cm**

**3cm**

**20cm**

***PART 2***

***RECTANGLES, SQUARES AND TRIANGLES.***

1.Find the area of the shaded parts in the figure below.

**12cm**

**7cm**

**Area of a rectangle.**

Area = L W

=

=

**Area of 2 semi-circles**.

Area =( ) x2

**Area of the shaded part**

**Assignment.**

1. **Find the area of the shaded parts of the following.**

**7cm**

**12cm**

**20cm**

**14cm**

**14cm**

**14cm**

**28cm**

**7cm**

**18cm**

**7cm**

**18cm**

**14cm**

**20cm**

**44cm**

**28cm**

**28cm**

**PART 3**

**CIRCLES.**

Find the area of the shaded parts.

7cm

14cm

**Area of outer circle**.

Area =

**Area of inner circle**.

Area =

**Shaded part**

**Assignment.**

**Find the area of the shaded part.**

1.4cm

2.8cm

7cm

10cm

3cm

5cm

3.5cm

7cm

21cm

42cm

28cm

35cm

**TOTAL SURFACE AREA (T.S.A)**

1. **Total Surface Area of a cube**

Finding total surface area of cubes

10m

10m

10m

T. S. A =6

= 6(10m x 10m)

=

1. **Total surface area of a cuboid**

11cm

4cm

5cm

T.S.A =2(L X W) + 2(W X H) + 2(L X H)

=2(11cm X 4cm) +2(4cm X 5cm)+2(11cm X 5cm)

=(2 X 44) + (2 X 20)+ (2 X 55)

=88 + 40 + 110

=238

**Assignment.**

30m

10m

20m

9dm

4dm

3dm

10dm

10dm

10dm

8m

6m

3m

9m

a

9cm

8cm

5cm

b

**Find the total surface area of the following figures.**

1. **Total surface area of a cylinder.**

* A cylinder has three main surfaces. Two circular ends and a curved surface which forms a rectangle.
* The length of a rectangle formed is equal to the circumference since it was the curved surface of a cylinder.

**A net for a closed cylinder.**

**T.S.A =**

**=**

**=**

**Example**

**Find the total surface area of a closed cylinder below**

7cm

10cm

**T.S.A**  **=**

=

=

**Find the total surface area of the following closed cylinders.**

**20cm**

**15cm**

**a**

**35cm**

**60cm**

**b**

**21cm**

**100cm**

**c**

**10cm**

**d**

**14cm**

**8cm**

**e**

**14cm**

**10cm**

**f**

**21cm**

**35cm**

**g**

**20cm**

**Total surface area of an open cylinder (one end open)**

**T.S.A =**

**=**

**=**

1. Calculate the total surface area of an open cylinder whose radius is 7cm and height is 8cm as shown below.

**7cm**

8cm

**T.S.A**  **=**

=

=

**Activity.**

**Find the total surface area of the following open cylinders.**

**70cm**

**100cm**

**a**

**70cm**

**80cm**

**b**

**56m**

**3m**

**c**

**FINDING CIRCUMFERENCE**

* Circumference is the distance around a circle.
* Circumference is given by or and the value of
* We use when the radius or diameter is a multiple of 7 and 3.24 is used when the radius or diameter is a multiple of 10.

**Example.**

Find the circumference of a circle whose diameter or radius is;

approach 1 approach 2

10cm

Activity

Find the circumference of the following circles.

36cm

A

56cm

B

28cm

C

30cm

D

21cm

E

49cm

F

**FINDING CIRCUMFERENCE OF SECTORS.**

1. **SEMI CIRCLE**

Here, we only find the distance of the **curved part only(arc)**

**14cm**

**Approach 1**

**Approach 2**

1. **QUANDRANT**

**14cm**

**14cm**

Angle sector =

=

=

=

Circumference =

=

=

=

Circumference =

=

=

=

Angle sector =

=

=

=

**56cm**

1. **Other sectors**

**Activity**

Find the circumference of the following semi circles

**A**

**B**

**A**

**B**

**A**

**B**

**10dm**

**7 cm**

**56Hm**

**35 cm**

**A**

**B**

**14cm**

**14cm**

**10cm**

**10cm**

**21cm**

**FINDING THE PERIMETER OF SECTORS**

**14cm**

) *+ 14cm*

+ 14cm

= 36cm

1. **CIRCLES.**

**Activity**

**Find the perimeter of the following.**

**A**

**B**

**A**

**B**

**A**

**B**

**10dm**

**7 cm**

**56Hm**

**35 cm**

**A**

**B**

**Finding the radius of a circle when given circumference.**

Find the radius of a circle whose circumference is 44 cm.

Circumference = 2r

2

2

2

2

**Assignment**

Find the radius of the circles whose circumference are

1. 176cm
2. 880cm
3. 2.2cm
4. 39.6cm
5. 11cm
6. 88cm
7. 22cm
8. 66cm
9. **MEASURES 3**

**VOLUME AND CAPACITY.**

Volume is the amount of space occupied by an object.

Volume is measured using cubic metric units

**Finding volume of a cubes and cuboids.**

**a). Find the volume of a cube below.**

11cm

4cm

5cm

Volume = base area X height

= L X W X H

= 11cm x 4cm X 5cm

=

1. **find the volume of a cube below**

6m

6m

6m

Volume = base area X height

= S X S X S

= 6m x 6m X 6m

=

**Activity**

**Find the volume of the following**

9cm

8cm

5cm

b

6m

3m

9m

a

9dm

4dm

3dm

30m

10m

20m

8m

10dm

10dm

10dm

**FINDING THE VOLUME OF THE CYLINDERS.**

1. **What is the volume of the cylinder below?**

7cm

10cm

Volume = base area X height

=

=

=

=22

= 154

***The volume of the cylinder is 154***

**Activity**

**20cm**

**15cm**

**a**

**35cm**

**60cm**

**b**

**21cm**

**100cm**

**c**

**1.Find the volume of the following cylinders**

1. Find the volume of a cylinder whose diameter is 70dm and a height of 30dm.
2. What is the volume of a cylindrical tank whose radius is 70cm and height 150cm?
3. A water tank has a radius of 2.2m and height of 4m. find the volume of the tank (take ).

**FINDING SIDES OF A CUBE WHEN VOLUME IS GIVEN.**

1. Find the side of a cube whose volume is 125.
2. Calculate the length of a cube whose volume is 64
3. Find the perimeter of a cube whose volume is 729
4. Find the are a square that makes up a cube whose volume is 343.
5. A cube whose volume is 1000 was used to make a tank. Find its base.
6. Find the sum of any two given sides of a cube with a volume of 27
7. The volume a cube is 512 Calculate the length of its sides.

**FINDING CAPACITY**

**Capacity** is the amount of content a container can hold**.**

Capacity is given by

Examples.

1. A rectangular tank 30cm by 60cm by 90cm. find its capacity.

30cm

60cm

90cm

**a**

Volume = base area X height **capacity =**

= L X W X H =

= 30cm X 60cm X 90cm = 162 litres

=

**70cm**

**80cm**

**b**

4m

3m

2m

Volume = base area X height

= L X W H

= 400m X 300m X 200cm

=

1m = 100cm

4m = 4 X 100cm

=400cm

1m = 100cm

3m = 3 X 100cm

=300cm

1m = 100cm

2m = 2 X 100cm

=200cm

***Capacity***

24000 litres

b). How much water is in the tank below?

1. **How much water is in this tank?**

7cm

100cm

Volume = base area X height

=

=

=

=22

= 154

***Capacity***

15.4 litres

**Activity**

1. Find the capacity of the following.

10cm

10cm

10cm

5m

3m

10m

400cm

100cm

200cm

**70cm**

**100cm**

**a**

**70cm**

**80cm**

**b**

**56m**

**3m**

**c**

**21cm**

**70cm**

**100cm**

**140cm**

**100cm**

**21cm**

**30cm**

**90cm**

1. How much water is required to fill the following tanks?

**35cm**

**60cm**

**80cm**

**50cm**

**30cm**

**100cm**

**280cm**

**60cm**

**90cm**

1. Below is a container that was filled with the 44litres of passion fruit juice.

**140cm**

**70cm**

1. Find the radius (take )
2. If this juice is sold in half litre glass at sh.500, how much money does the seller collect after selling all the juice?
3. The diagram below is a cylinder of diameter and height as indicated below. Use it to answer the questions that follow.
4. Find the value of x **(2marks)**

(x+9)cm

(3x+1)cm

(5x-6) cm

1. Workout the diameter of the cylinder. **(1marks)**
2. Calculate he volume of the cylinder.

**FINDING CAPACITY OF CYLINDERS INVOLVING FRACTIONS.**

1. A cylindrical tank of height 70cm and diameter 40cm is full of water. How many litres of water can it hold when it is full?

**Capacity of the tank when full**

Volume = base area X height

=

=

=

=22

= 880

***Capacity***

88 litres

***Capacity*** when **full** of 88litres

3 litres

66litres

1. A tank is full of water. When 6000litres are removed the tank becomes full. How many litres can it hold when it is full?

***Water removed***

|  |  |  |
| --- | --- | --- |
| **Water in the tank** | **Water removed** | **Water remains** |
|  | ?? |  |
|  | 6000litres |  |

**APPROACH 2**

***=***

***=***

***It can hold 5760litres when it is***  full.

**APPROACH 1**

***Let the water removed be m***

***=***

***=***

***It can hold 5760litres when it is***  full.

**Activity**

1. A tank is full of water. When 600litres were added, the tank became full. How many litres does it contain when it is full?
2. A busket is full of water. When 4litres are removed, the bucket became full of water. How many litres can it hold when it is full?
3. A tank is full of water. When 3000litres were added the tank becomes full. How many litres can it hold when it is full?
4. The tank shown below is full of water

**35cm**

**(h)cm**

**100cm**

1. Find the value of h
2. How many litres of water are in the tank?
3. How many litres of water are needed to fill the tank?
4. A petrol tank was full of petrol. When 1080litres of petrol were added, the tank became full.
5. How many litres of petrol can it hold when it is full?
6. If of the petrol was sold. How many litres were sold?
7. A fuel tank is full of water. When 2800litres were added the tank becomes full. How many litres can it hold when it is full?
8. The rectangular tank below is full of water. Use it to answer the questions that follow.

*h*

**32cm**

**40cm**

**50cm**

a). How many litres are needed to fill the tank?

b). Find the value of h.

1. The given tank below is full of water.

*500cm*

x

**700cm**

800cm

i). How many litres are in the tank?

ii). How many litres are needed to fill the tank?

ii). Find the value of x

**PACKING CUBES OR CUBOIDS IN BOXES**.

1. How many cubes each of 10cm side can be packed in the box.

10cm

56cm

42cm

60cm

Along the length =

= 5cubes

Along the width =

= 4cubes

Along the height =

= 6cubes

= 120cubes

1. Calculate the space left after packing 3cm sided cube in the box 30cm by 16cm by 9cm.

3cm

**Volume of box**

Volume = base area height.

=

=

=

**Volume of 150 cubes**

Volume = 150(base area height).

=150 (

=

=

=

Space left = vol. of a box – vol. of cubes

=

**=**

30cm

16cm

9cm

Along the length =

= 10cubes

Along the width =

=5cubes

Along the height =

=3cubes

= 150cubes

**Activity**

1. Find how many boxes of B can fit in box A

**60Cm**

**24cm**

**40cm**

**A**

**3cm**

**2cm**

**4cm**

**B**

**16cm**

**17cm**

**15cm**

**A**

**2cm**

**2cm**

**2cm**

**B**

1. Below is a big box 70cm long, 60cm wide, and 50cm high. Small boxes 3cm by 3cm by 3cm are to be packed into a big box.

**70cm**

**60cm**

**50cm**

**3cm**

**3cm**

**3cm**

1. How many small boxes can be packed in the first layer?
2. Find the number of layers that can fill the big box?
3. How many small boxes can fill the big box?
4. Find the space left after packing.
5. Small box B can be packed into a rectangular tank A

**A**

**180cm**

**30cm**

**20cm**

**9cm**

**7cm**

**3cm**

1. How many such small boxes can be packed in the tank?
2. How many small boxes B will fill the first layer?
3. Find the space left un occupied after packing.

**B**

**PACKING CYLINDERS IN BOXES.**

1. a). How many cylindrical tins of diameter 7cm and height 10cm can be packed into a box measuring 56cm by 42cm by 60cm

**Approach 1**

**7cm**

**10cm**

**56cm**

**42cm**

**60cm**

Along the length =

=8 tins

Along the width =

= 6 tins

Along the height =

= 6 tins

No of cylinders = (8 66)

= 288 tins

**Approach 2**

No cylinders =

**= ) tins**

**=**(8 66)

= 288tins

**b).** Calculate the spaceleft

**Volume of the 228 cylinders**

Vol. = base area X height

=

=

=

=11

= 385

228 cylinders = 228 385

= 87780

**Volume of box**

Volume = base area height.

=

=

=

Space left=Vol. of a box–Vol.of cylinder

= – 87,780

**=**

**Activity**

1. How many tins of B can fit in box A and what space is left?

**42cm**

**35cm**

**56cm**

**A**

**7cm**

**8cm**

**B**

**18cm**

**14cm**

**28cm**

**A**

**6cm**

**7cm**

**B**

**53cm**

**41cm**

**40cm**

**A**

**10cm**

**10cm**

**B**

**a**

**b**

**c**

**84cm**

**44cm**

**36cm**

**A**

**14cm**

**6cm**

**B**

**30cm**

**30cm**

**30cm**

**A**

**5cm**

**14cm**

**B**

**60cm**

**60cm**

**40cm**

**A**

**20cm**

**19cm**

**B**

**d**

**e**

**f**

1. In the factory, the blue band cylindrical tins of diameter 7cm and height 10 cm are packed in large to boxes measuring 49cm by 42cm by 52cm. calculate the space left un occupied.
2. A potter poured in container A using a size of size B. Use the diagram below to answer the questions that follow.

**30cm**

**60cm**

**50cm**

**A**

**14cm**

**20cm**

**B**

1. Find the volume of the cup A
2. How many capfuls of size B did he pour into the container A to fill it?
3. Mr Lado a bee farmer harvested honey and packed in cylindrical tins A which he packed in boxes B for easy transportation to Kamonkoli market.

**30cm**

**20cm**

**40cm**

**A**

**7cm**

**10cm**

**B**

1. How many tins(A) can be packed in the box (B)
2. Work out the space left empty after packing the tins in the box.

**ALGEBRA**

Forming algebraic expressions

Examples

4 more than a = a + 4

X less than 12 = 12 - x

A number added to 10 = 10 + n

A number divided by 2 =

Three more than x equals to 7 is x + 3 = 7

**Activity**

1. A number multiplied by 6.
2. 3 subtracted from number
3. 2 divided by a number
4. Two books weigh 10 grams
5. Perimeter of a square is 40 cm
6. John is 5 years older than Mary.
7. Five boys shared sh.25000 equally.
8. Add nine to a number, the result is fourteen.
9. The sum of 2x, x and 12 is 30.

**Collecting like terms**

Examples

**How many altogether?**

2pens + 2pens + 2pens

**Note**: we use letters that will help you to name the items you are collecting

2pens +2pens+2pens = 2p + 2p + 2p

=6pens

**How many altogether?**

4 boys +3 boys - 5 boys = 4b+3b-5b

=7b- 5b

=2b

=2 boys

**Activity**

1. Workout algebraically by choosing the most suitable letter of the alphabet
2. 2 bananas +2 bananas
3. 4 cows +10 cows – 9 cows
4. 5 eggs + 5 eggs – 3 eggs
5. 9 cats – 5 cats
6. 12 pots + 8 pots -10 pots
7. Three boys have 3 books,5books and 6books respectively. How many books do they have altogether?
8. A farmer had 13 cows and sold off 5 cows. How many cows remained?
9. Find the sum of 2 bottles, 13 bottles, 1 bottle and 17 bottles.
10. A poultry keeper collected 20 eggs on Monday and 30 eggs on Tuesday but sold off 17 eggs. How many eggs remained?

**Collecting and simplifying like terms**

Collect the like terms

q +7q+4q

= 12q

**Example II**

Simplify: 2b+3t+3b+t

= (2b+3b) + (3t + t)

= 5b + 4t

**Example I**

**Example III**

Simplify: 9p + 6h -2p +4h

=(9p – 2p) + (6h+4h)

= 7p + 10h

Example IV

Simplify: 7y- 8m + y + 10m -6

= (7y + y) + (10m -8m) - 6

= 7y + 2m - 6

**Activity**

1. Collect like terms and simplify where necessary.
2. a +2b +3a
3. 6a – 4p + 2 +3
4. 8g + 4n – 6g +n
5. 4c + 10c – 9c
6. 7p – 3m – 2
7. 10d + 5w + 11w
8. 4b +26b- 17b

**Solving equations by subtracting**

Note: an equation is an algebraic expression with an equal sign between.

* In the equation like x+3 =5 the letter is called the UNKOWN value.
* We must always make sure that all equations balance.
* When we try to find the unknown value of the equation, we say we are solving the equation.
* We can balance the given equations by using the inverse operation to remove the unwanted numbers from both sides of an equation.

**Example I** **Example II**

16 + a = 20

16 – 16 + a = 20 – 16

a = 4

n + 7 = 13

n + 7 – 7 = 13 – 7

n = 6

Solve n + 7 = 13 Solve: 16 + a = 20

**Activity**

1. Solve the following:
2. n + 6 =13
3. n + 8 = 12
4. m + 5 =10
5. x + 7 =19
6. r + 6 =18
7. a + 9 =16
8. 13 + c =17
9. 16 + m =35
10. X + 25 =5

**Forming and solving equation involving subtraction.**

1. What number when added to 5 gives 11?

Let the number be y

Y + 5 = 11

Y + 5 – 5 = 11 – 5

Y = 6

The number is 6

**Example II**

2. There are 50 pupils in a class, 30 are boys. How many are girls?

Let the number of girls be x

Boys + girls = 50

30 + x = 50

30 – 30 + x = 50 – 30

X = 20

The number of girls is 20

**Example I**

**Activity**

1. A box of has 12 pens, 5 are red and the others are blue. How many blue pens are in the box?
2. A girl had sh.5000 and bought a book for sh.4500. How much money was left?
3. What number when added to 16 gives 30?
4. Ten plus a number gives 32. Find the number.
5. The sum of 2 numbers is 45 one of them is 19. Find the second number.
6. Think of a number and add 30 to it, the answer is 48. What is the number?
7. Out of 50 animals on Mr. Mukasa’s farm, 13 are bulls and the rest are cows. Find the number of cows.
8. What number when added to 19 gives 30 as the answer?
9. I think of a number, add 5 to it and the answer is 12. Find the number.

10.Apio picked 59 mangoes, 24 of them were raw. How many were ripe?

**Solving equations by adding**

Example I Example II

x – 5 = 3

x – 5 + 5 = 3 + 5

x = 8

p – 35 = 65

p – 35 + 35 = 65 + 35

p = 100

Solve: x – 5 = 3 Solve: p – 35 = 65

**Activity**

1. Solve the following equations

h). n – 22 = 18

i). t – 10 = 2

j). b – 18 = 10

k). y – 39 = 61

1. w – 17 = 23

d). a – 12 = 6

e). d – 48 = 24

f). m – 20 = 13

g). c – 14 = 11

1. n – 8 = 3
2. x – 14 = 7
3. y – 11 = 5

**Forming and solving equations by adding**

**Example I**

A boy used 3 of his exercise books and remained with 4 books. How many books did he have at first?

Let the number of books he had be b

b – 3 = 4

b – 3 + 3 = 4 + 3

b = 7

He had 7 books

Let the number be x

x – 3 = 10

x – 3 + 3 = 10 + 3

b = 13

The number is 13

**Example II**

When 3 is subtracted from a number the answer is 10. What is the number?

Activity

1. In a class, 12 pupils were absent and 48 presents. How many pupils are in the class?
2. A woman sold 5 of her hens and remained with 6. How many hens did she have?
3. By paying sh.1500 a man cleared part of his debt and had sh.3, 300 still to pay. What was the full debt?
4. I think of a number, when I take away three, the answer is 7. What is the number?
5. When 7 is subtracted from a number, the number is 13. What is the number?
6. A teacher marked 15 pupils absent and 35 are present. How many pupils are in that class?
7. A car used 12 litres of petrol and remained with 28 litres. How much fuel did the car have at first?

**Solving equations by dividing**

12x = 144

=

x = 12

5a = 20

=

a = 4

Example I Example II

Solve: 5a = 20 Solve: 12x = 144

**Activity**

Solve the following

1. . 2x = 8 e). 7r = 21
2. . 3y = 12 f). 7k = 28
3. . 4m = 14 g). 5f = 30
4. . 6b = 60 h). 5y = 35

**Forming and solving equation by dividing**

Example I

The length of a rectangle is 9 cm and the width w cm. if its area is 72cm2. Find the width

L X W = A

9 x w = 72cm2

9w = 72cm2

=

W = 8cm

Activity

1. Cherimo collected 40 mangoes in 5 baskets. How many mangoes were in each basket?
2. What number when multiplied by 12 gives 60?
3. The width of a rectangular garden is 4m, if its length is f m and area 36m2. What is its length?
4. I thought of a number and multiplied it by 2 if my answer was 30, what was the number?
5. A pen costs sh.2p and a book costs sh.p. if the total cost of a book and a pen is sh.3000, find the cost of the book.
6. The product of 2 numbers is 27. Find the second number if the first number is 3.
7. One side of a rectangle is 6 cm, its area is 48cm2. Find the other side.
8. A rectangle with a length of 6 cm has an area of 30cm2. Calculate its width.

**Solving equations involving dividing**

Example I Example II

Solve: x + x + x = 24 Solve: 2p + 5p = 14

x + x + x = 24

3x = 24

=

x = 8

2p + 5p = 14

7p = 14

=

P = 2

Example III

Mary is x years old, John is 2 times as old as Mary. If their total age is 15 years, find Mary’s age.

|  |  |  |
| --- | --- | --- |
| Mary | John | Total |
| X | 2x | 15yrs |

x + 2x = 15

3x = 15

=

x = 5

Mary is 5 years old

**Activity**

1. Solve the following equations
2. x + x = 10
3. b + b + b = 18
4. y + y + y + y = 12
5. p + p = 64
6. 2x + 3x = 20
7. P + 5p =42
8. 4n + n =45
9. Cheblet is x years old, his father is 3 times as old as Cheblet. If their total age is 40 years, how old is each of them?
10. A mother is 5x years and the daughter is 2x years. Their total age is 49years. Find their ages.
11. Kato has twice as many books as Wasswa. If they both have 27 books, how many books does Wasswa have?
12. A girl has 2p oranges and the sister has 3p oranges. If both have 20 oranges, how many oranges does each have?

**Solving equation involving division**

**Example II**

Solve: 4a + 2a + 5 = 23

4a + 2a + 5 = 23

6a + 5 – 5 = 23 – 5

6a = 18

**=**

a = 3

**Example I**

Solve: 2x + 5 = 17

2x + 5 = 17

2x + 5 – 5 = 17 – 5

2x = 12

=

x = 6

**Activity**

1. Solve the following equations.
2. . 3n + 1 = 10
3. . 6y + 5 = 17
4. . 4p + 5 = 20
5. . 7x + 7 = 14
6. . 2n + 2 = 2
7. 6y + 3 + 2y = 43
8. 4p + p + 10 = 65
9. When a number is multiplied by 5 and 8 is added to it the result is 23. What is the number?
10. Larok multiplied a number by 4 and added 5 to it. His result was 25. What was the number?
11. Hadijah received 5y books from her mother, father gave her 3y books and she bought 4 books. Altogether she had 36 books. Find the number of books each gave her.
12. Alice has x pens, Ben has 2x pens and Charles has 9 pens. If they all have 18 pens, how many pens does Alice have?
13. Three children received 2p, 3p and sh.500. If they all got sh.1500, find how much the first child got.

**SOLVING MIXED EQUATIONS**

2. Solve: 3x – 8 = x

3x – 8 = x

3x – x – 8 = x – x

2x – 8 = 0

2x – 8 + 8 = 8 + 0

**2x = 8**

**=**

**x = 4**

Examples

1. Solve: 5a – 2a – 4 = 11

5a – 2a – 4 = 11

3a – 4 + 4 = 11 + 4

3a = 15

=

a = 5

Activity

Solve the following equations

1. 3y + 2 – y = 10
2. 4y + 6 – 2y = 24
3. 7n + 7 – 4n = 22
4. 4m + 3 – 3m = 9
5. 8x + 10 – 5x = 25
6. 2n – 3 = n
7. 4y – 8 = 2y
8. 6x -12 = 3x
9. 10a - 5 = 5a
10. 6a + 4 = 5a = 7

Solving equations with fractions

Example I Example II

= 4 x 3

x = 4 x 3

x = 12

= 7 x 7

p = 7 x 7

p = 49

Solve: = 4 Solve: = 7

**Activity**

Find the value of the unknowns.

1. = 9 b) = 4 c) = 9 d) = 8 e) = 6 f) = 9
2. = 12 i) = 4

Forming and solving more equations with fractions

**Example I**

What number when divided by 4 gives 3?

Let the number be x

= 3

= 3 x 4

x = 12

The number is 12

**Example II**

A man divided his money among his 3 children and each got sh.450. How much money did he give out?

Let the number be y

Each child gets =

Therefore = sh.450

3 x = sh.450 x 3

Y = sh.450 x 3

Y = sh.1350

Therefore the man gave out sh.1350

**Activity**

1. A father divided some money between two children and each got sh.150. How much money did he give out?
2. What number when divided by 7 gives 6?
3. 12 men shared a bag of sugar and each got 5 kg. How much sugar in kg was in that bag?
4. What amount of money is needed to pay 9 workers if each worker earns sh.2200?
5. When x is shared among 6 boys each gets sh.1500. Find the value of x.
6. When a number is divided by 7 the result is 8. Find the number.
7. What number when divided by 9 gives 21?
8. 3 boys shared x exercise books. How many books were there altogether if each got 12 books?
9. When a number of sweets is shared among 5 pupils each gets 3 sweets. How many sweets are there?

10. The teacher gave out exercise books to 25 pupils and each got 10 books. How many books did the teacher have?

**Finding the unknown involving squares**

Find the square of numbers 1 to 20

Multiplying a number by itself gives a square number.

Finding square root

A square is a number multiplied by itself to get square is the square root.

The symbol foe square root is √

**Example I** **Example II**

a2 = 4

√a2 = √4

√ax a = √(2 x 2) x(2x2)

a = 2x2

a = 4

Solve: x2 = 4 Solve: a2 = 16

x2 = 4

√x2 = √4

~~√~~ x2 = √4

X = 2

**Activity**

1. Give the value of the unknowns by finding the square roots.
2. x2 = 1. Find x
3. b2 = 4. Find b
4. c2 = 9. Find c
5. y2 = 16. Find y
6. h2 = 25. Find h
7. k2 = 36. Find k
8. m2 = 49. Find m
9. n2 = 64. Find n
10. y2 = 100. Find y

**Substitution**

To substitute means to replace.

z + y = 2 + 4

= 6

**Example II**

If x = 2 and y = 5. Find the value of 2x + 3y

2x + 3y = 2x X + 3 x y

= (2 x 2) + (3 x 5)

= 4 + 15

= 19

**Example I**

If z = 2 and y = 4.

Find the value of z + y

Activity

1. If a = 1, b = 3 and c =5. Find the value of;
2. a + b + c
3. ab + c
4. 2b + 3a + c
5. Given that a = 2, b = 3 and c = 4. Find the value of the following;
6. a + b + c
7. 4a + 3b + c
8. 2a + 3b + c
9. 4c + 2b + c
10. 2a + 3c – b
11. 4b + c
12. a + b – c
13. 2a + 2b + c
14. a + c – b
15. ab
16. (a x b) – c

**ALGEBRIC EXPRESSIONS INVOLVING BRACKETS.**

1. Simplify +(b + -6m)

+(b + -6m) = +b + (-6m)

=b - 6m

1. Simplify –(5 - q)

–(5 - q) =–5 -(- q)

= –5 + q

1. Workout –2(a - b)

–2(a - b) = (-2 x a) - (-2 x b)

= -2a - (-2b)

= -2a + 2b

**Note the following.**

A positive integer outside the brackets does not change any sign inside the

brackets.

A negative term changes term outside the brackets changes all the sides the

Brackets.

**Work out the following**

1. Add -2(x - 4) to 2(x - 1)

j. Subtract 3p - 1 from 5p - 3

k. Subtract (y + 1) from (2y + 3)

l. Add y + 4 and y + 6

m. Subtract – 2(x + 1) from (2x - 3)

1. (x + 1) + (x + 2)
2. 3(x + 2) + 2(x - 1)
3. 3(x + 1) - 2(x - 1)
4. 2(x - 2) - 3(x - 1)
5. (x + 2) - (x + 3)
6. -2(x - 4) - 2(x - 1)
7. -3(m - 5) + 2(m - 1)
8. 2(q - 1) + 3(q - 2)

**Simplify the following**

**Collecting like terms**

1. 4ab – 4mn2 + 5mn2 – 2ab
2. X2 – x + 2x2 + 2x
3. 4abc – 4a2b – 4ab + 4a2b + 3ab – 2abc
4. mn2 + 4abc2 – 3mn2 – abc2
5. 2(m + 3) = 6
6. 5(m - 4) = 50
7. 3(2x + 7) = 3
8. 5(m + 4) = 30
9. 2(y + 3) = 18
10. 4(k - 1) = 28
11. 6(2x - 5) = 50
12. 6(m + 4) = 0
13. 4(x - 2) = 32
14. 2x2 = 18
15. 3x2 = 12
16. 6(x2 + 2) = 306

**Equating algebraic expressions.**

1. Solve : 2m + 4 = m + 6
2. Solve 3x + 7 = x + 9
3. Work out 7x + 2 = x + 10
4. Simplify 8 + 5x = 4 + x
5. Evaluate 11n + 6 = 2n + 24
6. Find the value of y ; 3x + 7 = x + 9
7. Solve 3(2x – 2) = 2(x - 9)
8. Find the value of p if 6(2p – 2) = 2(3p + 6)
9. Find the unknown 3(a - 2) = 2(a - 1)
10. **Simplifying equations involving figures**

4x – 4cm

2x + 4cm

2x

3x – 1cm

2x + 2cm

6x – 3cm

5x + 2cm

6x – 3cm

5x + 2cm

2x + 4cm

5x - 5cm

2x + 9cm

4x + 1cm

2x – 5cm

x + 3cm

x

1. Below is a rectangle ABCD. Use it to answer the questions that follow.
2. Find the value t
3. Find the length of the diagonal BD

**2t + 2cm**

**t + 5cm**

**2t + 9cm**

A

B

D

C

1. Below is a rectangle. Use it to answer the questions that follow.
2. Find the value p
3. Work out the perimeter of the figure above

**(5p – 7) cm**

**(3p + 3) cm**

**(2p – 1) cm**

1. The figure below is cuboid. Study and use it to answer the questions that follow.
2. Find the value p
3. Find the value of k
4. Find the volume of the cuboid.

**20cm**

**(5k) cm**

**9 cm**

**(2p + 4) cm**

**10cm**

1. The figure below is a cuboid. Study it and use it to answer the questions that follow.

**(n) cm**

**(n + 2) cm**

**(2n - 3) cm**

**(n - 2) cm**

1. Find the value of n
2. Find the volume of the cuboid.

**Equations involving fractions.**

**Approach 2**

**Solve:**

**Approach 1**

1. **Solve**

**Solve the following equations**

1. 1 - = 2

**Equations involving fractions and squares.**

**Assignment 1**

Solve the following

1. **2  = 15**

**Assignment 2**

Solve the following

1. Solve :

**Operation on fractional expressions.**

1. Find the value of m :

Approach 1

**Approach 2**

**Assignment 2**

Solve the following

**Assignment 1**

Solve the following

**Equating fractional expressions**

1. Find the value of the unknown:

**Approach 1**

**Approach 2**

LCM = 4

**ASSIGNMENT**

Find the value of the unknowns in the following equations.

6.

7.

8.

9.

10.

**INDICES**

**Additions with powers**

2. **Simplify**

3. **Simplify**

1. **Simplify**

**Subtraction with powers**

**3. Simplify**

**2. Simplify**

1. **Simplify**

**Assignment 1**

Simplify the following.

4.

5.

6.

**Assignment 2**

d.

e.

f.

g.

**MULTIPLICATION OF INDICES**

**Laws of indices.**

* **When multiplying numbers of the same bases, we keep the base and add the powers.**

**Approach 2**

1. Simplify

**Approach 1**

1. **Simplify**

**Assignment**

1. Simplify the following.

2. Work out



* **When dividing numbers of the same bases, we keep the base and subtract the powers**

**Examples 1**

**OR**

Simplify

**Examples 2**

Simplify

**Approach 2**

**Approach 1**

**Assignment**

1. Simplify the following

**g.**

h.

i.

j.

**SOLVING INEQUALITIES AND SOLUTION SETS**

A solution set is a collection of all possible values of the given unknowns in an inequality like

Note; every integer on the right of the other is greater than any integer on its left.

An inequality is a mathematical statement that shows the relationship between two expressions that are not equal.

**e.g**  means all integers greater than 2

means all integers less than 2

means all integers greater than -3

means all integers less than -6

**EXAMPLES**

1. If, find the solution set for

means all integers greater than -6

**0**

**+1**

**+2**

**+3**

**-2**

**-3**

**-5**

**-1**

**-4**

**-6**

**-7**

**-8**

**-9**

**-10**

**-11**

={**-5, -4, -3, -2, -1, 0 , +1, +2………..}**

1. Find the solution set for if y is a whole number.

means all integers greater or equal than 3

**+8**

**+9**

**+10**

**+5**

**+4**

**+2**

**+6**

**+3**

**+1**

**0**

**-1**

**-2**

**-3**

**-4**

**+7**

**={+3, +4, +5, +6, +7, +8………..}**

1. **Find the solution set for**

**+8**

**+9**

**+10**

**+5**

**+4**

**+2**

**+6**

**+3**

**+1**

**0**

**-1**

**-2**

**-3**

**-4**

**+7**

**= (all integers less 5)**

**={…………-4, -3, -2, -1, 0 , +1, +2, +3, +4 }**

**Activity**

Find the solution set for each of the following inequalities

**f.**

**g.**

**h.**

**i.**

**j.**

**k.**

**l.**

**m.**

**n.**

**o.**

**More about solution sets**

1. Find the solution set for

means (x is a set of integers between -3 and 5)

**+8**

**+9**

**+10**

**+5**

**+4**

**+2**

**+6**

**+3**

**+1**

**0**

**-1**

**-2**

**-3**

**-4**

**+7**

**= { , +1 , +2, +3, +4}**

1. Write the solution set for **.**

means integers from -2 and 4

**+8**

**+9**

**+10**

**+5**

**+4**

**+2**

**+6**

**+3**

**+1**

**0**

**-1**

**-2**

**-3**

**-4**

**+7**

**={-2, -1, 0, +1,  +2, +3, +4 }**

**Assignment.**

Show the solution set for the following inequality.

11.

**12.**

**13.**

**14.**

6.

**7.**

**8.**

**9.**

**10.**

**SOLVING INEQUALITIES**

**PART 1**

**c.**

**Note; When dividing by a negative term, the symbol changes.**

**Assignment**

g.

h.

i.

j.

k.

l.

Solve the following inequalities.

**PART 2**

1. **Solve;**

**Approach 2**

**Approach 1**

**Assignment;**

Solve the following inequalities and find the solution sets for each?

**j.**

**k.**

**l.**

f.

g.

h.

i.



**WORD PROBLEMS INVOLVING ALGEBRA.**

1. Ruby is 4 years older than her sister. In 10 years’, time, the sum of their ages will be 60 years. How old is Ruby?

Let the Ruby’s sister be x

|  |  |  |  |
| --- | --- | --- | --- |
| Period of time | Ruby’s age | Her sister | Sum |
| Now |  |  |  |
| In 10 years’ time |  |  | **60** |

**Assignment**

1. Okello is twice as old as his son. In 4 years’ time , their total will be 50 years, how old is the son now?
2. Gloria is 18 years older than her daughter Ruby. In 10 years time, Gloria will be twice as old as heer daughter Ruby
3. How old is Gloria and her daughter now?
4. How old will the daughter be in 10 years’ time?
5. Bua is 4 times as old as Erisu. In 10 years’ time, Bua will be twice as old as Erisu.
6. How old is Bua now?
7. How old will Erisu be in 10 years’ time?
8. Sarah is 4 times as old as Neikesa. In 10 years’ time, Sarah will twice as old as Neikesa. How old is sarah?
9. Nanziri is 4 times as old as Nakku. In 10years’ time, Nanziri will be twice as old as Nakku. How old is Nanziri and Nakku?
10. Jane is 15 years older than her daughter. In 10 years’ time, Jane will twice as old as her daughter. How old is her daughter?
11. Kirya is three times as old as his daughter. The difference between their ages is 36 years. How old is the daughter?
12. Annet is 20 years younger than Peter. In 15 years’ time, Peter will be twice as old as Annet. How old is Annet now?
13. Babra is 4 times as old as Mukasa. In 10 years’ time, Barbra will be twice as old as Mukasa. How old is Barbra and Mukasa now?
14. Half of Tracy’s age now and a third of Prince’s age now add up to 66 year. Prince is 18 years older than Tracy. How old is each of them now?
15. The two consecutive even numbers are (2x - 2) and (x + 11).
16. Find value of x
17. Find the third number.
18. A man is 13 years older than his daughter, in 3 years’ time, their total age will be 43 years. How old is the man now?
19. Nakawesi has two children, a son and a daughter, if the son is half her age, the daughter is a third her age, and the total age of the two children is 30 years.
20. Find Nakawesi’s age
21. How old is her daughter?
22. Jenah is twice as old as Doreen and their total age is 33 years. How old is Doreen?
23. Ibrah is 20years younger than Sarah. In 15 years to come, Sarah will be twice as old as Ibrah.
24. Find the age of Sarah now.
25. How old will Ibrah be after 15 years?
26. Nakalema is 6 years younger than Muteera. If their total age is 30years. Find Muteera’s age?
27. Aminah is 4 times as old as Annitah. In 3 years’ time their total age will be 56years. How old will Annita be by then?
28. Bushira is 5 years older than Gabriellah now. In 15 years’ time, their total total age will be 75 years.
29. How old is Bushira now?
30. How old will Gabriellah be in 20 years’ time?
31. Musa is (x + 4) years younger than Mike who is 2(2x + 4) years. How old is Musa?
32. A father is 5 times as old as his son. After 5 years, the difference in their ages will be 32years.
33. How old is the father now?
34. How old will the father be after 5 years.
35. Mukasa is 3 times as old as his sister. The product of their ages is 48 years. How old is his siter?
36. Paul is 20 years old and Mary is 6 years old.
37. After how many years will Paul be twice as old as Mary?
38. How many will Mary be then?
39. The mother of Apio is 23 years old and Apio is 4 years old.
40. In how many years will the mother be twice as old as Apio?
41. How old will Apio’s mother be then?
42. Akiiki is 38 years old and his son is 12 years old. At what age will Akiiki be twice as old as his son?
43. Okello is twice as old as his son. In 4 years’ time their total age will be 50 years. How old is the son now?
44. Jesse is 3 times as old as Mark. In 5 years, Jesse will be twice as old as Mark will be.
45. How old is Jesse and Mark now?
46. How old will mark be when Jesse is 40years?

**COMPILED BY MWALIMU DENIS LADO**

**0758084383**

**0779746443**

**ladodenis@gmail.com**