ALPHA CHOICE INNOVATIVE ACADEMY

AREPO, OGUN STATE.

MATHEMATICS

Second term(2022/2023)

GRADE 8

SCHEME OF WORK FOR GRADE 8

WEEK 1: REVIEW OF FIRST TERM WORK, EXPANDING AND FACTORIZING ALGEBRAIC EXPRESSIONS, SOLVING OF ALGEBRAIC EQUATIONS.

WEEK 2: WORD PROBLEMS ON ALGEBRAIC FRACTION.

WEEK 3: LINEAR INEQUALITIES.

WEEK 4: LINEAR INEQUALITIES IN ONE VARIABLE, GRAPHICAL PRESENTATIONS OF SOLUTION OF LINEAR INEQUALITIES.

WEEK 5: GRAPHS OF LINEAR EQUATIONS IN TWO VARIABLES.

WEEK 6: PLANE FIGURES OR SHAPES, IDENTIFICATION OF PLANE SHAPES WITH THEIR PROPERTIES.

WEEK 7: REVIEW OF THE FIRST HALF TERMS’S AND PERIODIC TEST.

WEEK 8: SCALE DRAWING OF LENGTH AND DISTANCES.

WEEK 9: QUANTITATIVE APTITUDE PROBLEMS.

WEEK 10: REVISION OF SECOND HALF TERMS WORK.

WEEK 11: REVISION.

WEEK 12: EXAMINATION.

WEEKS 1&2: Word Problems Leading To Algebraic Expression

Behavioral objectives: *At the end of this lesson, students should be able to:*

1. *Recognize equivalent fractions*
2. *Convert an algebraic fraction to an equivalent fraction*
3. *Find the LCM of algebraic expressions*
4. *Add, subtract, multiply, and divide algebraic fractions.*

2.1 Introduction:

Sometimes you may be asked to solve problems given in words. To do this you need to convert the words into an algebraic equation and then solve it. The following points will show you what to do:

a. Read the equation carefully and then decide what the unknown number is

b. Where necessary, change all the unit of measurement to the same unit

c. Use a letter to represent the unknown

d. Use the information provided to write the required equation

e. Solve the equation as usual

f. Use the solution obtained to answer the questions in words

g. You can check your answer as usual.

Example 2.1: Think of a number, add 5 to it and multiply the result by 3, the answer is 36. What is the number?

Solution:

Note the rules above. Follow the steps.

1. Let the number be q, add 5 to it, = q + 5, multiple by 3

3(q+5), the answer is 36

Open the bracket 3(q+5) = 36 [use the 3 to multiply the equation]

$3q+ 15 = 36$ [subtract 15 from both side]

$(3q + 15) – 15 = 36 – 15$ [Expand the LHS and solve]

$3q + 15 - 15 = 21$

$3q = 21$ [divide both sides by 3]

$3q/3 = 21/3$

$q = 7$

Check

3(7+5)

$3 \times 12 = 36$

Example 2.2: The sum of a number and 9 is multiplied by -2 and the answer is -8. Find the number.

Solution:

Let t be the number.

t+ 9, multiply by -2,

-2(t + 9), the answer is -8

$-2(t + 9) = -8$ [open the bracket]

$-2t -18 = -8$

Collect the like terms by adding 8 to both sides

$-2t -18 + 18 = -8 + 18$ [the sign we change to positive]

$-2t = 10$

Divide both sides by -2

$-2t/-2 = 10/-2$

$t= -5$

Check

-2(-5+9)

$-2(+4) = -8$

Example 2.3: The smallest of three consecutive odd numbers is n, if their sum is 27. Find the three numbers.

Solution:

Note that odd number are 1, 3, 5, 7, the difference between each number is 2. If the first number is k, then the second consecutive odd number will be (k + 2) and the third will will be (k + 2 +2)

$k + (k+2) + (k+2+2) = 27$

$k + k + 2 + k +4 \quad = 27$

$k +k + k + + 2 + 4 = 27$

$3k + 6 \qquad = 27$

Subtract 6 from both sides,

$3k + 6 – 6 = 27 – 6$

$3k = 21$

Ivied both sides by 3,

$3k/3 = 21/3$

$k = 7$

$k+2 = 7+2=9$

$k+4 =7+2+2 = 9 =2 =11$

Therefore, the consecutive numbers are 7, 9, and 11

Problems involving simple equations with fractions

To solve equations involving fractions means to find the value of the unknown that makes the equation true. Choose a letter for the unknown, write the given information in algebraic form, make an equation and solve it. Don’t forget to check if your answer is right. This can be achieved by substituting your answer into the equation to make it true.

Watch out for words like ***a third or one-third*** = 1/3

A fifth or one-fifth = 1/5

A tenth or one-tenth = 1/10

Two-third = 2/3

Quarter = 1/4…

Example: The price of a chair is a third of the price of a table. If a customer pays #28,000 for the two items, find the price of (i) the table (ii) the chair

Solution

Let b = price of table, price of chair= b/3

b + b/3 = 28000

(3b + b)/3 = 28000

4b/3 = 28000

Multiply both sides by 3

4b = 28000 x 3

4b = 84,000

Divide both sides by 4

EVALUATION 2.0: Translate the following statement into algebraic equations and then solve them

a. Think of a number, add 6, the result is 25. What is the number?
b. If I divide a number by 5 and the answer I get is 8. What is the number?
c. If a number is trebled and 10 is subtracted from it and then multiply the result by 5, the answer is 55. What is the number?
d. Think of a number, divide it by 5 and then subtract 4. The result is 15. Find the number.

ASSIGNMENT 2.0: Cambridge lower secondary school mathematics. Book 2

EXERCISE 2.1 No1, 2i,2ii,3i,3ii,4ei,4eii. PAGE 31

EXERCISE 2.4 NO 2(a,b,c) N0 10(a,d,f) PAGE 48

EXERCISE 2.5 NO 8(a,b,c) PAGE 55

Simplify the following algebraic expressions.

A) -2x + 5 + 10x - 9

B) 3(x + 7) + 2(-x + 4) + 5x

Simplify the expressions.

A) (2x - 6) / 2

B) (-x - 2) / (x + 2)

C) (5x - 5)/10

Solve for x the following equations.

A) -x = 6

B) 2x - 8 = -x + 4

C) 2x + 1/2 = 2/3

Evaluate for the given values of x and y.

A) x2 - y2 , for x = 4 and y = 5

B) |4x - 2y| , for x = -2 and y = 3

C) 3x3 - 4y4 , for x = -1 and y = -2

Solve the following inequalities.

A) x + 6 < 0

B) x + 1 > 5

C) 2(x - 2) < 12

What is the reciprocal of each of the following numbers?

A) -1

B) 0

C) ¾

7. Evaluate the following expressions involving mixed numbers.

A) 3 3/4 + 6 1/7

B) (1 3/5) × (3 1/3) - 2 1/2

C) (5 2/3) ÷ (4 1/5)

D) (3 4/7 - 1 1/2) ÷ (2 3/8 + 2 1/4)

8. Evaluate the following exponential expressions.

A) -4^2
B) $(-2)^3$

9. Convert to fractions and write in simplest form.
A) 0.02
B) 12%

10. Convert to decimals.

A) 1/5

B) 120%

C) 0.2%

WEEK 3: LINEAR INEQUALITIES

Behavioral objectives: *At the end of this lesson students should be able to:*

1. *Recognize and use the inequality symbols correctly*
2. *Write and interpret linear inequalities in one variable*
3. *Show the graphs of inequality in one variable on a number line*
4. *Solve linear inequalities in one variable*
5. *Solve word problems involving inequalities*

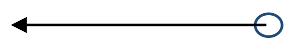
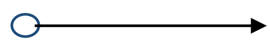
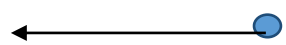
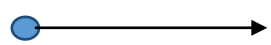
3.1. <u>Introduction:</u>

Inequality is an algebraic expression formed by replacing the equal sign of an equation with an inequality symbol. e.g. (equation) while (inequality).

An inequality is a statement that one quantity is greater than or less than another quantity. We can also use inequalities to compare numbers and quantities.

3.2. <u>Inequality Symbol:</u>

The following are commonly used in an inequality symbol.

SYMBOL	MEANING	REPRESENTATION
$<$	LESS THAN	
$>$	GREATER THAN	
$\leq$	LESS THAN OR EQUAL TO	
$\geq$	GREATER THAN OR EQUAL TO	

We often use inequality in our everyday life. We can write them as algebraic statement. For example, if the speed of a car is 250km/h or less, we can write this as $S \leq 250$, where s represent speed.

<u>Example 3.1:</u>

At a fund raising, over ₦5 000 000 was realized. Write this statement in symbolic form.

<u>Solution</u>

Let the amount realize be ₦a

Thus, a > ₦5 000 000

3.2. <u>Graph of Inequalities:</u>

A linear inequality has no square or higher power of the unknown. In other words, the power of the unknown is 1.

For example:

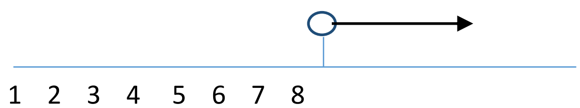
(a) 2x > 10 is a linear inequality in **one variable (**)

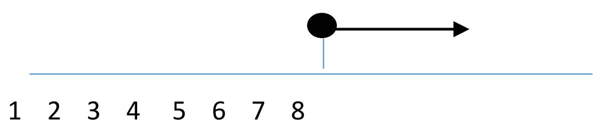
(b) is a linear inequality in **two variables ()**

3.3. Showing inequalities on a number line

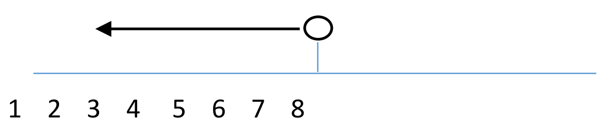
You can use a number line to show an inequality. To do this, take note of the following guides

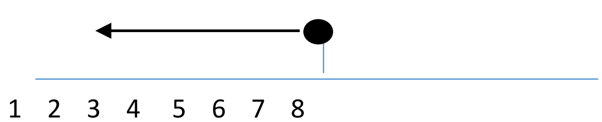
- For an inequality with > (e.g.), the arrow points in the direction of all numbers bigger than 5 with an empty circle at the end of the arrow on 5. This as well indicates 5 is **not included in the range.** Whereas for inequality with ≥ (e.g.), the arrow also points in the direction of all numbers bigger than 5 but now with a solid circle at the end of the arrow on 5.





- For an inequality with < (e.g.), the arrow points in the direction of all numbers smaller than 5 with an empty circle at the end of the arrow on 5. This as well indicates 5 is **not included in the range.** Whereas for inequality with ≤ (e.g.), the arrow also points in the direction of all numbers smaller than 5 but now with a solid circle at the end of the arrow on 5.





3.5 Combining Inequalities

When combining inequalities (sometimes an unknown quantity obeys more than one inequality). These inequalities may be combined as one statement, *the smallest number must be written first followed by the unknown and finally the largest number and vice-versa.*

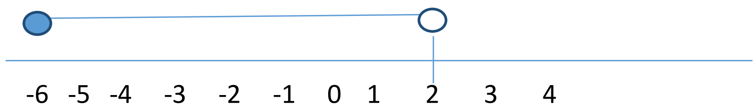
For example, inequalities and can be combined as a single inequality as follows.

x<3 and x≥-2

The two inequalities can be written in reverse form and joining them, we have;

-2 ≤ x < 3

This can be represented in the diagram below



The diagram shows that can take any value from -2 to 3. The solid circle is used to show that -2 is included in the range but the empty circle shows that 3 is not included.

<u>EVAULATION: Essential Mathematics for Junior Secondary Schools Book 2</u>

PAGE 172 EXERCISE 14.3 NO 1(e,g)

PAGE 172 EXERCISE 14.3 NO 3(k,m)

<u>ASSIGNMENT:</u>

PAGE 172 EXERCISE 14.3 NO 1(a,c,f), 2(a,b)

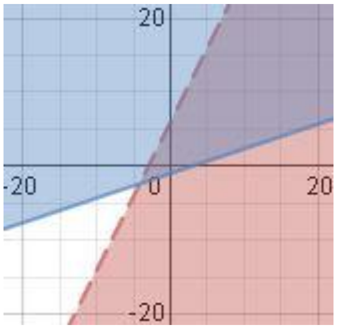
1. What part of this graph is the solution area for a system of inequalities?

A.The red part

B. The overlapping part

C. The blue and red path

D. Yhe white part



2. Solve the following inequality: $x + 2 > 10$.

A. $x > 8$

B. $x < 8$

C. $x > 12$

D. $x < 12$

3. If $-5 > a$ and $a > b$ then -5 is

A. less than a

B. greater than b

C. grater than a

D. less than b

4. Which inequality symbol has a graph with an open circle?

a. $\leq\leq$

b. $\geq\geq$

c. $==$

d. $>$

5. Solve the inequality.

$y-2+3<5y$

a. $y < 4$

b. $y >-4$

c. $y< -4$

d. $y >4$

6. Harry owes his father $80. He makes $45 cutting grass on Saturday morning and has another grass cutting job on Saturday afternoon. Which inequality shows how much Harry will need to earn on Saturday afternoon to have enough to pay his father back?

a. $45+x>8045+x>80$

b. $45+x\geq8045+x\geq80$

c. $45+x<8045+x<80$

d. $45+x\leq80$

7. $-3+(3-9)2\div-12$-3+(3-9)2÷-12

a. -6

b. 0

c. 6

d. -4

Solve the following inequality for x.

8. $x/6 - 14 > 1$

a. $x > 90$

b. $x > 15/6$

9. $2x+7\leq5(x-4)$

10. $7x-6x>5-4+3x-2.5$ $7x-6x>5-4+3x-2.5$

a. $x<0.75$ $x<0.75$

b. $0.75<x$ $0.75<x$

c. $1>x$ $1>x$

d. $x<9.6$

WEEK 4: SOLVING INEQUALITIES

Behavioral objectives: *At the end of this lesson students should be able to:*

1. *Apply the rules of inequalities*
2. *Solve and map inequalities in one variable*
3. *Simplify words problems involving inequalities in one variable*

4.1 INTRODUCTION

Inequality can be solved exactly the same way as ordinary equations. Unlike equations, inequality may have many solutions or range of solutions. However, there are certain rules meant to guide solving of inequalities.

4.2 RULES IN SOLVING INEQUALITIES.

a. An inequality remains true when the same quantity is **added to**, or **subtracted from** both sides.
b. An inequality remains true when both sides are **multiplied or divided** by the same **positive quantity.**
c. An inequality remains true when both sides are **multiplied or divided** by a **negatives quantity provided the inequality sign is reversed.**

Example 4.1: Find the greatest possible value of that satisfies the inequality.

$-3x + 8 > 2$

Solution:

$-3x + 8 > 2$

Subtract 8 from both sides

$-3x + 8 - 8 > 2 - 8$

$-3x > -6$

Divide both sides by - 3 and also reverse the inequality

[rule three]
$-3x/-3 < -6/-3$

$x < 2$

The greatest integer value of is 1.

Example2: Solve and represent the solution on a number line (graph)

$4x - 7 < 3x + 1$

Solution:

$4x - 7 < 3x + 1$

Subtract 3x from both sides

$4x - 7 - 3x < 3x + 1 - 3x$

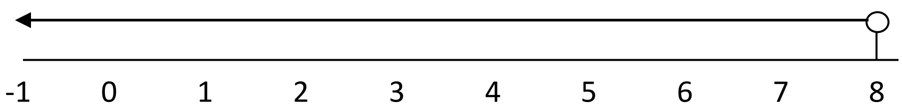
$x - 7 < 1$

Add 7 to both sides

$x - 7 + 7 < 1 + 7$

$x < 8$

the number line is



4.3 WORD PROBLEMS LEADING TO INEQUALITIES

Example 1: Victor is x years old. In 5 years time his age will still be less than 12 years.

(a) Write this information in an inequality

(b) Find the maximum age of Victor to the nearest whole numbers.

Solution:

Now, Victor is x years.

In 5 years time Victor's age will be (x+5) years.

If at that time his age will be less than 12, then,

$x + 5 < 12$

Subtract 5 from both sides

$(x + 5) - 5 < 12 - 5$

Open the bracket on the left hand side,

$x + 5 - 5 < 7$

$x < 7$

the collection of numbers less than 7 are 6, 5, 4, 3, 2, 1,…

The maximum age of Victor is 6 years.

Example 2:

If a number is subtracted from 5, and the result is greater than 15.

(a) Write this information in an inequality and (b) Solve for the unknown and list 5 possible numbers that satisfy the inequality

Solution:

Let y be the number.

Subtract 5 from y

That is: $y-5$

$y-5 > 15$

because 5 was subtracted from y, we will have to add 5 to both sides so as to solve for the unknown.

Add 5 to both sides

$(y – 5) + 5 > 15 + 5$

$y-5+ 5 > 20$

$y > 20$

The possible numbers greater than 20 are 21, 22, 23, 24 and 25.

EVALUATION:

PAGE 172 EXERCISE 14.3 N0 4(a,c,d,e)

ASSIGNMNET:

PAGE 172 EXERCISE 14.3 N0 4(m,n,o,p,q,r)

PAGE 172 EXERCISE 14.3 N0 5

1. Solve the inequality.

   $x + 5 \leq 13$

answer choices

A. x ≥ 8

B. x ≥ 18

C. x ≤ 8

D. x ≤ 18

2. When you graph an inequality, you used a closed dot when you use which symbols?

answer choices

A. ≤, ≥

B. <, >

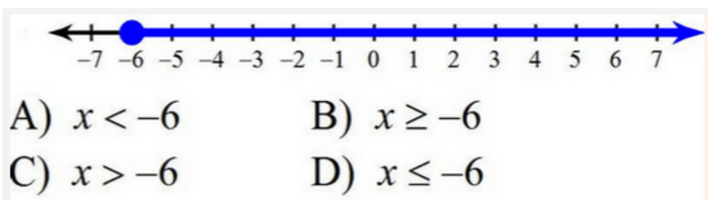
3. When graphing an inequality, you use an open dot when you use which symbol?

answer choices

A. <, >

B. ≤, ≥

4. Pick the correct inequality.



A

B

C

D

5. What are two solutions to x < 8?

A. 8.6, 7.9

B. 11, 16

C. 0.8, 5.9

D. 12, 7.1

6. 3g >12

A. g>36

B. g<36

C. g>4

D. g<4

7. No More Than implies

A. <

B. >

C. ≤

D. ≥

8. What inequality does the number line graph represent?

x > 5

A. x < −5

B. x ≥ 5

C. x ≥ −5

9 No less Than implies

A. <

B. >

C. ≤

D. ≥

10 You flip an inequality symbol when you...

an

A. subtract

B. multiply and divide only

C. multiple by a negative number

D. multiple or divide by a negative number

WEEK 5 GRAPH OF LINEAR EQUATION

Behavioral objectives: *At the end of this lesson students should be able to:*

1. *Identify and draw the position of points on a number line*
2. *Use Cartesian Plane to describe the position of points on a plane surface*
3. *Define the position of points on a Cartesian plane in terms of coordinates in relation to x-axis and y-axis*

5.1 Straight Line Graphs

A straight line is formed when two or more points are joined together. A graph has two axes: x-axis and y-axis. The x-axis is the horizontal axis while the y-axis is the vertical axis. A point on a graph is made possible by the intersection of values on both x- and y-axes. These two axes intersect each other at a point called the origin. When two points on a graph are joined together, we have a straight line graph. Straight line graphs depend on these points.

Graph papers are special square papers that are used for drawing Cartesian and other graphs.

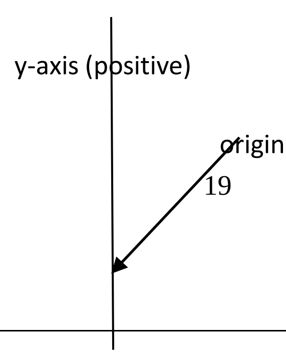
5.2 Drawing a Straight Line Graph

To draw a straight line graph, simply follow these steps.

- Draw the axes, label the origin, O
- Label the x- and y-axes
- Get the values (coordinates) of the first point; a value for x and a value for y. These two values are ordered pair written as (x,y). The intersection of these two values gives a point
- Get another sets of values for x and y, their corresponding intersection gives another point.
- Join the two points together
- The result is a straight line graph.

5.3 The Cartesian Plane

A Cartesian Plane is a plane surface with an intersection of two axes. The point of intersection is called the **origin, (0,0)**



x-axis negative **O(0,0)** x-axis(positive)

y-axis (negative)

From the origin upward we have positive values of y while downwards from the origin they are negative values of y. The right of the origin consists of positive values of x while leftwards they are negatives of x.

The ordered pair of numbers (also known as **coordinates**) gives the position of each point. The first is the x-coordinate followed by the y coordinate. The ordered pair are separated by a semicolon.

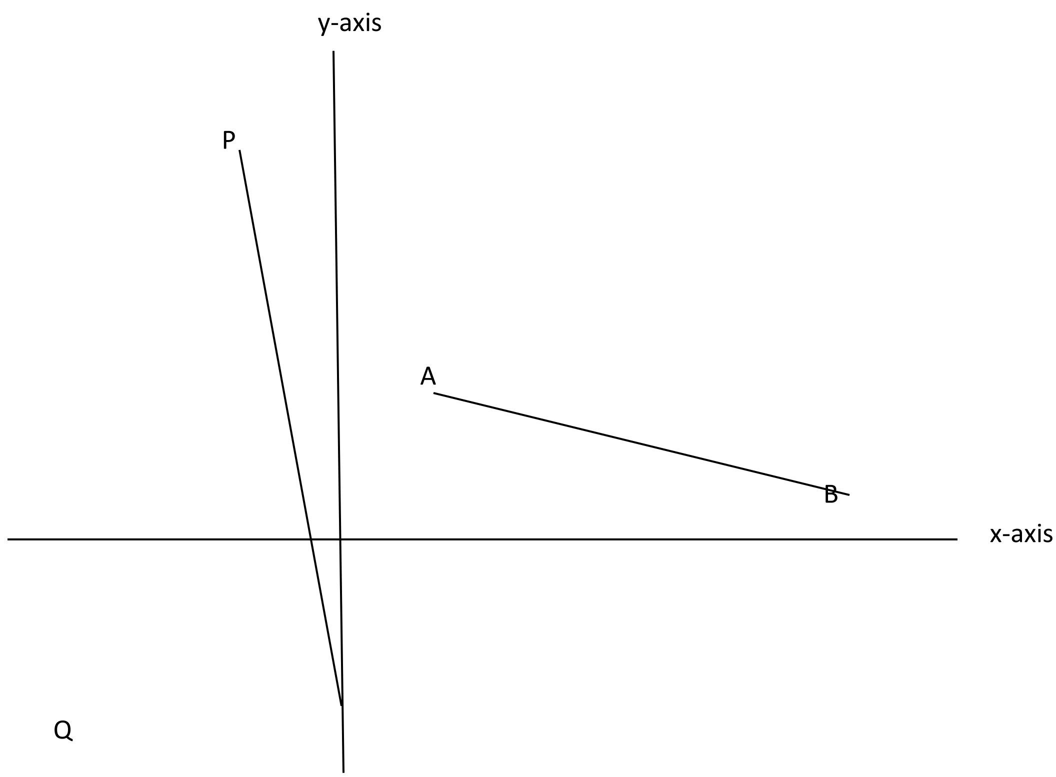
NOTE: Every point on the Cartesian plane has a unique ordered pair of coordinates in the form (x;y).

<u>Example:</u> Draw a line formed by joining the following points

(a) A(1;3) and B(5;2)

(b) P(-1;6) and Q(0;-2)

<u>Solution</u>



Graphing Titbits:

The *x*-coordinate may be called the **abscissa.**

The *y*-coordinate may be called the **ordinate.**

EVALUATION:

PAGE 178 EXERCISE 15.3 N0 1(a,b,c)

PAGE 178 EXERCISE 15.3 N0 2(a,b,c)

ASSIGNMNET:

PAGE 178 EXERCISE 15.3 N0 3(a,b), No4, No5

1. **The solutions to the equation y = 8 - x are**

answer choices

A. x = 1, y = 6

B. x = 2, y = 5

C. x = 3, y = 5

D. x = 8, y = 7

2. The table of values for the equation, y = x + 2 are:

x	−1	0	1	2
y	−1	0	1	2

x	−1	0	1	2
y	2	3	4	5

x	−1	0	1	2
y	0	4	8	10

x	−1	0	1	2
y	1	2	3	4

3.State whether the values given for x and y make the equation true or false

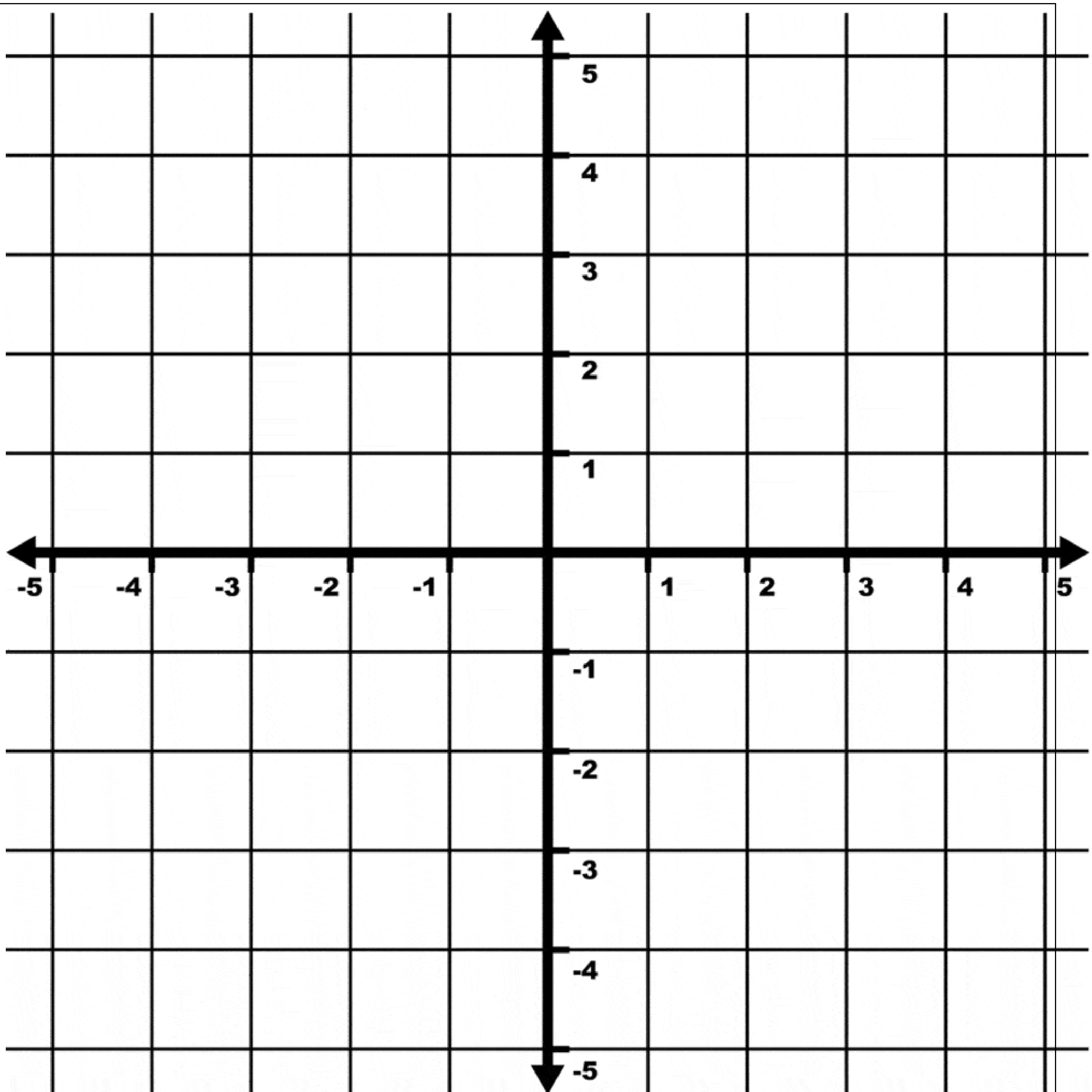
$$y = 4x$$

$$x = 5, y = 20$$

A. True

B.False

4. Draw the graph of the straight line: $3x + y = 6$ (*hint*: complete a Table of Values).



5.Using the graph above,

Draw the graph of the straight line: y = 3

True and False Statement

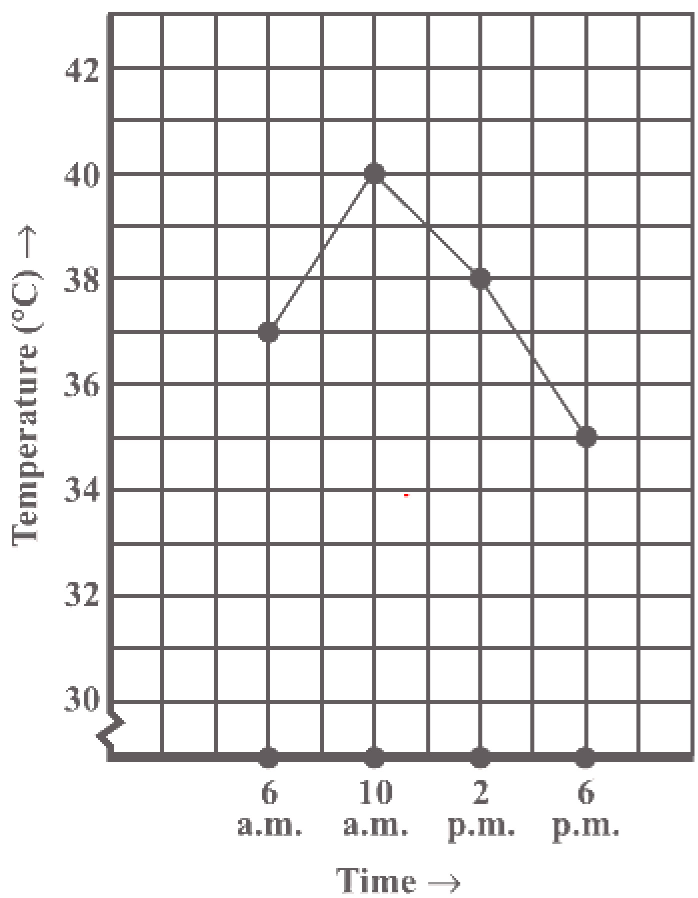
(6) (5,0) lies on the x-axis

(7) (0,1) lies the the on x-axis

(8) (0,0) is the origin

(9) (4,4) is equal distance from both the x-axis and y-axis

10



a) what time temperature was maximum

(b) What is the temperature at 6 PM

(c) What is the temperature difference between time 6:00 AM and 6:00 PM

WEEK 6 PLANE SHAPES AND THEIR PROPERTIES

Behavioral objectives: *At the end of this lesson students should be able to:*

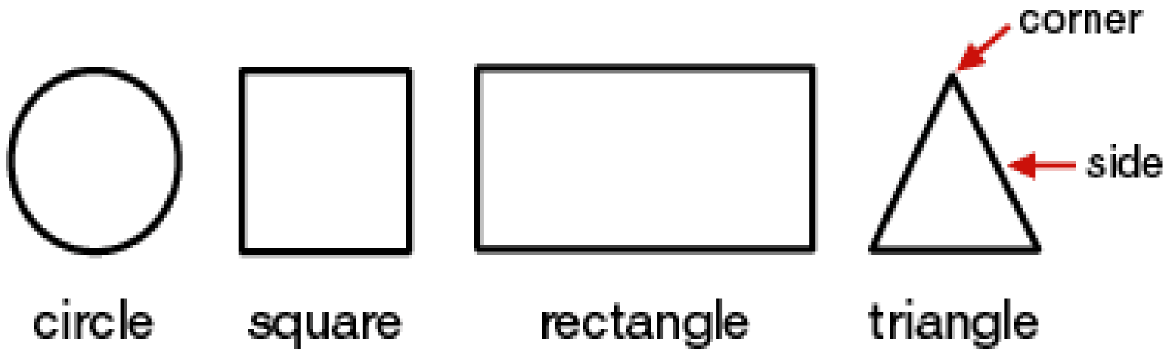
1. *Identify and name different plane shapes*
2. *Recall and describe the properties of different plane shapes*
3. *Relate the plane shapes to the environment*
4. *Show the similarities and differences between the plane shapes*

6.1 Overview

Geometry and spatial relationships are a part of children's daily lives. Understanding an object's position in space and learning the vocabulary to describe the position and give directions are important. Simple terms like ***above, below, left, right,*** or ***between,*** enable students to order and describe the world around them. They can apply these terms as they describe planes and solid shapes in the classroom.

Most of the objects that we encounter can be associated with basic shapes. A closed, two-dimensional,l or flat figure is called a **plane shape.** Different plane shapes have different attributes, such as the number of **sides** or **corners.** A side is a straight line that makes part of the shape, and a corner is where two sides meet. In this chapter, children will learn to identify, describe, sort, and classify plane shapes by these attributes.

Although children are familiar with the most common shapes, up until now they may not have been able to verbalize what distinguishes a square from a rectangle or a circle from a triangle. They will learn to describe shapes in terms of their sides and corners. A **triangle** is a shape with three sides and three corners. A **rectangle** is a shape with four sides and four corners. They may notice that opposite sides are the same length. A **square** is a rectangle in which all four sides are of equal length. A **circle** is a round shape that has no sides or corners. These attributes, as well as size, can be used to sort and classify shapes.



PROPETIES OF PLANE SHAPES

Square

- A square has four sides, but not just any four sides. A square's four sides are all the same length. A square with 1cm sides is smaller than a square with 3cm sides because one is less than three. A square also has four corners. Opposite sides are equal, the diagonal bisect at right angles. It has four lines of symmetry.
- Perimeter, $P= l+l+l+l = 4l$ cm
- Area, $A= l \times l= l^2$ cm^2

Rectangle

- A rectangle has two equal sides of one length and two equal sides of a different length. A rectangle is like a stretched square. Both figures have four corners, but no longer four equal sides for the rectangle. Write their findings on the board under headings "square," "rectangle" and "both." The diagonals are equal, and they bisect each other. It has two line of symmetry.
- Perimeter, $P= l+b+l+b = 2l + 2b$ cm $= 2(l+b)$ cm
- Area, $A= l \times b$ cm^2

Triangle

This is a polygon with three sides and three angles. The sum of angles in a triangle is 180°. When two sides are equal; the base angles are equal the triangle is called isosceles triangle. If all the three sides are equal, all the angles are equal which is 60, we have equilateral triangle, it has three lines of symmetry. But when no sides are equal we have a scalene triangle. Students should illustrate the aforementioned and other types of triangles.

Circle

- A circle is a round shape. The sum of angles is 360°. It has different parts such as the radius, diameter, circumference, centre, arc, quadrant, semi-circle, sector, segment and chord.
- The circumference of a circle, $C= 2\pi r$ cm
- Area of a circle, $A= \pi r^2$ cm^2

- Give each student a piece of string. Ask them to make circles with the string on their desks. Discuss how many sides and corners a circle has: none. Let each child pick a piece of construction paper. Fold it in half and show them how to trim the edges; open it up and it's a circle. For homework, tell the class to take home their circle, find unneeded items that are circles and glue them on the construction paper. The next day post the artistic circles on the bulletin board.

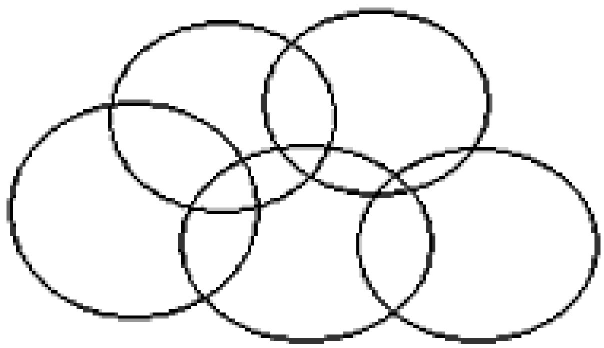
ASSIGNMENT

PAGE 214 EXERCISE 17.1 NO 1-4

PAGE 217 EXERCISE 17.2 NO 1-3

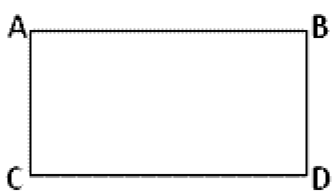
PAGE 219 EXERCISE 17.3 NO 3-4

1. How many circles are there in the following figures?



2-3. Name the following shapes or plane-closed figurers:

(i)



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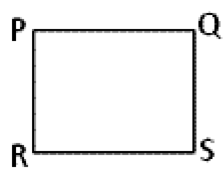

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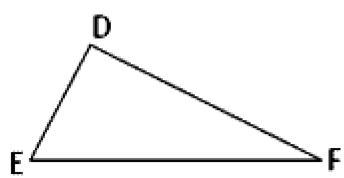

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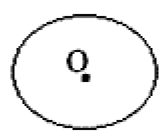


4-6. Write the names of two objects whose shapes are:

(i) Circular (Like a circle)

(ii) Triangular (Like a triangle)

(iii) Square

(iv) Rectangular (Like a rectangle)

7-9. Write the names of the shapes of the following shapes:

(i) Page of a book

(ii) Surface of a postcard

(iii) Surface of a scale

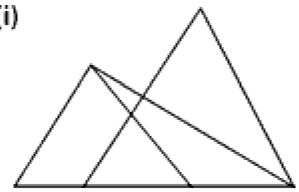
(iv) Shape of a handkerchief

(v) Surface of one-rupee coin

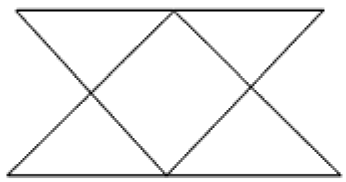
(vi) Surface of an Indian bread

10.How many triangles are there in the following figures?

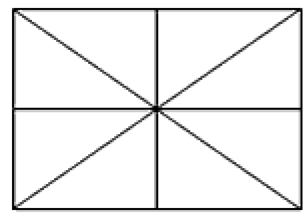
(i)



(ii)



(iii)



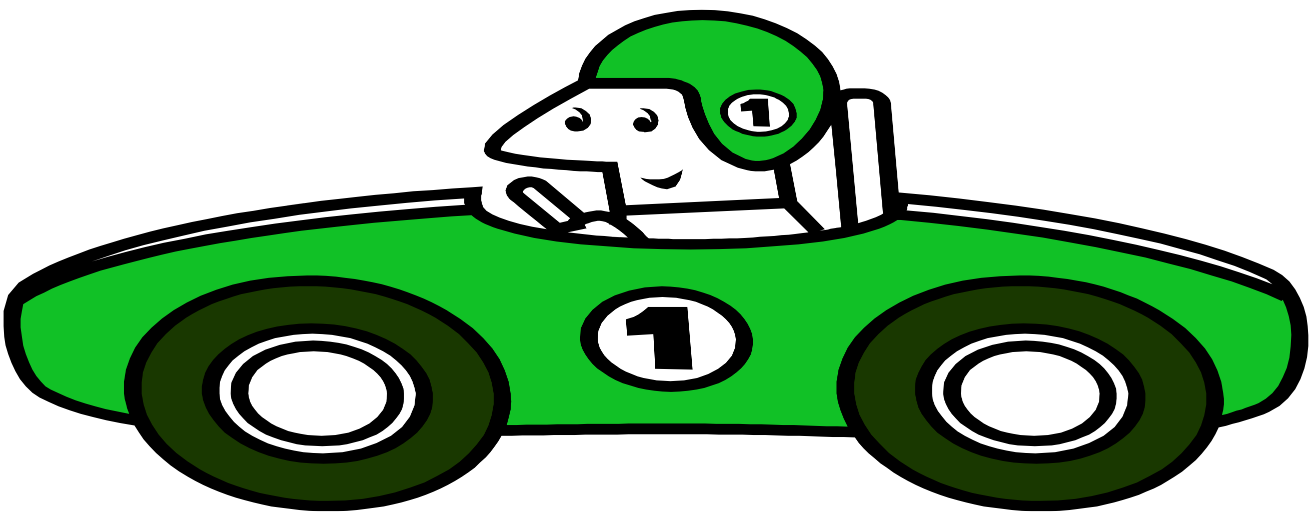
WEEK 8 SCALE DRAWING

Behavioral objectives: *At the end of this lesson students should be able to:*

1. *Identify and interpret scales as simple ratios*
2. *Relate scales to real distances and to lengths on drawings*
3. *Measure real lengths and distances and represent on sale drawing*
4. *Read and interpret various scale drawings.*

Introduction:

A Scale drawing is a pictorial representation of a real object, area or region e.g. maps, technical drawing. Since it is not always possible to draw on paper the actual size of real-life objects such as the real size of a car, an airplane, we need scale drawings to represent the size like the one you see below of a van.



In real-life, the length of this van may measure 240 inches. However, the length of a copy or print paper that you could use to draw this van is a little bit less than 12 inches

Since 240/12 = 20, you will need about 20 sheets of copy paper to draw the length of the actual size of the van

In order to use just one sheet, you could then use 1 inch on your drawing to represent 20 inches on the real-life object

You can write this situation as 1:20 or 1/20 or 1 to 20

Notice that the first number always refers to the length of the drawing on paper and the second number refers to the length of real-life object

Example #1:

Suppose a problem tells you that the length of a vehicle is drawn to scale. The scale of the drawing is 1:20

If the length of the drawing of the vehicle on paper is 12 inches, how long is the vehicle in real life?

Set up a proportion that will look like this:

$$\frac{\text{Length of drawing}}{\text{Real length}} = \frac{1}{20}$$

Do a cross product by multiplying the numerator of one fraction by the denominator of the other fraction

We get :

Length of drawing × 20 = Real length × 1

Since length of drawing = 12, we get:

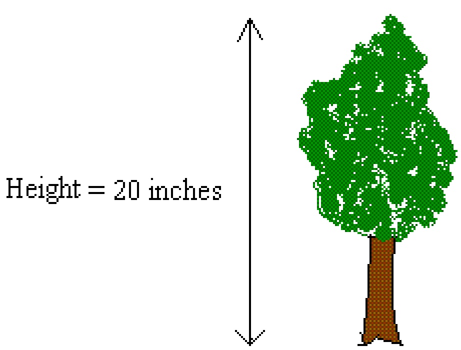
12 × 20 = Real length × 1

240 inches = Real length

Example #2:

The scale drawing of this tree is 1:500

If the height of the tree on paper is 20 inches, what is the height of the tree in real life?



Set up a proportion like this:

$$\frac{\text{Height of drawing}}{\text{Real height}} = \frac{1}{500}$$

Do a cross product by multiplying the numerator of one fraction by the denominator of the other fraction

We get :

Height of drawing × 500 = Real height × 1

Since height of drawing = 20, we get:

20 × 500 = Real length × 1

10,000 inches = Real height

EVALUATION

Do these

1-2. Two places are 800cm apart. If this distance is represented by 20cm on a map, what is the scale of the map?

3-7. Copy and complete the table below.

Length on drawing	Scale	Actual length
5cm	1cm to 10cm	
8cm	1cm to 5cm	
9.5cm	1cm to 3cm	
7.8cm	1cm to 30cm	
12cm	1cm to 5km	

8. **Pam drew a scale drawing of a game room. She used the scale 1 inch : 2 feet. If the air hockey table is 5 inches in the drawing, how long is the actual air hockey table?**

answer choices

A. 10 Feet

B. 2.5 Feet

C. 5 Feet

D. 15 Feet

9. Desmond measured a city park and made a scale drawing. The scale he used was 1 centimeter : 9 meters. The actual width of the soccer field is 54 meters. How wide is the field in the drawing?

answer choices

A. 6 cm

B. 486 cm

C. 9 cm

D. 54 cm

PAGE 248 EXERCISE 19.2 NO 1-4

PAGE 248 EXERCISE 19.3 NO 4-5

PAGE 252 EXERCISE 19.4 NO 1-4

PAGE 252 EXERCISE 19.5 2,3,4

WEEK 9: QUANTITATIVE APTITUDE PROBLEMS ON PLANE SHAPES.

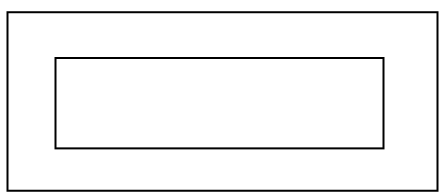
Behavioral objectives: *At the end of this lesson students should be able to:*

I. Solve problems relating different types of plane shapes.

II. Understand where and how to tackle shapes detached or combined from a particular shape.

EXAMPLES;

Calculate the area of the gap between the two diagrams below. If the length and the breadth of the bigger rectangle is 7cm and 4cm respectively. While for the smaller rectangle is 5cm and 2cm respectively.



SOLUTION.

(The area of the bigger rectangle) – (The area of the smaller rectangle.)

$(7 \times 4) - (5 \times 2) = 28 - 10 = 18$cm.

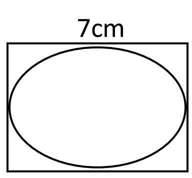
EVALUATION.

The diagram below shows a wire circle set inside a wire square of side 7cm.

a. Calculate the perimeter of the square.

b. Calculate the circumference of the circle.

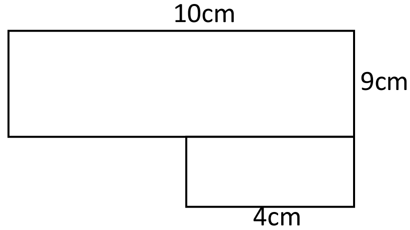
c. Calculate the total length of wire used.



ASSIGNMENT.Calculate the area of the shape below.

1.

2.



3. Find the perimeter and the area of a square, if we know the length of its diagonal $d = 4.2$ m.

4. Find the area of the rectangle $ABCD$, where the length of the side $|AB| = a = 8.2$ cm and the diagonal $d = 2a$.

5. Lengths of the sides of a rectangular garden are in the ratio $1:2$. Line connecting the centers of the adjacent sides of the garden is 20 m long. Calculate the perimeter and the area of the garden.

6. A rectangular garden has a length of 57 m and a width of 42 m. Calculate of how many m^2 will decrease the area of a garden, if the ornamental fence with a width of 60 cm will be planted inside its perimeter.

7. A perimeter of a parallelogram is 2.8 meters. The length of one of its sides is equal to one-seventh of the entire perimeter. Find lengths of the sides of the parallelogram.

8. One of the internal angles of the rhombus is 120° and the shorter diagonal is 3.4 meters long. Find the perimeter of the rhombus

9. Find a length of the diagonal AC of the rhombus $ABCD$ if its perimeter $P = 112$ dm and the second diagonal BD has a length of 36 dm.

10. In the isosceles trapezoid $ABCD$ we know: $AB||CD$, $|CD| = c = 8$ cm, height $h = 7$ cm, $|\angle CAB| = 35°$. Find the area of the trapezoid.