PIVOT 4A

LEARNER'S MATERIAL

QUARTER 2

Mathematics

G7

MELC based SLM

DepEd CALABARZON
Curriculum and Learning Management Division

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The Editors

PIVOT 4A Learner's Material
Quarter 2
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Mathematics
Grade 7

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Guide in Using PIVOT 4A Learner's Material

For the Parents/Guardians

This module aims to assist you, dear parents, guardians, or siblings of the learners, to understand how materials and activities are used in the new normal. It is designed to provide information, activities, and new learning that learners need to work on.

Activities presented in this module are based on the Most Essential Learning Competencies (MELCs) in **Mathematics** as prescribed by the Department of Education.

Further, this learning resource hopes to engage the learners in guided and independent learning activities at their own pace. Furthermore, this also aims to help learners acquire the essential 21st century skills while taking into consideration their needs and circumstances.

You are expected to assist the children in the tasks and ensure the learner's mastery of the subject matter. Be reminded that learners have to answer all the activities in their own notebook.

For the Learners

The module is designed to suit your needs and interests using the IDEA instructional process. This will help you attain the prescribed grade-level knowledge, skills, attitude, and values at your own pace outside the normal classroom setting.

The module is composed of different types of activities that are arranged according to graduated levels of difficulty—from simple to complex. You are expected to :

a. answer all activities on separate sheets of paper;

b. accomplish the **PIVOT Assessment Card for Learners on page 38** by providing the appropriate symbols that correspond to your personal assessment of your performance; and

c. submit the outputs to your respective teachers on the time and date agreed upon.

Parts of PIVOT 4A Learner's Material

	K to 12 Learning Delivery Process	Descriptions
Introduction	What I need to know	This part presents the MELC/s and the desired learning outcomes for the day or week, purpose of the lesson, core content and relevant samples. This maximizes awareness of his/her own knowledge as regards content and skills required for the lesson.
	What is new	
Development	What I know	This part presents activities, tasks and contents of value and interest to learner. This exposes him/her on what he/she knew, what he/she does not know and what he/she wants to know and learn. Most of the activities and tasks simply and directly revolve around the concepts of developing mastery of the target skills or MELC/s.
	What is in	
	What is it	
Engagement	What is more	In this part, the learner engages in various tasks and opportunities in building his/her knowledge, skills and attitude/values (KSAVs) to meaningfully connect his/her concepts after doing the tasks in the D part. This also exposes him/her to real life situations/tasks that shall: ignite his/ her interests to meet the expectation; make his/her performance satisfactory; and/or produce a product or performance which will help him/her fully understand the target skills and concepts .
	What I can do	
	What else I can do	
Assimilation	What I have learned	This part brings the learner to a process where he/she shall demonstrate ideas, interpretation, mindset or values and create pieces of information that will form part of his/her knowledge in reflecting, relating or using them effectively in any situation or context. Also, this part encourages him/her in creating conceptual structures giving him/her the avenue to integrate new and old learnings.
	What I can achieve	

This module is a guide and a resource of information in understanding the Most Essential Learning Competencies (MELCs). Understanding the target contents and skills can be further enriched thru the K to 12 Learning Materials and other supplementary materials such as Worktexts and Textbooks provided by schools and/or Schools Division Offices, and thru other learning delivery modalities, including radio-based instruction (RBI) and TV-based instruction (TVI).

WEEKS 1-2

Measuring Quantities

Lesson

I

Measurement is a number that characterized an object or event, which can be compared with other objects or events. You use basic unit of measure for length, time, weight/mass, electric current, volume, angles, temperature and rate. There are two systems of measures, the Metric System or the International System of Units (SI) and the English System. Most countries, including the Philippines, use the SI Unit of measure.

The table below shows the commonly used units of measure for different quantities.

Units of Measure		
Quantity	**Metric**	**English**
Length	millimeter (mm) centimeter (cm) meter (m) kilometer (km)	inch (in) foot (ft) yard (yd) mile (mi)
Volume	cubic centimeter (cm^3) cubic meter (m^3)	cubic inch (in^3) cubic foot (ft^3) cubic yard (yd^3)
Mass	gram (g) kilogram (kg)	ounce (oz) ton (t) pound (lb)
Temperature	Kelvin (K) degree Celsius (^0C)	degree Fahrenheit (^0F)
Time	second (s) minute (min) hour (h)	second (s) minute (min) hour (h)
Capacity	milliliter (mL) liter (L)	fluid ounce (fl. oz) pint gallon
Angle	degree radian	degree radian

D

Learning Task 1. Identify the appropriate unit of measure that can be used to the following quantities.

Physical Quantity	Unit of measure	Physical Quantity	Unit of measure
1. table		5. distance of your place to Manila	
2. handkerchief		6. baking cake	
3. ice cream		7. balikbayan box	
4. ball pen		8. size of the shoes	

Each unit of measure has its own use in any physical quantities.

1. **Length** describes how long a physical quantity is. It includes distance, height, depth and the like. In the previous page you can see the different units of measures used in measuring length. The smallest unit of measure for length is millimeter (mm) and the biggest unit of measure is kilometer (km). Length is use to determine perimeter and area of other geometric figures. The basic instrument used in measuring length is a ruler. It has four units of measure, millimeter (mm), centimeter (cm), inches (in), and foot. Meter stick is used to measure longer length like measuring the floor of your house, the distance between the floor and the ceiling and many more. In English System , yard stick is used. Distance from one town to another is measured by kilometers in metric system or miles in English System. The instrument use is odometer.

Instruments Used to Measure Length

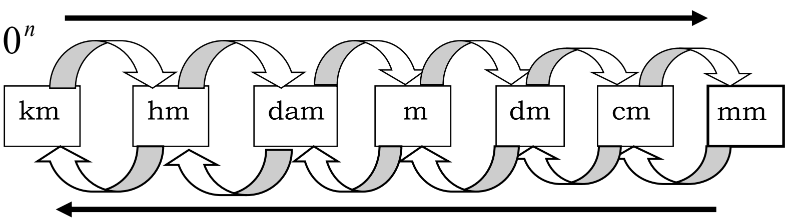
One unit of measure can be expressed in another unit of measure. It can be from smaller to bigger unit and vice versa or from Metric unit to English unit of measure and vice versa.

The table below shows the equivalent measure of one unit to meter since it is the basic unit of measure in metric system.

Unit	Meaning	
Millimeter (mm)	$\frac{1}{1000} = 0.001$	meter
Centimeter (cm)	$\frac{1}{100} = 0.01$	meter
Decimeter (dm)	$\frac{1}{10} = 0.1$	meter
Dekameter (dam)	10	meters
Hectometer (hm)	$100 = 10^2$	meters
Kilometer (km)	$1000 = 10^3$	meters

In converting smaller unit to bigger unit, divide the given by the corresponding powers of 10 while from bigger to smaller multiply the given powers of 10.

x 10^n



Every step should be multiplied by 10

$\div 10^n$

Every step should be divided by 10

Examples:

1. Convert 3 km to a) m b. cm

   Solution: Given : 3 km to be converted to smaller unit. Hence you multiply by powers of 10.

   Since meter is 3 steps from kilometers, them 3 km = 3 x 10^3 = 3,000 meters

   Centimeter is 5 steps from km, the 3 km = 3 x 10^5 = 300 000 cm

2. Convert 560,000 cm to a) dam b) km

   Solution: Given: 560,000 cm to be converted to bigger units. Hence you divide by powers of 10.

   Since dam is 3 steps from cm, then 560,000 cm = 560,000 ÷ 10^3 = 560 dam

   Kilometer is 5 steps from centimeter, then 560 000cm = 560,000÷10^5 = 5.6 km

3. The length of the rectangular lot is 12 m and the width is 550 cm. Find the perimeter and the area.

   Solution: Given L = 12m w = 550 cm

   Before solving for the perimeter and the area of the rectangular lot, make sure that the length and the width have the same unit of measure. Hence you can convert one unit in terms of the other unit. In this case centimeter is converted to meters. 550 cm = 550 ÷ 10^2 = 5.5 m. The width now is w = 5.5 m

   P = 2l + 2w (formula for the perimeter)
   = 2(12) + 2(5.5)
   = 24 + 11 = 35 meters

   A = lw (formula for the area)
   = 12(5.5)
   = 66 m^2 (square meter)

The table below shows how to convert the English unit to metric unit of measure and vice versa.

Converting	to	Multiply by	Result
Inch (in)	cm	2.54	1 in = 2.54 cm
Foot (ft)	cm	30.5	1 ft = 30.5 cm
Yard (yd)	m	0.9	1 yd = 0.914 m
	cm	90	= 91.4 cm
Mile (mi)	km	1.61	1 mi = 1.61 km
Centimeter (cm)	in	0.4	1 cm = 0.4 in
Meter (m)	in	39.4	1m = 39.4 in
	ft	3.28	= 3.28 ft
	yd	1.1	= 1.1 yd
Kilometer (km)	mi	0.62	I km = 0.62 mi

Examples:

1. What is 4.2 inches in centimeter?

   Solution: Since 1 in = 2.54 cm , then 4.2 in = 4.2(2.54) = 10.67 cm

2. What is 10.5 m in yards?

   Solution: Since 1 m = 1.1 yd, then 10.5m = 10.5(1.1) = 11. 55 yds.

3. Three yards of ribbon will be cut into 7 equal pieces. How long in centimeters is each piece?

   Solution: Convert 3 yards to centimeters.

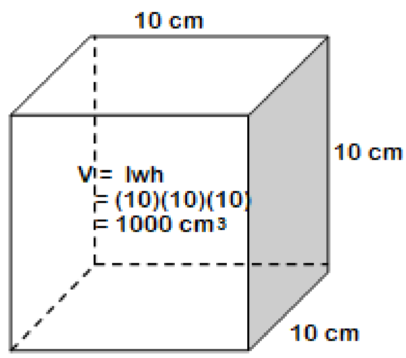
   Since I yd = 91.4 cm, then 3 yd = 3(91.4) = 274.2 cm

   To get the length of each piece : 274.2 ÷ 7 = 39.17 cm per piece.

2. Volume and Capacity

Volume is the measure of how much amount of space is occupied by a 3-dimensional figure. **Capacity is the** amount contained in a 3-demensional figure. Volume can be measured using SI units like cubic meter (m^3) for solid, which is the basic unit for volume. Other unit of measure is Liter for liquid which is equivalent to 1000 cubic centimeter. For English System, gallon, pints or fluid ounce are used to measure the capacity of liquid contained in a 3-dimentional figures.

The illustration at the right is a cube whose edge measures 10 cm. The volume of the cube is 1000 cm^3 or cc (cubic centimeter). This means that it can hold a capacity of 1000cc or of liquid equivalent to 1 Liter (L). Your water consumption is measured in cubic centimeter. You can verify it through your water bill. For larger capacity , cubic meter is used. Smaller capacity is measured using milliliter (mL) , which is commonly used for liquid medicine prescriptions.



Below is the conversion table for volume.

Unit	Equal to	Unit	Equal to
Cubic kilometer (km^3)	10^9 m^3	Cubic meter (m^3)	1000 L
Cubic hectometer (hm^3)	10^6 m^3	Hectoliter (hL)	100 L
Cubic dekameter (dam^3)	10^3 m^3	dekaLiter (daL)	10 L
Cubic meter (m^3)	10^0 m^3 =1	Cubic decimeter (dm^3)	1 L
Cubic decimeter (dm^3)	10^{-3} m^3	Deciliter (dL)	0.1 L
Cubic centimeter (cm^3)	10^{-6} m^3	Centiliter (cL)	0.01 L
Cubic millimeter (mm^3)	10^{-9} m^3	Milliliter (mL) = cc	0.001 L

Examples:

1. Convert 8 m^3 to mm^3 .

Solution: Since the conversion is from bigger unit to smaller unit, you have to multiply every step by 10^3. Cubic millimeter (mm^3) is 3 steps from m^3, therefore

$8m^3 = 8(10^9) = 8 \times 10^9$ cubic millimeter.

2. Convert 340,000 cm^3 to km^3

Solution: Since the conversion is from smaller to bigger unit, you have to divide every step by 10^3. Cubic kilometer (km^3) is 5 steps from cm^3 , therefore $430000\ cm^3 = 430\ 000 \div 10^{15} = 430\ 00 \times 10^{-15}$ or $4.3 \times 10^{-19}\ km^3$.

3. The rectangular prism measures 0.054 m in length , the height is 5 cm and the width is 42 mm, what is the volume of the prism in cubic centimeter. How many liters of liquid can it hold?

Solution. All unit of measure must be in centimeter. Convert 0.054 m and 42mm to cm. $0.054\ m = 0.054 \times 10^2 = 5.4$ cm; $42\ mm = 42 \div 10 = 4.2$ cm

The volume of the prism is $V = lwh = 5.4(4.2)(5) = 113.4\ cm^3$

Since 1 cc = 0.001 L, then 113.4 cm^3 or cc = $113.4 \times 0.001 = 0.1134$ L

Other measures for capacity that are very useful in your home are shown in the table below:

Convert	to	Multiply by	Result
Teaspoon (tsp)	mL	5	1 tsp = 5 mL
Tablespoon (tbsp)	mL	15	1 tbsp = 15 ml
Fluid ounce (fl.oz)	mL	30	1 fl.oz = 30 mL
Cup (c)	L	0.28	1 c = 0.28 L
Pint (pt)	L c qt	0.47 2 0.5	1 pt = 0.47 L = 2 c = 0.5 qt
Quart (qt)	L c pt	0.95 4 2	1qt = 0.95 = 4 c = 2 pt
Gallon (gal)	L	3.8	1gal = 3.8 L

Examples:

1. How many liters is 16 cups of milk?

Solution: Since 1 cup is 0.28 L, then 16 cups = $16 \times 0.28 = 4.48$ L.

2. A bottle of cough syrup contains 5 fl.oz . If you are going to drink the medicine and the doctor prescribed 5 mL three times a day, how many days you're going to drink the one bottle of medicine?

Solution: Convert 5 fl.oz to mL. 5 fl.oz = $5 \times 30 = 150$ mL. If you are going to drink 5mL , 3 times a day, in one day you will consume 15 mL.

The number of days you can consume the medicine is $150 \div 15 = 10$ days

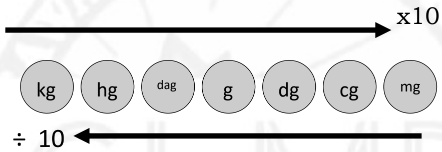
3. **Mass** is a measure of the amount of matter in a sub stance or an object. The basic SI unit for mass is the kilogram (kg), but smaller masses may be measured in grams (g), for great amount of mass, the unit of measure is ton. To measure mass, you would use a balance or weighing scale. Weighing scales can be in different forms according to its use. There are weighing scales intended for kitchen use, for markets and some for heavy weights. At the right are samples of weighing scales.




The table below shows the metric unit of measure and its equivalent in grams.

Unit	Equivalent
Milligrams (mg)	1 mg = 0.001g
Centigram (cg)	1 cg = 0.01 g
Decigram (dg)	1dg = 0.1 g
Gram (g)	1g = 1 g
Dekagram (dag)	1 dag = 10 g
Hectogram (hg)	1 hg = 100 g
Kilogram (kg)	1 kg = 1000 g
Metric ton (t)	1 t = 1 000 000 g = 1000 kg

Converting bigger unit to smaller unit, **multiply** every move by 10



Converting smaller unit to bigger unit, **divide** every move by 10

Examples:

1. Every cup cake needs 2250 mg of flour . How many grams of flour is needed for12 cup cakes?

   Solution: Convert first 2250mg to g. Since converting smaller unit to bigger divide every step by 10. Gram is 3 steps from mg, then
   2250mg = 2250÷ 10^3 = 2. 25 g

   12 cup cakes need 2. 25 g x 12 = 27 g of flour

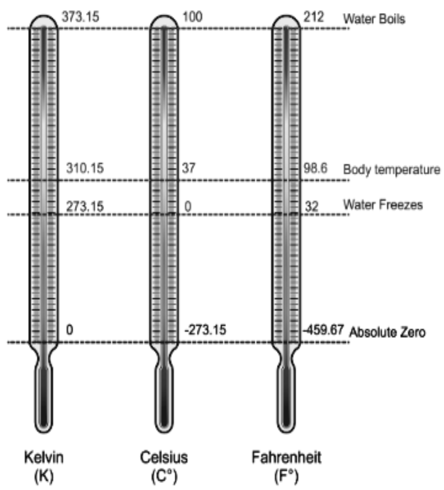
2. In your village, the garbage collector collects 980 kg of garbage everyday. How many metric ton of garbage in 30 days can they collect?

   Solution: 1 metric ton = 1000 kg , therefore 980 kg = 980 ÷ 1000 = 0.98 t

   In 30 days they can collect 0.98 x 30 = 29.4 t of garbage.

4. **Temperature** refers to the measure of the hotness or coldness of an object or substance with reference to some standard value. The instrument used to determine temperature is a thermometer. It is measured by Kelvin (K), degree Celsius (^{0}C), and degree Fahrenheit (^{0}F) The commonly used units of measure for temperature are degree Celsius and degree Fahrenheit.

Comparing the three units of measure as you can see in the figure the boiling point of water, body temperature, room temperature and freezing point of water are different from each other. You can convert one unit of measure to the other using these formulas:



Fahrenheit to Celsius

$^0C = \frac{5}{9}(^0F - 32)$ or $^0C = 0.56(^0F - 32)$

Celsius to Fahrenheit

$^0F = \frac{9}{5}(^0C) + 32$ or $^0F = 1.8(^0C) + 32$

Celsius to Kelvin

$K = {}^0C + 273$

Examples:

1. A butter melts at 31^0C while a candle melts at about 55^0 C. How much higher is the melting point of candle in Fahrenheit?

   Solution: Find how much higher the meting point of candle than butter:

   $55^0C - 31^0C = 24^0C$. Convert 24^0C to ^{0} F. $^0F = 1.8(24) + 32 = 75.2$

   The melting point of candle is 75.2^0F higher than the butter.

2. The recipe for a certain cake to be baked in an oven calls for a 475^0F tempera ture. If your oven is set in degree Celsius, what should be your temperature setting?

   Solution: Change ^0F to ^0C: $^0C = 0.56(475 - 32) = 0.56(443) = 248.08\ ^0C$ or you may round off to 250^0C in your oven setting.

5. Time is very important and the fundamental quantities of physical world. As the saying goes "Time is gold". Everything you do is bounded with time. Time is a period during which an action or event occurs.

Earth revolves around the sun for 365 days, 5 hours, 48 minutes and 46 seconds. However , the 365 days is adapted as equivalent to one year. Nevertheless, the 5 hours, 48 minute and 46 seconds are still considered that is why we have leap year, which 366 days every 4 years.

The table shows the unit of time:

60 seconds (s)	= 1 minute	366 days	= 1 leap year
60 minute (min)	= 1 hour	10 years	= 1 decade
24 hours (h)	= 1 day	20 years	= 1 score
12 months (mo)	= 1 year (yr)	100 years	= 1 century
365 days	= 1 year	1000 years	= 1 millennium

Examples:

1. Joy recorded a song for 140 minutes. How many hours did she spend in recording the song?

Solution: Since 1 h = 60 minutes, then 140 min = 140 ÷ 60 = 2.33 hours

2. Approximately it takes 1575.5 minutes to travel by sea from Manila to Leyte. How many days, hours, minute and seconds does it take to travel from Manila to Leyte?

Solution: Convert 1575.5 min to hour. 1575.5 min = 1575.5 ÷ 60 = 26.26 hours

Convert 26.26 hours to days. 26.26 h = 26.26 ÷ 24 = 1. 09 days

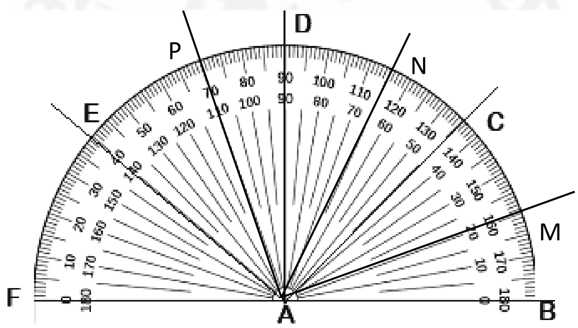
Convert 0.09 days to hour . 0.09 day = 0.09(24) = 3.06 hours

Convert 0.06 hour to min. 0.06 hr = 0.06(60) = 3.6 min

Convert 0.6 min to second. 0.6min = 0.6(60) = 36 seconds

Thus, it takes 1 day, 3 hours, 3 minutes and 36 seconds to travel from Manila to Leyte.

6. Angle is formed by two rays intersecting at a point called the **vertex** of the angle. The two rays are called the **sides of the angle**. The amount of the opening of the two sides determines the measure of the angle. The unit of measure is degrees and the instrument used to measure the angle is a protractor. The protractor has inner and outer scale. The inner scale is read in a counter clockwise direction while the outer scale is read in a clock wise direction. The angle can be named using the letter assigned to the vertex. However if there are several angles with the same vertex you use the 3 letters in naming the angle. In the figure at the right , you can name several angles like $\angle BAC$ o r $\angle CAB$ (the symbol $\angle$ is read as angle) The measure of this angle is 45^0 , reading the inner scale. Make sure that one side of the angle lies on the zero line. This angle is an **acute angle**. Any angle that measures less than 90^0 is an acute angle. $\angle BAD = 90^0$. This angle is a right angle. **Right angle** measures 90^0. An angle whose measure is more than 90^0 is an **obtuse angle** like $\angle FAC = 135^0$, the measure is read using the outer scale.



Examples:

Using the figure above determine the measure and kind of angles are the following:

a . $\angle FAE$ b $\angle BAE$ c $\angle DAF$ d $\angle EAC$

Solution: a. 40^0 , acute angle c. 90^0 right angle

b 140^0, obtuse angle d. $\angle EAC = \angle FAC - \angle FAE = 95^0$ obtuse angle

7. Rate is a ratio of two different quantities. Among these ratios are speed, which is the ratio between distance and time, water consumption is the ratio of the price per cubic meter and many more.

Examples:

1. What is the speed of the car if it travels 100 kilometer in 2 hours?

Solution: The ratio between the distance and the time is the speed.

$\frac{100}{2} = 55$ The speed is 55 km per hour or 55kph

E

Learning Task 2.

A. Convert to the indicated unit of measure

1. 708 mm = ______m
2. 15.6 km = ______ dam
3. 108 cc = ______mL
4. 8 tbsp = ______ mL
5. 16.5 L = _____ gal
6. 3,569 sec = _____days
7. 4 score = ______ mo.
8. 299 K = _______^{0}C
9. 200^{0}F = ______^{0}C
10. 10,866 mg = ______kg

B. Identify what kind of angle with the given measure are the following:

1. 47^0
2. 160^0
3. 89^0
4. 10^0
5. 91^0

C. Solve the following;

1. Elisse has 20 meters of ribbon. How many 15 cm of ribbon can be cut from it?
2. Mr. JB has a rectangular lot that measures 550 meters by 0.75 km. What is the area of the land in square meter. He is selling the whole lot for 206, 250,000 pesos, how much is the price per square meter?
3. Drinking 8 glasses of water a day is good for your health. If each glass of water is equivalent to 148 mL, how many liters of water you need to consume everyday.
4. Your baby brother has a body temperature of 100^0 F. What is his body temperature in ^{0}C? Does he has a normal body temperature?
5. Your mother asked you to buy 2.5 kg of sugar. Each pack of sugar in the store weighs 250 grams. How many packs of sugar will you buy?
6. The 120 grams powdered milk make 12 cups of milk. How many kilograms of powdered milk can produce 60 cups of milk. How many liters is 60 cups of milk?

7. You have 8 modules to study in a day. Your teacher gave you this schedule for 5 days from Monday to Friday.

Subject	Number of	Subject	Number of
Math	45	MAPEH	30
Science	40	EPP	30
English	40	ESP	25
Filipino	35		

A. How many hours in a day you spend studying all these subjects?

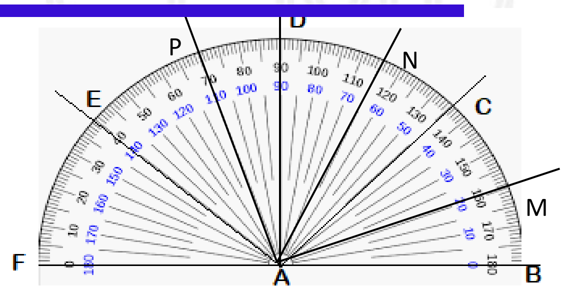
B. If you will add the number of minutes you spend in each subject in one week, how many hours you spend in one week for each subject.

C. You mother gives you 2700 seconds playtime everyday, how many minute is your playtime.

D. Refer to the figure at the right. Find the measure and identify the kind of angle.

A

Learning Task 3:



1. $\angle FAP$
2. $\angle DAC$
3. $\angle NAM$
4. $\angle NAP$
5. $\angle EAN$

B. Below is a recipe of a cake . Find the equivalent amount for 3 cakes.

Ingrediemts	Measure for one cake	Measure for 3 cakes
Cake flour	12,000 mg	________g
Milk	2 cups	________mL
Brown sugar	1 pint	________cups
butter	5 mg	_______ g
walter	0.006 L	________ml
Chocolate chips	100 mg	________ g

1. If the cost of all the ingredients for 3 cakes is P 360.00, how much the ingredients per cake costs?
2. If a cake was sold for P220.00, how much is the profit for the three cakes?

WEEK 3

Algebraic Expressions

I Lesson

In the English subject you learn about phrases and sentences. Mathematics has also mathematical phrases and sentences. You have to translate verbal phrases to mathematical symbol to form mathematical phrases. Mathematical phrase consists of operational symbols like +, -, ( ) or x , ÷ or /. There is/are corresponding word(s) for these symbols. Aside from operational symbols, it also includes variables and numbers.

D

Learning Task 1: What mathematical operation corresponds to the following words. Do this in a separate sheet of paper.

Mathematical term	Mathematical symbol/ operations	Mathematical term	Mathematical symbol/ operations
sum		Product	
Increased by		Quotient	
difference		Times	
Decreased by		Divided by	
Less than		More than	

In mathematics you cannot do away with symbols. Mathematical word problems cannot be solved unless you translate it into symbols. Symbols used for operations are called **operational symbols** while symbols used to determine relation between quantities are called **relational symbols**.

Operational symbols	Words associated to symbols	Operational symbols	Words related to symbols
Plus sign (+)	Plus, add, increased by, more than, sum of	**Division sign ÷, / or bar**	Divide, quotient, ratio
Minus sign (-)	Minus, subtract from, decreases by, diminished, differ-	**Involution (exponents)**	Raised to the power of, squared, cube ..,
Multiplication sign {x, ( ), ● }	Multiply, multiplied by, the product of, times (no symbol between variables means multiplication	**Evolution Radical sign** $\sqrt{\ }$	n^{th} Roots, where n is any positive integer

In grammar, a phrase is a group of words that does not express complete thoughts. Mathematical phrase does not express a complete thought also unless it becomes an equation.

Examples: Translate the following to mathematical symbols:

1. Thrice the sum of 5 and a number.

   Solution: let m be the number

   Sum of 5 and number (5 + m)

   Thrice means 3 times

   The mathematical phrase is **3(5 + m)**

2. Subtract two thirds of the number from thirty

   Solution: let x be the number

   Two thirds of the number - the word “of” means multiply. $\frac{2}{3}x$

   The mathematical phrase is $30 - \frac{2}{3}x$

3. One half the square root of twice the square of the number .

   Solution: Let y be the number. Twice the square of the number : $2y^2$

   Square root of $2y^2$: $\sqrt{2y^2}$

   The mathematical phrase is $\frac{\sqrt{2y^2}}{2}$

4. Translate 2x - 5 to verbal phrase .

   Solution: 2x means twice a number

   Possible verbal phrase : Twice a number decreased by 5 or Subtract 5 from twice a number.

In the above examples the mathematical phrases are called algebraic expressions. Algebraic expression can be a number, a single variable or a combination of letters, numbers and operational symbols.

Examples:

A. 3, m, -5x, 3y, 7xy are algebraic expressions with one term

B. $4x^2$ - 8xy , xy + 5 are algebraic expressions with two terms.

Terms in algebraic expression are separated by plus (+) or minus (-) signs. When the operations between variables or variable and number is multiplication or $\frac{24x}{ab}$ division, it is considered as one term only. 4xyz is a single term algebraic expression so as since the operations involve are multiplication and division.

Algebraic expressions are named according to number of terms.

A. Monomial is an algebraic expression with one term

B. Binomial is an algebraic expression with two terms

C. Trinomial is an algebraic expression wit 3 terms

D. Multinomial or polynomial is an algebraic expression with more than 3 terms.

The **degree** of the algebraic expressions is the highest exponent of a n expression with one variable or the highest sum of the exponents of the variables in a term of the expressions. The **constant** of the algebraic expressions is a number with fixed value. A **variable** is a letter which represents a number.

Examples:

1. $5x^4 - 3x + 12$. The expression is trinomial, the degree is 4 which is the highest exponent, the variable is x and the constant is 12.
2. $3x^2yz + x^3yz^2 - 2xyz + 4xy^2z$. This is a multinomial with variables xyz. The highest sum of the exponent is 6 which is on the second term, hence the degree is 6 and there is no constant in this expression.

E

Learning Task 2:

A. Match the verbal phrase in column A with mathematical phrase in column B.

COLUMN A	COLUMN B
1. The difference between a number and 5	A. $(m + 2)^2 + 5$
2. Five times the sum of a number and 6	B. $4(p - 6)$
3. Divide the sum of the squares of ***a*** and **b** by the square of c	C. $m - 5$
4. The square of the sum of a number and 2 increased by 5.	D. $5(a + 6)$
5. The difference of a number and 6 multiplied by 4	E. $\frac{a^2 + b^2}{c^2}$

B. Identify the kind of algebraic expression and determine the degree, variables and constant .

Algebraic Expression	Type/kind	Variables	Degree	Constant
1. $7x + 4x^3 - 17$				
2. $3abc^2 + a^2bc^2 - abc + 2$				
3. $x + 2x^2 - 6x^3 + 9x^4 + 1$				
4. $3xyz^2 + 12$				
5. 14				

A

Learning Task 3: Express the following to Mathematical symbol. Write your answers in your answer sheet.

1. Zab is x years old now. What is his age 7 years from now?
2. Joan is twice as old as her sister now. What is her age 6 years ago?
3. A square has a side $3x - 2$, what is the perimeter?
4. His income is $7x + 6$ every day. What is his total income in x days?

WEEK 4

Addition and Subtraction of Polynomials

I

Lesson

Algebraic expressions are said to be similar if the expressions has the same literal coefficients or variables, like 3x and x are similar while x and x^2 are not.

In general, algebraic expressions are called polynomials. You can only perform addition and subtraction to polynomials that are similar.

In the previous lesson you define variables as a letter that represents a number. An expression can have a value if you replace the variable with a number and perform the operations involved.

The terms in the expression 3x + 5 are not similar, hence you cannot add them. However if you give value to x, then you can perform the operations.

Example:

1. Find the value of 3x + 5 , if x = 2

   Solution: 3x + 5 = 3(2) + 5 = 6 + 6 = 11.

   The value of the expression 3x + 5 is 11 when x = 2.

2. Find the value of $\frac{6ab-c}{abc}$ if a = 5; b = 3 ; c = 10

   Solution: $\frac{6ab-c}{abc} = \frac{6(5)(3)-10}{5(3)(10)} = \frac{80}{150} = \frac{8}{15}$

Rules in Adding or Subtract Polynomials

Step 1. Arrange the polynomial in descending or ascending order if possible.

Step 2. Group Terms which are similar.

Step 3. Add/subtract the numerical coefficients, applying the rules in subtracting and adding integers and copy the literal coefficients.

Examples:

1. Add: $4x^2 - 2x + 5$ and $7 + 5x^3 + 4x - x^2$

D

Learning Task 1: Find the value of the expression given the value of the variables

1. 3x + 5 ; x = 2
2. 5xy + x - 4, x = -3 and y = 5
3. $\frac{6ab-c}{abc}$; a = 5; b = 3 ; c = 10
4. 3(xy + 6); x = -6 and y –1
5. $\frac{2x+5}{3x-y}$ x = -3 and y = -8

Solution:

Step 1. $4x^2 - 2x + 5$ and $5x^3 - x^2 + 4x + 7$

Step 2. $5x^3 + (4x^2 - x^2) + (-2x + 4x) + (5 + 7)$

Step 3. $5x^3 + (4 - 1)x^2 + (-2 + 4)x + 12$

$\mathbf{5x^3 + 3x^2 + 2x + 12}$

You can also solve it using the vertical method.

All similar terms must be in one column.

$$\begin{array}{r} 4x^2 - 2x + 5 \\ + \quad 5x^3 - x^2 + 4x + 7 \\ \hline \mathbf{5x^3 + 3x^2 + 2x + 12} \end{array}$$

2. Subtract $4xy + 5x - 7y + 3$ from $xy - 6x + y + 6$

Grouping Similar Terms

$(xy - 6x + y + 6) - (4xy + 5x - 7y + 3)$

Change the sign of the subtrahend

$xy - 6x + y + 6 - 4xy - 5x + 7y - 3$

Group similar terms and perform the operation.

$(xy - 4xy) + (-6x - 5x) + (y + 7y) + (6 - 3)$

$-3xy + (-11x) + 8y + 3$

$\mathbf{-3xy - 11x + 8y + 3}$

Vertical Method

Similar terms must be placed in one column, change the sign of the subtrahend then add.

$$\begin{array}{r} xy - 6x + y + 6 \\ (-)4xy \overset{(-)}{+} 5x \overset{(+)}{-} 7y \overset{(-)}{+} 3 \\ \hline \mathbf{-3xy - 11x + 8y + 3} \end{array}$$

Note: Terms without numerical coefficient written beside the variable, it is understood the numerical coefficient is 1, like xy, x , etc.

3. Add : $5a^5 - 6a^2 + 8$; $3a^3 + a^2 - 8a$; $4a^4 + a^3 - 6a^2 + a - 10$

Align similar terms vertically, you may replace the missing exponent with zero or just provide a space.

$5a^5 + 0a^4 + 0a^3 - 6a^2 + 0a + 8$ (the missing exponents are 4, 3 and 1)

$$\begin{array}{r} 5a^5 + 0a^4 + 0a^3 - 6a^2 + 0a + 8 \\ + \qquad 3a^3 + a^2 - 8a \quad \\ 4a^4 + a^3 - 6a^2 + a - 10 \\ \hline \mathbf{5a^5 + 4a^4 + 4a^3 - 11a^2 - 7a - 2} \end{array}$$

4. Subtract $3x^3 + 8x - 5$ from the sum of $x + 4$ and $x^2 - 3$

Add first $(x + 4) + (x^2 - 3)$

$(x^2 + x - 4 - 3)$

$(x^2 + x - 7)$

Subtract: $(x^2 + x - 7) - (3x^3 + 8x - 5)$

$x^2 + x - 7 - 3x^3 - 8x + 5$

$-3x^3 + x^2 + (x - 8x) + (-7 - 5)$

$\mathbf{-3x^3 + x^2 - 7x - 12}$

E

Learning Task 2:

A. Evaluate the algebraic expressions

Let $a = 4$, $b = -5$, $c = 0.6$, $x = -3$, $y = 0.4$; $z = \frac{1}{2}$			
Algebraic Expression	Value	Algebraic Expression	Value
1. $3abc + bc - a$		6. $3x^2 + 2xy - 3(ab)^2$	
2. $bxy + 5ab - ay$		7. $25 - 2x^2y + 3a^2b - az^2$	
3. $abz - 8z + b$		8. $(az)^2 + 5x^2y - 4bc$	
4. $ax + by - cz$		9. $2x^2y^2 - 12abz - 16$	
5. $4ax \div cz$		10. $8z^3 - 4x + y^2$	

B. Perform the indicated operations

Add	Subtract:
1. $(5x^4 - 3x^2 + 4) + (6x^3 - 4x^2 - 7)$	6. $(5x^3 - 7x^2 + 3x - 4) - (8x^3 + 2x^2 + 3x - 7)$
2. $-7x^3y + 4x^2y^2 - 2$ and $4x^3y + 1 - 8x^2y^2$	7. $(2x^2y - 5xy + 3y^2) - (7xy - 6y^2 + 5x^2y)$
3. $(5 + 24y^3 - 7y^2) + (-6y^3 + 7y^2 + 5)$	8. $(9x^5 - 6x^3 + 7x^2) - (7x^3 - 6x^5 + 2x^2)$
4. $(2x^5 - 6x^3 - 12x^2 - 4) + (-11x^5 + 8x + 2x^2 + 6)$	9. Subtract $4x^3 - 5x - 8$ from $6x^2 - 3x + 8$
5. $(3y^5 - 2y + y^4 + 2y^3 + 5)$ and $(2y^5 + 3y^3 + 2 + 7)$	10. $(1.5y^3 + 4.8y^2 + 12) - (y^3 - 1.7y^2 + 2y)$

Learning Task 3: Solve the following. Do this in a separate sheet of paper.

1. A box is $(2x—3)$ by $(x + 5)$ by $(3x + 1)$, what is the volume of the box if $x = 3$ cm?
2. The formula for the area of a triangle is $A = \frac{bh}{2}$ If the base (b) = 10 cm and the height (h) = 6 cm, what is the area of the triangle?
3. The length (l) of the rectangle is $x^2 + 2x - 3$ and the width (w) is $5x + 4$, what is the perimeter of the rectangle.
4. From the sum of $3x^3 + 7x^2 - 5$ and $2x^2 + 3x + 8$ take away $5x^2 + x - 5$.
5. What should be added to $3x^3 + 4x^2 - 7$ to have a sum of $4x^3 + x^2 + 5$.

Laws of Exponents and Its Application

I Lesson

In the process of multiplication and division of polynomials you need to apply the laws of exponents. Remember that exponent tells how many times the base will be multiplied by itself. Any number a^n , a is the base and n is the exponent. 5^3 means $5 \cdot 5 \cdot 5 = 125$. In $x \cdot x \cdot x \cdot x \cdot x$, the variable x is multiplied by it self 5 times, hence you can write it as x^5 . Here, the base is x and the exponent is 5

D

Learning Task 1

Simplify by writing in exponential form	Write in expanded form
1. 2(2)(2)(2)(2)(2) = 2^6	$(2x)^4$ = (2x)(2x)(2x)(2x)
2. (3a)(3a)(3a)(3a) =	$(xy)^7$ =
3. (-4)(-4)(-4)(-4)(-4) =	$(-ab)^6$ =

Exponents have its own rule in performing mathematical operations.

The Laws of Exponents

1. Product Law of Exponent.

Any numbers m and integers x and y, $m^x \cdot m^y = m^{x+y}$

The base must be the same before you can add the exponents.

Example: $b^2 \cdot b^3 = (b \cdot b)(b \cdot b \cdot b) = b^5$

Similarly: $b^2 \cdot b^3 = b^{2+3} = b^5$

2. Quotient Law of Exponents

Any numbers m and integers x and y,

a. $\frac{m^x}{m^y} = m^{x-y}$, if x > y b $\frac{m^x}{m^y} = m^{x-y} = 1$, if x = y c $\frac{m^x}{m^y} = \frac{1}{m^{y-x}}$, if x < y

Examples:

a. $\frac{a^5}{a^2} = \frac{a \cdot a \cdot a \cdot a \cdot a}{a \cdot a} = a \cdot a \cdot a = a^3$ similarly $\frac{a^5}{a^2} = a^{5-2} = a^3$

b. $\frac{a^3}{a^3} = \frac{a \cdot a \cdot a}{a \cdot a \cdot a} = 1$ similarly $\frac{a^3}{a^3} = a^{3-3} = a^0 = 1$ Any number raised to zero is always equal to 1

c. $\frac{a^2}{a^4} = \frac{a \cdot a}{a \cdot a \cdot a \cdot a} = \frac{1}{a^2}$ similarly $\frac{a^2}{a^4} = \frac{1}{a^{4-2}} = \frac{1}{a^2}$

3. Power of a Power Rule

Any numbers m and integers x and y, $(m^x)^y = m^{xy}$

Example: a. $(a^2)^3 = a^2 \cdot a^2 \cdot a^2 = a^{2+2+2} = a^6$ or $(a^2)^3 = a^{2(3)} = a^6$

b. $\left(\frac{a^2}{b^3}\right)^2 = \left(\frac{a^{2(2)}}{b^{3(2)}}\right) = \frac{a^4}{b^6}$

4. Power of a Product

Any numbers m and n integers x, $(mn)^x = m^x n^x$

Example: $(2ab)^3 = 2^3a^3b^3 = 8a^3b^3$

5. Power of a Quotient

Any numbers m and n integers x, $\left(\frac{m}{n}\right)^x = \frac{m^x}{n^x}$

Example: $\left(\frac{3}{2}\right)^3 = \frac{3^3}{2^3} = \frac{27}{8}$

Multiplication and Division of Polynomials

You can apply the laws of exponents in multiplying or dividing polynomials.

Examples:

1. Multiply 3xy and 4xz.

Solution : $3xy(4xz) = 3(4)(x)(x)(y)(z) = 12x^2yz$, multiply the numerical coefficients, add only the exponents of the same variable and copy the rest of the variables

2. Find the product of 3abc and $(4a^2 + 3a - 5)$.

Solution: Use Distributive Property

$3abc(4a^2 + 3a - 5) = 3abc(4a^2) + 3abc(3a) + 3abc(-5)$

$= 12a^3bc + 9a^2bc - 15abc$

3. What is the product of $(m - 4)(m^2 + 3m + 7)$?

Solution:

Distributive Method (Horizontal Form)	Vertical Form	
$(m - 4)(2m^2 + 2m - 3)$	$2m^2 + 2m - 3$	
$m(2m^2 + 2m - 3) - 4(2m^2 + 2m - 3))$	$m - 4$	
$2m^3 + 2m^2 - 3m - 8m^2 - 8m + 12$	$2m^3 + 2m^2 - 3m$	Partial products
$2m^3 + (2m^2 - 8m^2) + (-3m - 8m) + 12$	$+ \quad -8m^2 - 8m + 12$	
$\mathbf{2m^3 - 6m^2 - 11m + 12}$	$\mathbf{2m^3 - 6m^2 - 11m + 12}$	

4. Find the quotient : $25x^5y^2z^3 \div 5xy^3z^2$

Solution: $\dfrac{25x^5y^2z^3}{5xy^3z^2} = \dfrac{5x^{5-1}z^{3-2}}{y^{3-2}}$ Divide the numerical coefficients, then apply the quotient law of exponents

5. What is the quotient : $\dfrac{4x^8+6x^6-2x^4-10x^2}{2x^2}$

Solution: $\dfrac{4x^8+6x^6-2x^4-10x^2}{2x^2} = \dfrac{4x^8}{2x^2} + \dfrac{6x^6}{2x^2} - \dfrac{2x^4}{2x^2} - \dfrac{10x^2}{2x^2} = 2x^6 + 3x^4 - x^2 - 5$

In dividing polynomial by another polynomial you have to apply the following steps:

1. Arrange both dividend and divisor in descending or ascending powers of common variables, leaving a space or replacing the missing term with zero.
2. Divide the first term of the dividend with the first term of the divisor to get the first term of the quotient.
3. Multiply the entire divisor by term of the quotient and write the product under the dividend of similar terms.
4. Subtract similar terms. Apply rules in subtracting polynomials
5. Bring down unused terms of the dividend.
6. Divide the first term of the difference by the first term of the divisor to get the second term of the quotient.
7. Repeat steps 3 - 6 until the result of subtraction is zero or the degree of the term of the difference is less than the degree of the divisor.

Example: Divide $15n^2 - 2n - 24$ by $3n - 4$.

	$5n + 6$	Quotient
	$3n-4\overline{)15n^2-2n-24}$	Divide $15n^2$ by $3n$, the quotient is $5n$
	$15n^2 - 20n$	Multiply $(3n - 4)$ by the quotient $5n$
Divide 18n by 3n, the quotient is 6. Multiply (3n - 4) by the second quotient which is 6, then subtract.	$18n - 24$	Subtract the product from the dividend, then bring down -24.
	$18n - 24$	
	0	The difference is zero

The quotient is $5n + 6$.

To check if the answer is correct, multiply the divisor and the quotient to get the dividend. $15n^2 - 2n - 24 = (3n - 4)(5n + 6)$

$= 3n(5n + 6) - 4(5n + 6) = 15n^2 + 18n - 20n - 24$

$= 15n^2 - 2n - 24$

2. Divide $6x^3 - 3x^2 + 2z + 3 \div x - 2$

$$
\begin{array}{r|l}
 & 6x^2 + 9x + 20 \\
x-2 & 6x^3 - 3x^2 + 2x + 3 \\
 & 6x^3 - 12x^2 \\
\hline
 & 9x^2 + 2x + 3 \\
 & 9x^2 - 18x \\
\hline
 & 20x + 3 \\
 & 20x - 40 \\
\hline
 & 43
\end{array}
$$

Divide $6x^3$ by x, to get the quotient $6x^2$

The product of multiplying (x-2) by $6x^2$

Subtract then divide $9x^2$ by x to get the quotient 9x

Multiply (x—2) by 9x

Subtract then divide 20x by x to obtain the quotient 20

Multiply x-2 by 20

Subtract. 43 cannot be divided by x. Hence 43 is the remainder

The quotient is $6x^2 + 9x + 20$ R. 43 or $6x^2 + 9x + 20 + \dfrac{43}{x-2}$

E

Learning Task 2:

A. Simplify

1. $(-m^4)^3$
2. $\left(\dfrac{10c^2}{2d^3}\right)^2$
3. $(3a^2bc^3)^3$
4. $(2x^3y^2z)(3x^2yz^2)$
5. $\left(\dfrac{3m^2n^3}{xy^2}\right)^2\left(\dfrac{x^3yz^2}{2mn^2}\right)^3$

B. Perform the indicated operations. Simplify your answer

1. $2ab(4a^2 + 3ab - 7b^2)$
2. $-3xy(x^3y^3 - 3x^2y + 7xy^2)$
3. $(x + 2)(x^2 - 3x + 2)$
4. $(2x - 1)(2x^2 + 4x + 3)$
5. $(12y^2 - 9y + 16)(8y^3 - 14y + 5)$
6. $\dfrac{25a^5b^3c}{5ab^4c}$
7. $\dfrac{16a^3b^2c^5 - 24a^5bc^4 + 44a^7b^6c^6}{4a^2bc^3}$
8. $\dfrac{30c^2 + 19ac - 63a^2}{6c - 7a}$
9. $(a^6 + b^6) \div (a^2 + b^2)$
10. $\dfrac{6w^3 + 7w^2 - 12w + 15}{2w^2 + 3w - 5}$

A

Learning Task 3:

Solve .

1. What is the area of the rectangle whose length is (x + 5) and width (x - 5)?
2. What is the area of the square whose sides measure (3x + 4)?
3. The area of the rectangle is $3x^2 + 7x - 6$, what is the length if the width is (x + 3)
4. What is the average speed of the car that covers a distance of $(2y^3 - 7y^2 + 5y - 1)$ km in (2y—1) hour?
5. Multiply $(m^2 + 2m - 2)$ by the sum of (m + 3) and (2m - 3)

WEEK 6

Special Products

I Lesson

There are binomials or trinomials that when you multiply the products form a pattern. Such are called special products. Using the laws of exponents you will be able to find the product of a) square of a binomial b) sum and difference of binomials, c) cube of a binomial d) square of a trinomial.

Did you find a pattern in the product when you multiply the binomials or trinomials in the Learning Task Number 1? These are special types of polynomials.

A. Square of a Binomial

$(a + b)^2 = a^2 + 2ab + b^2$

$(a$	$+$	$b)^2$	$=$	a^2	$+$	$2ab$	$+$	b^2
1st term		2nd term		Square of the 1st term		Twice the product of the first and the 2nd		Square of the 2nd term

Using the pattern above for $(a - b)^2 = (a)^2 + 2(a)(-b) + (-b)^2 = a^2 - 2ab + b^2$

Square of Binomial

$(a + b)^2 = a^2 + 2ab + b^2$ **$(a - b)^2 = a^2 - 2ab + b^2$**

Examples:

1. $(2x + 3)^2 = (2x)^2 + 2(2x)(3) + 3^2 =$ $\mathbf{4x^2 + 12x + 9}$

2. $(x - 2y)^2 = (x)^2 + 2(x)(-2y) + (-2y)^2 =$ $\mathbf{x^2 - 4xy + 4y^2}$

B. **Square of a Trinomial**

$(a$	$+$	b	$+$	$c)^2 =$	a^2	$+$	b^2	$+$	c^2	$+$	$2ab$	$+$	$2ac$	$+$	$2bc$
1st term		2nd term		3rd term	Square of the 1st term		Square of the 2nd term		Square of the 3rd term		Twice the 1st and 2nd term		Twice the 1st and 3rd term		Twice the 2nd and 3rd term

Square of Trinomial : $(a + b + c)^2 = a^2 + b^2 + c^2 + 2ab + 2ac + 2bc$

Example: $(2x + y - 3z)^2 = (2x)^2 + y^2 + (-3z)^2 + 2(2x)(y) + 2(2x)(-3z) + 2(y)(-3z)$

$= \mathbf{4x^2 + y^2 + 9z^2 + 4xy - 12xz - 6yz}$

C. **Sum and Difference of two Binomials**

$(a + b)(a - b) =$	$a(a)$	$+$	$a(-b)$	$+$	$a(b)$	$+$	$(b)(-b)$
	Product of the 1st terms		Product of outer terms		Product of inner terms		Product of the 2nd terms

Sum and Difference of two Binomials: $(a + b)(a - b) = a^2 - b^2$

Examples: $(x + 2y)(x - 2y) = (x)^2 - (2y)^2 = \mathbf{x^2 - 4y^2}$

$(2a^2 - 3b)(2a^2 + 3b) = (2a^2)^2 - (3b)^2 = \mathbf{4a^4 - 9b^2}$

$[x + (3a - 2)][x - (3a - 2)] = (x)^2 - (3a - 2)^2$

$= x^2 - [(3a)^2 - 2(3a)(2) + 2^2]$

$= x^2 - (9a^2 - 12a + 4)$

$= \mathbf{x^2 - 9a^2 + 12a - 4}$

D. **Cube of a Binomial**

$(a + b)^3 = a^3 + 3a^2b + 3ab^2 + b^3$

a^3	$3a^2b$	$3ab^2$	b^3
Cube of the 1st term	Thrice the product of the square of the 1st term and the 2nd term	Thrice the product of the square of the 1st term and	Cube of the 2nd

$(a - b)^3 = (a)^3 + 3(a)^2(-b) + 3(a)(-b)^2 + (-b)^3 = a^3 - 3a^2b + 3ab^2 - b^3$

Examples : $(2x + 3y)^3 = (2x)^3 + 3(2x)^2(3y) + 3(2x)(3y)^2 + (3y)^3$

Cube of a Binomial : $\mathbf{(a + b)^3 = a^3 + 3a^2b + 3ab^2 + b^3}$

$\mathbf{(a - b)^3 = a^3 - 3a^2b + 3ab^2 - b^3}$

=

$\mathbf{8x^3 + 36x^2y + 54xy^2 + 27y^3}$

$(3a - 2) = (3a)^3 - 3(3a)^2(2) + 3(3a)(2)^2 - (2)^3$

$= \mathbf{27a^3 - 54a^2 + 36a - 8}$

D

Learning Task 1: Find the product. Do this in your separate sheet of paper.

1. $(a + b)^2$
2. $(a - b)$
3. $(a + b)(a - b)$
4. $(a + b)^3$
5. $(a - b)^3$
6. $(a + b + c)^2$

E

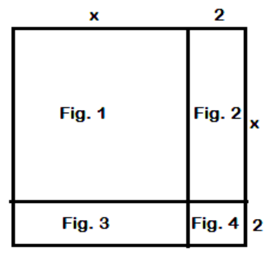
Learning Task 2: Find the product. Do this in a separate sheet of paper.

1. $(a + 5)^2$
2. $(3xy - 7)^2$
3. $[x + (y - 2)]^2$
4. $(2x + 3y + 5)^2$
5. $(3a - b + 2c)^2$
6. $(4 - 2x)(4 + 2x)$
7. $(3xy - abc)(3xy + abc)$
8. $(x^2 + 4y^2)(x^2 - 4y^2)$
9. $[2 + (x-1)][2 - (x - 1)]$
10. $[(x+2) - (y+1)][(x+2) + (y + 1)]$
11. $(2 + 2x)^3$
12. $(x^2 - 3)^3$
13. $(2x + 5)^3$
14. $[(x + 1) - y]^3$
15. $[x + (y - 2)]^3$

A

Learning Task 3. Given the square figure at the right, find the:

1. Area of Fig. 1
2. Area of Fig. 2
3. Area of Fig. 3
4. Area of Fig. 4
5. Area of the whole figure



WEEK 7

Linear Equations and Inequalities in One Variable

I

Lesson

In the previous lesson, you translate verbal phrases to mathematical symbols which become an algebraic expression. In grammar, a phrase does not express a complete thought only sentence does. Similarly, in mathematics, a mathematical phrase or expression does not express a complete thought, only mathematical sentence does.

Mathematical sentence makes use of relational symbol like equal (=), less than (<), greater than (>), less than or equal to $(\leq)$, and greater than or equal to $(\geq)$. If the mathematical sentence uses equal sign (=), then it is an equation, other wise it is an inequality.

Word problems can be solved if you will translate it into an equation or inequality. An equation is a mathematical sentence that shows two equal expressions. $3x + 5 = 20$ is an equation. The left side of equation $3x + 5$ must be equal to the right side of the equation which is 20. $3x + 5 = 20$ is an example of a linear equation in one variable. A linear equation is in the form of $ax + b = c$, where a, b and c are real numbers and $a \neq 0$.

An equation may either be true or false.

$8 + 2 = 10$ is a true equation since $8 + 2$ is really 10.

$2x + 5 = 15$ is an equation that can either be true or false, depending on the value of x. There is only one value of x that will make the equation true.

An inequality is a mathematical sentence that shows two unequal quantities. One might be greater or lesser than the other.

$5 > 1$ is a true inequality.

$2x + 1 < 10$, may be true or false, depending on the values of x. More than one value of x can make the inequality true.

You have to interpret or translate word problem correctly to be able to solve equation or inequality.

Examples.

1. The sum of three consecutive integers is 57.

   Consecutive means that the next number must 1 greater than the previous.

   If x represent the number, the next number is $x + 1$, this is one greater than x, the third number is $(x + 1) + 1$, also 1 greater than the previous. When simplified it is $x + 2$.

   Hence the 3 consecutive integers are represented by: x, $x + 1$ and $x + 2$

   The equation is: $x + (x + 1) + (x + 2) = 57$

2. Angels age is twice the age of Gideon 5 years ago. The sum of their ages now is 35.

   You can represent the ages in tabular form.

	Age now	Age 5 year ago
Gideon	x	(x - 5)
Angel	2(x - 5) = 2x –10	2x - 15

Equation: x + 2x - 10 = 35

3. EJ drives her car 50kph. After 30 minutes her father followed her driving an other car at 60 kph. How long will it take for the father to be at the side of her daughter?

Remember that the formula for distance is d = r t, where r is the rate or speed and t is the time.

	Rate (r)	Time (t)	Distance (d)
EJ	50	t	50t
Father	60	$t-\frac{1}{2}$	60($t-\frac{1}{2}$)

Note: 30 minutes is one half hour.

There is a point where EJ and the father will be beside each other before he can overtake her. Therefore they cover the same distance.

Equation: d_1 = d_2

50t $\left(t-\frac{1}{2} \right)$ =60

4. The difference btween six times the number and eight is greater than 15.

Let x be the number

Six time the number: 6x

The difference between 6 time the number and 8 : 6x - 8

Greater than means that the problem is an inequality problem

Inequality: 6x - 8 > 15

5. Ten divided by twice the number is less than one-fourth.

Let x be the number; twice the number: 2x

Ten divided by twice the $\frac{10}{2x}$ number :

Ine- $\frac{10}{2x}$ $\frac{1}{4}$ quality: $<$

6. Choi's monthly commission plus monthly salary of 15,000.00 is at most 20,000.00

Choi's commission is x; at most means it can be equal to or less than

Inequality: x + 15,000 ≤ 20,000.00

7. Elisse score in 3 of the 4 quizzes in math are 80, 78, 90. What score must she
get on the 4th quiz to have an average of at least 85.

Let x be the 4th score; average score is to add the 4 scores divided by 4

At least means equal to or greater than.

Inequality: $\frac{80+78+90+x}{4} \geq 85$

D

Learning Task 1: Translate the verbal sentence to mathematical sentence. Use variable **x** to represent number. Do this in a separate sheet of paper.

Verbal Sentence	Mathematical sentence
1. The sum of a number and 5 is 12.	
2. Twice a number is 54	
3. Thrice a number increase by 2 is less than 50.	
4. One half the sum of a number and 4 is less than 28.	
5. A number increased by one-third of the number is 5.	

Learning Task 2: Translate the following sentence into equation. Use x as the variable to represent number.

1. The perimeter of the rectangle is 96 when the length of a rectangle is twice the width.
2. The perimeter of equilateral (equal sides) triangle is 24.
3. Two– third of the number is 72
4. The sum of two consecutive integers is 29.
5. Four times a number increased by 8 is 54.

B. Translate the following sentence to inequality. Use y as the variable to represent a number.

1. The discount is not less than 100
2. The costs of the book is at most 300.00
3. His monthly income is at least 20,000.00
4. Twice the number is at least 80
5. Twice the measure of the acute angle is not more than 90 degrees.

E

Learning Task 3: Write the equation or inequality described in the following problems.

1. JP's age is twice the age of Reyna. The sum of their ages does not exceed 51.
2. Twice the sum of a number and 10 is 55.
3. Cut a 60 cm ribbon into two such that one part is one-third of the other.
4. The sum of two consecutive even integers is 162.
5. The sum of three consecutive integers is not more than 57.
6. Nine subtracted from the quotient of a number and three is twenty-one.
7. If seven is subtracted from six times a number, the result is at least 10.
8. The sum of 6 times a number and fifteen is no more than forty-two.
9. Five times the measure of an angle is an cute angle.
10. The circumference of the circle with radius y is at most 25.

A

Learning Task 4:

A. Find the value of x that will make the equality true or correct.

1. $x + 2 = 8$
2. $3x = 12$
3. $2x - 3 = 1$
4. $3(x + 5) = 18$
5. $5x + 8 = -7$

B. Find 3 values of x to make the inequality true or correct

1. $x < -1$
2. $2x > 0$
3. $x + 2 < 7$
4. $x - 4 > -1$
5. $3x + 5 < -1$

WEEK 8

Solving Linear Equations and Inequality in One Variable

I Lesson

Solving equation or inequality is finding the value or values of the variable that will satisfy the equation or inequality.

The equation x + 5 = 12 is a mathematical sentence that is a conditional equation because it can either be true or false. It can only be true if x = 7. By substituting 7 to x, you have 7 + 5 = 12. Both sides of the equation name the same number which is 12. Thus 7 is called the solution of the equation or sometimes it is called the root of the equation.

The inequality x + 5 < 12 can either be true or false too. The value of x that will make the inequality true are numbers that are less than 7. If you replace x with 6 which is less than 7 , then 6 + 5 < 12. 11 is really less than 12. You can substitute any number to x as long as it is less than 7.

You have to consider properties or equality or inequality before you can solve an equation or inequality.

For any real numbers a, b and c

Properties of Equality

Addition Property of Equality (APE)

If a = b, then a + c = b + c

Multiplication Property of Equality (MPE) .

If a = b, then ac = bc

Reflexive Property of Equality

Any number or expression is equal to it self. 3 = 3; m = m; x = x

Symmetric Property of Equality (SPE)

The sides of the equation can be interchanged. If ab = cd, then cd = ab.

Transitive Property of Equality (TPE)

If two equations are equal to a third quantity, then they are all equal to each other. If a = b and b = c, then a = c

Properties of Inequality

Axiom of comparison

a < b a = b a > b

Transitive Property of Inequality

If a < b and b< c , then a < c

If a > b and b > c, then a > c

Addition property of inequality (API)

If a < b then a = c < b + c

Multiplication Property of Inequality (MPI)

If a< b and c > 0, then ac < bc and $\frac{a}{c} < \frac{b}{c}$

If a < b and c < 0, then ac > bc and $\frac{a}{c} > \frac{b}{c}$

If a > b and c > 0, then ac > bc and $\frac{a}{c} > \frac{b}{c}$

If a > b and c <0, then ac < bc and $\frac{a}{c} < \frac{b}{c}$

APE	If x + 5 = 4, then x + 5 - 2 = 4 - 2 or x + 3 = 2
MPE	If x = 10, then 2(x) = 2(10) or 2x = 20
API	If x - 2 < 6, then x - 2 + 2 = 6 + 2 or x < 8
MPI	If -x < 3 , then (-1)(-x) > (-1)(3) or x > -3

Linear Equation in One Variable

To solve equations, you apply the properties of equality and follow some steps.

1. Simplify both sides of the equation. This includes applying Distributive Property of Multiplication over Addition (DPMA) and/ or combining similar terms.
2. If the equation has a fraction clear the denominators by multiplying both sides of the equation by the LCD of all the denominators.
3. If equation has decimal, clear the decimal by multiplying every term of the equation by powers of 10 depending on the greatest number of decimal places in the term has.
4. If a constant is added to a term with a variable, add its opposite to both sides of the equation or apply APE.
5. If a variable has a numerical coefficient other than 1, multiply both sides by the reciprocal of the numerical coefficient or divide both sides of the equation by the numerical coefficient or by MPE
6. Substitute the solved value to the variable in the equation to check if you get the right answer.

Examples: Solve for the value of x.

1. 2x + 5 = 21

   Solution. Since the equation is already in simplified form, the go to step 4.

   By APE: 2x + 5 - 5 = 21– 5 (the opposite of 5 is negative 5)

   2x = 16 (simplify)

   By APE: $\frac{1}{2}(2x) = \frac{1}{2}(16)$ (the reciprocal of 2 is 1/2.

Simplify : x = 8 the solution of the equation.

Check: 2x + 5 = 21 ⟶ 2(8) + 5 = 21 ⟶ 16 + 5 = 21 ⟶ 21 = 21

2. The sum of three consecutive odd integers is 81. Find the numbers.

Solution: The difference between two odd numbers is 2.

If **x** is the first odd integer, then **x + 2** is the second odd integer and the third is (x + 2) + 2 or x + 4

Since the sum of these numbers is 82, then the equation is:

$x + (x + 2) + (x + 4) = 81$

$3x + 6 = 81$ (combine similar terms)

$3x + 6 - 6 = 81 - 6$ (by APE)

$3x = 75$

$x = 25$ (by MPE, multiplying both sides by 1/3 or dividing both sides by 3)

The first number is x = 25

Second number is x + 2 therefore 25 + 2 = 27

Third number is x + 4, therefore 25 + 4 = 29

Check if the sum of these odd numbers is 81: 25 + 27 + 29 = 81

3. Anton is 2 more than three times older than her daughter, Zab. In 16 years , he will be twice as old as his daughter. What are their present ages?

Solution.

	Present Age	Age 16 from now
Zab	x	x + 16
Anton	3x + 2	(3x +2) + 16 2(x + 16)

Let x daughter's age, x + 16 , age 16 years from now

2 more than 3 times = 3x + 2, Anton's age

Twice as old in as in 16years = 2(x + 16)

In forming an equation, consider equating the same quantity expressed in different way. In this case, you can equate Anton's age 16 years from now.

$(3x + 2) + 16 = 2(x + 16)$

$3x + 18 = 2x + 32$ simplify both sides

$3x + 18 - 18 = 2x + 32 - 18$ by APE

$3x = 2x + 14$ simplify

$3x - 2x = 2x - 2x + 14$ by APE - to combine 3x and 2x

$x = 14$ the age of Zab now

$3(14) + 2 = 44$ the age of Anton now

To check : If Zab's age now is 14 , her age in 16 years is 14 + 16 = 30.

If Anton's age now is 44, his age in 16 years is 44 + 16 = 60

The age of Anton is twice as the age of Zab's 16 yrs from now, which is the condition in the problem.

Linear Inequality in One Variable

To solve inequality you have to use the properties of inequality and follow the same steps in solving for the equation.

Examples: Solve for x

1. $\frac{x}{3} + 4 > 5$

Solution: Clear fraction by multiplying each term in the inequality by the de nominator which is 3.

$$\frac{x}{3} + 4 > 5 \longrightarrow (3)\frac{x}{3} + 4(3) > 5(3) \longrightarrow x + 12 > 15$$

By API $x + 12 - 12 > 15 - 12$

$x > 3$

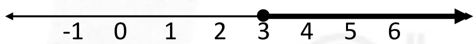
The solutions of the inequality are all numbers that are greater than 3.

The solution of the inequality can be written in different ways:

(a) set notation: $\{x/\ x > 3\}$ read as set of all x such that x is greater than 3

(b) interval notation $(3,\infty)$ the symbol ∞ means infinity.

(c) graphical method.



Take note that the point that corresponds to 3 is not solid, this means that 3 is not included in the solution set of the inequality.

The point must be solid if the number corresponding to that point is included as one of the solutions of the inequality. For interval notation, a bracket is used if the number is a part of the solution set.

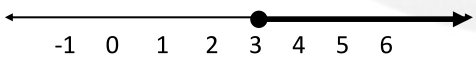
Suppose the inequality is $\frac{x}{3} + 4 \geq 5$, the inequality is equal or greater than.

The solution is $x \geq 3$

(a) by set notation $\{x/x \geq 3\}$

(b) By interval notation: $[3, \infty)$, the bracket is used to indicate that 3 is included.

(c) Graphical method:



The point that corresponds to 3 is solid, which means that 3 is included.

2. Find the value of x that satisfy both inequalities $-3 < 2x + 1$ and $2x + 1 \leq 9$.

Solution: You can write the inequality as

$-3 < 2x + 1 \leq 9$

$-3 - 1 < 2x + 1 - 1 \leq 9 - 1$ by API

$-4 < 2x \leq 8$ Simplify

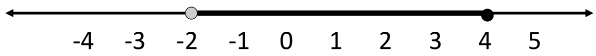
$-2 < x \leq 4$ by MPI

The solution set are numbers between - 2 and 4 including 4.

Set notation : $\{x/\ -2 < x \leq 4\}$

Interval notation: $(-2, 4]$, parenthesis means that –2 is not included in the solution set while bracket means that 4 is included in the solution set.

Graph:



The point that corresponds to –2 is not solid while the point that corresponds to 4 is solid.

3. The length of the rectangle is 4 more than twice the width. If the perimeter is not more than 80 cm, find the possible dimensions of the rectangle.

Solution: Let x be the width

$2x + 4$ is the length (4 more than twice the width)

$P = 2l + 2w$, however in the problem it must not be more than 80.

$2l + 2w \le 80$, the perimeter can be 80 but not more than

$2(2x + 4) + 2(x) \le 80$

$4x + 8 + 2x \le 80$

$6x + 8 \le 80$ simplify

$6x + 8 - 8 \le 80 - 8$ by API

$6x \le 72$

$x \le 12$ by MPI

The possible width is $0 < \text{width} \le 12$, since there is no negative measurement.

Since $l = 2x + 4$, if $x = 0$ then the length is 4, however the width must be greater than 0, therefore the length is greater than 4. The highest possible width is 12, then the length is $2(12) + 4 = 28$, therefore the length can be equal or less than 28.

The possible length is $4 < \text{length} \le 28$.

Possible dimensions of rectangle are: $w = 12, l = 28$; $w = 11, l = 26$, etc.

D

Learning Task 1: What value or value of x that will make the equation or inequality true.

1. $2x = 6$
2. $2x + 2 = 8$
3. $\frac{x}{6} = 3$
4. $3(x - 2) = 0$
5. $3 + x = 2x - 1$
6. $5x > 5$
7. $3x - 4 < 5$
8. $\frac{2x}{3} > 4$
9. $2(x + 3) < 0$
10. $5 + x < 2x - 1$

E

Learning Task 2: Do this in a separate sheet of paper.

A. Solve for x in the equation. 1.

1. 5x + 12 = 2x - 3
2. 3x + 6 = -2x + 1
3. $\frac{x}{2} - 4x = 7$
4. 1.4x - 3.8 = 0.4x + 6.2
5. 5(x - 2) + 2x = 7(x +4) - 38

B. Solve for x in the inequality. Write your answer in a) set notation, b) interval notation and c) graph

1. $2x \leq 4$
2. $-3 < 2x + 3 < 15$
3. $5x - 4 > 6$
4. $\frac{2x}{3} + \frac{1}{2} > x - 5$
5. $0.8 + 0.6x \geq 4.2$

A

Learning Task 3

Solve the word problems

1. The sides of the quadrilateral are consecutive numbers. If the perimeter is 160, how long is each side?
2. Inzo is 10 years older than Migz. Five years ago Migs is one-third as old as Inzo. What are their present ages?
3. An express train travels 100 kph from station A to station B. A local train travelling at 45 kph, takes 45 minutes longer for the same trip. How far apart is station A from station B.
4. The sum of two consecutive even integers is less than 60 but greater than 24. Find at least 3 pairs of numbers
5. The perimeter of the square is less than 152 m. Find the possible length of the sides of the square.

PIVOT Assessment Card for Learners

Personal Assessment on Learner's Level of Performance

Using the symbols below, choose one which best describes your experience in working on each given task. Draw it in the column for Level of Performance (LP). Be guided by the descriptions below.

☆ - I was able to do/perform the task without any difficulty. The task helped me in understanding the target content/lesson.

✓ - I was able to do/perform the task. It was quite challenging but it still helped me in understanding the target content/lesson.

? - I was not able to do/perform the task. It was extremely difficult. I need additional enrichment activities to be able to do/perform this task.

Distribution of Learning Tasks Per Week for Quarter 2

Week 1	**LP**	**Week 2**	**LP**	**Week 3**	**LP**	**Week 4**	**LP**
Learning Task 1		Learning Task 1		Learning Task 1		Learning Task 1	
Learning Task 2		Learning Task 2		Learning Task 2		Learning Task 2	
Learning Task 3		Learning Task 3		Learning Task 3		Learning Task 3	
Learning Task 4		Learning Task 4		Learning Task 4		Learning Task 4	
Learning Task 5		Learning Task 5		Learning Task 5		Learning Task 5	
Learning Task 6		Learning Task 6		Learning Task 6		Learning Task 6	
Learning Task 7		Learning Task 7		Learning Task 7		Learning Task 7	
Learning Task 8		Learning Task 8		Learning Task 8		Learning Task 8	

Week 5	**LP**	**Week 6**	**LP**	**Week 7**	**LP**	**Week 8**	**LP**
Learning Task 1		Learning Task 1		Learning Task 1		Learning Task 1	
Learning Task 2		Learning Task 2		Learning Task 2		Learning Task 2	
Learning Task 3		Learning Task 3		Learning Task 3		Learning Task 3	
Learning Task 4		Learning Task 4		Learning Task 4		Learning Task 4	
Learning Task 5		Learning Task 5		Learning Task 5		Learning Task 5	
Learning Task 6		Learning Task 6		Learning Task 6		Learning Task 6	
Learning Task 7		Learning Task 7		Learning Task 7		Learning Task 7	
Learning Task 8		Learning Task 8		Learning Task 8		Learning Task 8	

Note: If the lesson is designed for two or more weeks as shown in the eartag, just copy your personal evaluation indicated in the first Level of Performance found in the second column up to the succeeding columns, ie. if the lesson is designed for weeks 4-6, just copy your personal evaluation indicated in the LP column for week 4, week 5 and week 6. Thank you.

Answer Key

WEELK1-2 : Learning Task 1

1. meter or yard
2. Centimeter or inches
3. Gallon, pint or quarts
4. Centimeter or inches
5. Kilometer or miles
6. ^{0}Celsius or ^{0}Fahrenheit
7. Cubic meter or cubic feet
8. Inches or centimeter

Learning Task 2

A.

1. 0.708m
2. 1560 dam
3. 108ml
4. 120ml
5. 4.34gal
6. 2.48 days
7. 960 mo.
8. 26^{0}C
9. 94.08^{0}C
10. 0.010866 kg

B.

1. acute
2. Obtuse
3. Acute
4. Acute
5. Obtuse

C.

1. 133
2. 412,500 m^2
500/m^2
3. 1.36 L
4. 38.08^{0}C
He has fever

5. 10 packs
6. 0.6 kg of powdered milk
16.8L of milk
7. a. 4.08 hours
B. math—3.75

Sci & Eng. –3.33

Fil. –2.92

MAPEH & EPP—2.5

ESP– 2.08

C. 45 minutes

Learning Task 3

A. 1. 70^{0}, acute

2. 45^{0}, acute

3. 45^{0}, acute

4. 45^{0}, acute

5. 75^{0}, acute

B.

Cake flour - 36 g

Milk - 1680 ml

Sugar - 6 cups

Butter - 0.015 g

Water– 18 ml

Choc.chips –0.3g

1. 120 pesos/cake
2. 300 pesos

WEEK 3

Learning Task 1

1. plus (+)
2. Plus (+)

3,4,5. minus (-)

6. multiply

7. divide

8. multiply

9. divide

10. plus (+)

Learning Task 2

A.

1. C 2. D 3, E 4. A 5. B

B.

Kind	Variable	Degree	Constant
Trinomial	x, x^2	3	-17
multinomial	a,b,c	5	2
multinomial	x	4	1
binomial	x,y,z^2	4	12
mono-	none	0	14

Learning Task 3

1. x + 7 3. 12x - 8
2. 2x - 6 4. $7x^2 + 6x$

WEEK 5

Learning Task 2

B.

8. 5c + 9a

9. $a^4 - a^2b^2 + b^4$

10.3w-1 r. 6w + 1

Learning Task 3

1. $x^2 - 25$
2. $9x^2 + 24x + 16$
3. 3x - 2
4. $y^2 - 3y + 1$
5. $2m^3 + 4m^3 - 4m$

WEEK 4

Learning Task 1

1. 11 3. $\frac{8}{15}$ 5. 1

2. –75 4. 36

Learning Task 2

A.

1, -43 6. –1224.6

2. –95.6 7. –223.2

3. –19 8. 10

4. –14.3 9. 106.88

5. –160 10. –13.4

B.

1. $5x^4 - 6x^3 - 7x^2 - 3$
2. $-3x^3y - 4x^2y^2 - 1$
3. $18y^3 + 10$
4. $-9x^5 - 6x^3 - 10x^2 + 2$
5. $5y^5 + y^4 + 5y^3 - y + 12$
6. $-3x^3 - 9x^2 + 3$
7. $-3x^2y - 12xy + 9y^2$
8. $15x^5 - 13x^3 + 5x^2$
9. $-4x^3 + 6x^2 + 2x + 16$
10. $0.5y^3 + 6.5y^2 - 12y + 12$

Learning Task 3

1. 240 cm^3
2. 30 cm^2
3. $2x^2 + 14x + 2$
4. $3x^3 + 4x^2 + 2x + 8$
5. $x^3 - 3x^2 + 12$

WEEK 5

Learning Task 1

2. $(3a)^4$
3. $(-4)^5$
4. (xy)(xy)(xy)(xy)(xy)(xy)(xy)
5. (-ab)(-ab)(-ab)(-ab)(-ab)(-ab)

Learning Task 2

A.

1. $-m^{12}$
2. $\frac{25c^4}{d^6}$
3. $27a^6b^3c^9$
4. $6x^5y^3z^3$
5. $\frac{3mnx}{2y}$

B.

1. $8a^3b + 6a^2b^2 - 14ab^3$
2. $-3x^4y^4 + 9x^3y^2 - 21x^2y^3$
3. $x^3 - x^2 - 4x + 4$
4. $4x^3 + 6x^2 + 2x - 3$
5. $96y^5 - 72y^4 + 296y^3 + 186y^2 - 269y + 80$
6. $\frac{5a^4}{b}$
7. $4abc^2 - 6a^3c + 11a^5b^5c^3$

WEEK 6

Learning Task 1

1. $a^2 + 2ab + b^2$
2. $a^2 - 2ab + b^2$
3. $a^2 - b^2$
4. $a^3 + 3a^2 + 3ab^2 + b^3$
5. $a^3 - 3a^2b + 3ab^2 - b^3$
6. $a^2 + b^2 + c^2 + 2ab + 2ac + 2bc$

Learning Task 2

1. $a^2 + 10a + 25$
2. $9x^2y^2 - 42xy + 49$
3. $x^2 + y^2 + 2xy - 4x - 4y + 4$
4. $4x^2 + 9y^2 + 12xy + 20x + 30y + 25$
5. $9a^2 + b^2 + 4c^2 - 6ab + 12ac - 4bc$
6. $16 - 4x^2$
7. $9x^2y^2 - a^2b^2c^2$
8. $x^4 - 16y^4$
9. $-x^2 + 2x + 3$
10. $(x^2 - y^2 + 2x - 2y + 3$
11. $8 + 24x + 24x^2 + 8x^3$
12. $x^6 - 9x^4 + 27x^2 - 27$
13. $8x^3 + 60x^2 + 150x + 125$
14. $x^3 + 3x^2 + 3x - 3x^2y + 3xy^2 - 6xy + 3y^2 - y^3$
15. $x^3 + 3x^2y - 3x^2 + 3xy^2 - 12xy + 6x + y^3 - 6y^2 + 128 - 8$

Learning Task 3

A

1. x^2 4. 4

2. 2x 5. $x^2 + 4x + 4$

3. 2x

B.

1. $x^2 - 2x$
2. 2x-4
3. 2x
4. $x^2 - 4$
5. 2x + 4

WEEK 7

Learning Task 1

1. x + 5 = 12
2. 2x = 54
3. 3x + 2 < 50
4. $\frac{1}{2}(x+4) < 28$
5. $x + \frac{1}{3}x = 5$

Learning Task 2

A. 1. 4x + 2x = 96

2. 3x = 24

3. $\frac{2}{3}x = 72$

4. x +(x+1) = 29

5. 4x + 8 = 54

WEEK 7 Learning Task 2

B. 1. y ≥ 100

2. y ≤ 300

3. y ≥ 20,000

4. 2y ≥ 80

5. 2y ≤ 90

Learning Task 3

A. 1. x + 2x ≤ 51

2. 2(x+10) = 55

3. $x + \frac{1}{3}x = 60$

4. x + (x+2) = 162

5. x+(x+1)+(x+2) ≤ 57

6. $\frac{x}{3} - 9 = 21$

7. 6x - 7 ≥ 10

8. 6x + 15 ≤ 40

9. 5x < 90

10. 2Πy ≤ 25

Learning Task 4

1. 6 3. 2 5. 3

2. 4 4. 1

B. (Possible answers)

1. –2, -3, -4 4. 4, 5, 6

2. 1, 2, 3 5. –3,-4,-5

3. 5, 4, 3

WEEK 8

Learning Task 1

1. 3 5. 4 8. x > 6

2. 3 6. x > 1 9. x < -3

3. 18 7. x < 3 10. x > 6

4. 4

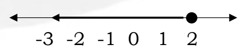
Learning Task 2

A. 1. -5 4. 10

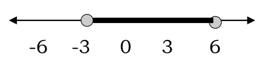
2. –1 5. infinite sol.

3. –2

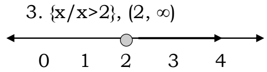
B. 1. {x/x ≤ 2}; (-∞,2]



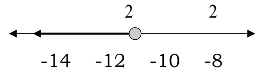
2. {x/-3<x<6}; (-3,6)



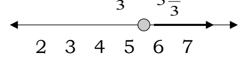
3. {x/x>2}, (2, ∞)



4. {x/x< $-\frac{33}{2}$ }, (-∞, $\frac{33}{2}$)



5. {x/x ≥ $5\frac{2}{3}$); ($5\frac{2}{3}$, ∞)



Learning Task 3

1. 36 & 38 4. 12&14

2. Migz-15, Inzo-25

3. 60.75km 5. x < 38

For inquiries or feedback, please write or call:

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