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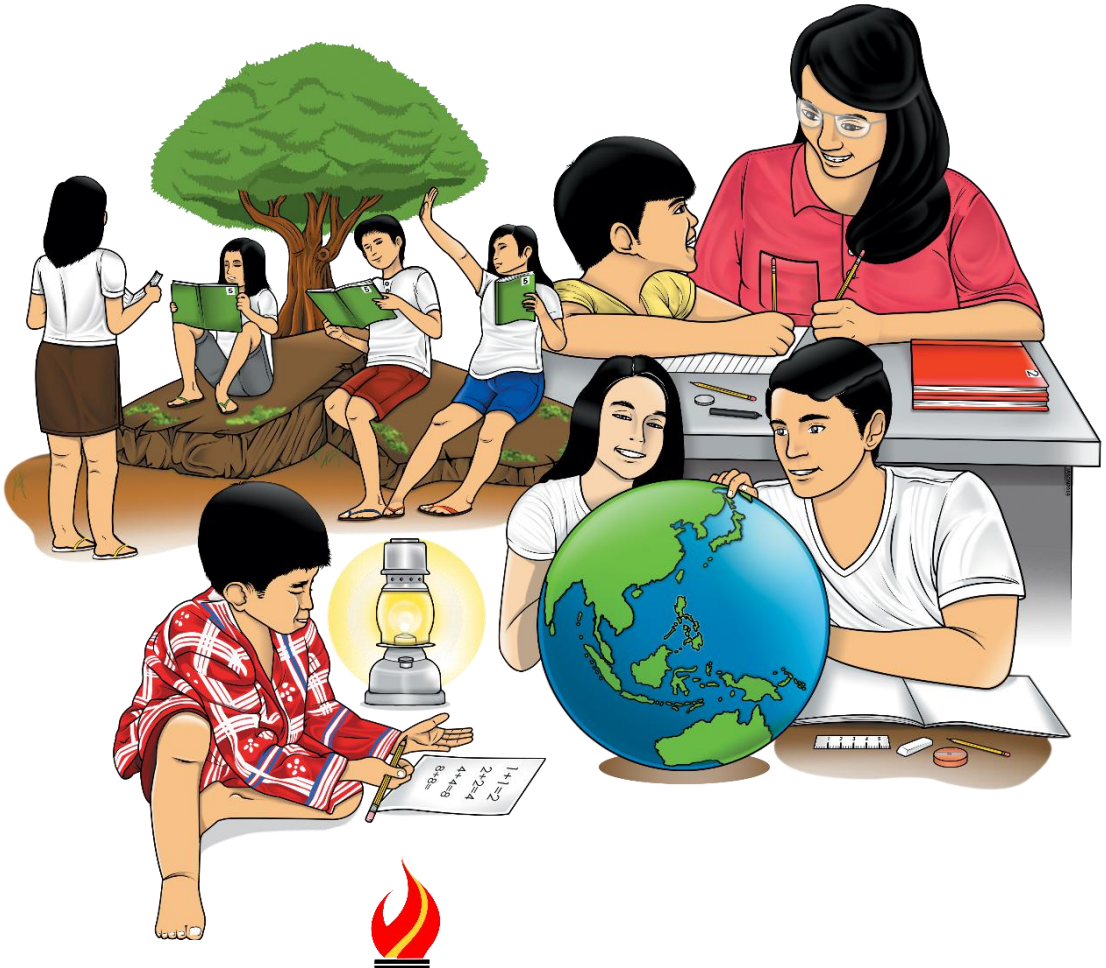
DEPARTMENT OF EDUCATION

Mathematics

Quarter 1 – Module 8: Performing Division of Polynomials Using Long and Synthetic Division



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Mathematics

Quarter 1 – Module 8:
Performs division of polynomials using long and synthetic division

M10AL-lg-1

Introductory Message

This is the eight learning competency in our Mathematics 10 curriculum standards hence mastery of the skills is significant to have a smooth progress in the succeeding lessons.

This module was collaboratively designed, developed and reviewed by educators both from public and private institutions to assist you, the teacher or facilitator in helping the learners meet the standards set by the K to 12 Curriculum while overcoming their personal, social, and economic constraints in schooling.

For the facilitator:

This module is intended to help grade 10 students understand and master the concepts of dividing polynomials. It is designed to equip them with essential knowledge about the said topic and skills on solving problems involving polynomials. Please have patience in assisting the learners accomplish this module.

For the learner:

This learning material provides you with set of activities that will help you understand how to divide polynomials. By doing the prepared activities, it is expected that you will develop your skill in dividing polynomials that is a very important skill on the succeeding lessons. This module was also designed so that you can pace your own learning as you achieve the required learning competencies. Please read completely the written texts and follow the instructions carefully so that you will be able to get the most of this learning material. We hope that you will enjoy learning!

Here is your guide on the parts of the learning modules which you need to understand as you progress in reading and analyzing its content.

ICON	LABEL	DETAIL
	**What I need to know**	This will give you an idea of the skills or competencies you are expected to learn in the module.
	**What I know**	This part includes an activity that aims to check what you already know about the lesson to take. If you get all the answers correct (100%), you may decide to skip this module.

	**What's in**	This is a brief drill or review to help you link the current lesson with the previous one.
	**What's new**	In this portion, the new lesson will be introduced to you in various ways such as a story, a song, a poem, a problem opener, an activity or a situation.
	**What is it**	This section provides a brief discussion of the lesson. This aims to help you discover and understand new concepts and skills.
	**What's more**	This comprises activities for independent practice to solidify your understanding and skills of the topic. You may check the answers to the exercises using the Answer Key at the end of the module.
	**What I have learned**	This includes questions or blank sentence/paragraph to be filled in to process what you learned from the lesson.
	**What I Can do**	This section provides an activity which will help you transfer your new knowledge or skill into real life situations or concerns.
	**Assessment**	This is a task which aims to evaluate your level of mastery in achieving the learning competency.
	**Additional Activities**	In this portion, another activity will be given to you to enrich your knowledge or skill of the lesson learned. This also tends retention of learned concepts.
	**Answer Key**	This contains answers to all activities in the module.

At the end of this module you will also find:

References This is a list of all sources used in developing this module.

The following are some reminders in using this module:

1. Use the module with care. Do not put unnecessary mark/s on any part of the module. Use a separate sheet of paper in answering the exercises.
2. Don't forget to answer *What I Know* before moving on to the other activities included in the module.
3. Read the instruction carefully before doing each task.
4. Observe honesty and integrity in doing the tasks and checking your answers.
5. Finish the task at hand before proceeding to the next.
6. Return this module to your teacher/facilitator once you are through with it.

If you encounter any difficulty in answering the tasks in this module, do not hesitate to consult your teacher or facilitator. Always bear in mind that you are not alone.

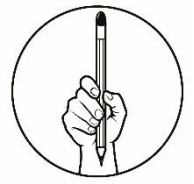
We hope that though this material, you will experience meaningful learning and gain deep understanding of the relevant competencies. You can do it!

What I Need to Know

This module was designed and written with you in mind. It is here to indulge you in dividing polynomials using long method and synthetic division. The scope of this module permits it to be used in many different learning situations. The arrangement of the lessons follows the standard sequence of the course. But the pacing in which you read and answer this module is dependent on your ability.

After going through this module, you are expected to:

1) divide polynomials using long division and synthetic division, and
2) solve word problem that involves dividing polynomials.



What I Know

DIRECTION: Choose the letter of your answer from the given choices. Write your answer on a separate sheet of paper.

1) If a fifth degree polynomial is divided by a third degree polynomial, what is the degree of the quotient?

A) 1 B) 2 C) 3 D) 4

2) Divide: $x^3 - 5x^2 + 2x - 10$ by $x^2 + 2$.

A) $x^2 - 7x + 16$ B)$x^2 - 3x + 8$ C) $x + 5$ D) $x - 5$

3) In the division algorithm $\frac{P(x)}{d(x)} = Q(x) + \frac{r(x)}{d(x)}$, what is the dividend?

A) $P(x)$ B) $d(x)$ C) $r(x)$ D) $Q(x)$

4) Find the remainder when $x^3 - 2x^2 + 4x - 3$ is divided by $x - 2$.

A) 27 B) 5 C) -5 D) -27

5) If $x^3 - 2x^2 - 5x + 6$ is divided by $x - 1$, the remainder is zero.

A) True B) False C) Cannot be determined

For #6 to 8, use the illustration of long division below:

Divide $(3x^3 - 2x^2 + x - 2)$ *by* $(x - 4)$

$$
\begin{array}{r}
3x^2 + 10x + 41 \\
x - 4 \overline{)\,3x^3 - 2x^2 + x - 2} \\
-\underline{\left(3x^3 - 12x^2\right)} \\
10x^2 + x \\
\underline{-\left(10x^2 - 40x\right)} \\
41x - 2 \\
\underline{-(41x - 164)} \\
162
\end{array}
$$

6) What is the remainder?

A) $41x - 164$ B) $x + 4$ C) 41 D) 162

7) Which is the divisor?

A) $x - 4$ B) $5x - 6$ C) $3x^2 + 10x + 41$ D) 162

8) Which is the quotient?

A) $x - 4$ B) $5x - 6$ C) $3x^2 + 10x + 41$ D) 162

9) Using synthetic division to divide $3y^3 - 7y^2 - 20$ by $y - 3$, which of the following is the correct first row of the algorithm?

A) $-3\rfloor\ 3\ \ -7\ \ -20$ C) $-3\rfloor\ 3\ \ -7\ \ 0\ \ -20$
B) $3\rfloor\ 3\ \ -7\ \ -20$ D) $3\rfloor\ 3\ \ -7\ \ 0\ \ -20$

For #s 10 to 11, use the following synthetic division:

$$\begin{array}{r|rrrr} -2 & 1 & 6 & 2 & -12 \\ & & -2 & -8 & 12 \\ \hline & 1 & 4 & -6 & 0 \end{array}$$

10) Which polynomial is the dividend?

A) $x^4 + 6x^3 + 2x^2 - 12x$ B) $x^3 + 6x^2 + 2x - 12$
C) $x^3 + 4x^2 - 6x$ D) $x^2 + 4x - 6$

11) Which polynomial is the quotient?

A) $x^4 + 6x^3 + 2x^2 - 12x$ B) $x^3 + 6x^2 + 2x - 12$
C) $x^3 + 4x^2 - 6x$ D) $x^2 + 4x - 6$

12) Find the quotient when $(x^3 - 2x^2 - 11x - 20)$ is divided by $(x - 5)$.

A) $x^2 + 3x + 4$ B) $x^2 - 3x + 4$
C) $x^2 + 3x - 4$ D) $x^2 - 3x - 4$

13) What is the quotient when $(2x^3 - 9x^2 - 2x + 3)$ is divided by $(2x - 1)$?

A) $x^2 + 4x + 3$ B) $2x^2 - 8x - 6$
C) $x^2 - 4x - 3$ D) $2x^2 + 8x + 6$

14) What will be multiplied to $x^2 - 6x + 2$ to get $3x^3 - 19x^2 + 12x - 2$?

A) $3x - 1$ B) $3x + 1$ C) $x + 3$ D) $3x + 2$

15) The volume of a rectangular prism is $(2x^3 - 11x^2 + 13x - 4)cm^3$ and its height is $(x - 4)\ cm$. What is the area of its base?

A) $(2x^2 - 3x + 1)\ cm^2$ B) $(2x^2 + 19x + 76)\ cm^2$
C) $(2x^2 + 3x - 1)\ cm^2$ D) $(2x^2 - 19x - 76)\ cm^2$

LESSON

1

Division of Polynomials Using Long and Synthetic Division

What's In

When you were in Grade 7, you had learned that polynomial is an algebraic expression whose variables must have nonnegative-integer powers. The degree of a polynomial in one variable is the highest exponent among all the terms in the polynomial. Recall also the concepts about naming polynomials according to its number of terms and its degree. Then answer the following activity (*the first polynomial was done for you*) in a separate answer sheet.

Polynomial	**Number of Terms**	**Name of the Polynomial** *(according to the number of terms)*	**Degree**	**Name of the Polynomial** *(according to degree)*
Example: $x^2 + 2x + 1$	3	Trinomial	2	Quadratic
1) $x + 1$				
2) $2x^4 + 3x^2 + 4x + 1$				
3) $-5x^3$				
4) $x^6 - 3x^3 + 1$				
5) $3x^3 + 2x$				

What's New

Some real life applications of polynomials can be seen in the field engineering and economy. Engineers used polynomials when designing roads, buildings and other structures and economist used it to model economic growth pattern. To understand more about polynomials, let's have the following problem:

Problem:

> During a school fund raising activity, you were able to generate a total of $x^3 - 9x - 3x^2 + 27$ pesos from selling candies. If each candy costs $x + 3$ pesos, how many candies were you able to sell?

To find the number of candies, we can use dividing polynomials which is the focus of this module.

What Is It

In this part of the module, we will show you how to divide polynomials using long division and synthetic division. This skill is very important in factoring and solving for the roots of a polynomial equation.

A. Dividing Polynomials using Long Division

To show you how to divide polynomials using long division, we will use the polynomials specified in the problem from the previous page. That is to divide $x^3 - 9x - 3x^2 + 27$ by $x + 3$. Follow the steps:

Example 1. Divide $(x^3 - 9x - 3x^2 + 27)$ by $(x + 3)$.

Solution:

1) Arrange the polynomials in descending powers of x and write in the form $divisor\overline{)dividend}$. If there are missing terms, replace it with 0.

$$\frac{x^3 - 9x - 3x^2 + 27}{x + 3} \quad \Longrightarrow \quad x+3\overline{)x^3 - 3x^2 - 9x + 27}$$

2) Divide the first term of the dividend by the first term of the divisor to get the first term of the quotient:

$$\begin{array}{r} x^2 \\ x+3\overline{)x^3 - 3x^2 - 9x + 27} \end{array} \longrightarrow \quad x^3 \div x = x^2$$

3) Multiply the divisor by the first term of the quotient.

$$\begin{array}{r} x^2 \\ x+3\overline{)x^3 - 3x^2 - 9x + 27} \\ \underline{x^3 + 3x^2} \end{array} \longrightarrow \quad (x+3)(x^2) = x^3 + 3x^2$$

4) Subtract the product from the dividend then bring down the next term.

$$\begin{array}{r} x^2 \\ x+3\overline{)x^3 - 3x^2 - 9x + 27} \\ -\ \underline{(x^3 + 3x^2)} \\ -6x^2 - 9x \end{array}$$

5) Repeat steps 2 to 4. This time, the difference and the next term will be the new dividend.

$$\begin{array}{r} x^2 - 6x \\ x+3\overline{)x^3 - 3x^2 - 9x + 27} \\ -\ \underline{(x^3 + 3x^2)} \\ -6x^2 - 9x \\ \underline{-(-6x^2 - 18x)} \\ 9x + 27 \end{array} \begin{array}{l} \\ \\ \\ \\ \longrightarrow \quad -6x^2 \div x = -6x \\ \\ \longrightarrow \quad (x+3)(-6x) = -6x^2 - 18x \end{array}$$

6) Continue the process until a remainder is obtained. The remainder can be zero or a polynomial whose degree is lower than the divisor.

$$
\begin{array}{r}
x^2-6x+9 \\
x+3\overline{)\,x^3-3x^2-9x+27} \\
-\underline{\left(x^3+3x^2\right)} \\
\quad -6x^2-9x \\
\quad \underline{-\left(-6x^2-18x\right)} \\
\qquad\quad 9x+27 \\
\qquad\quad \underline{-\left(9x+27\right)} \\
\qquad\quad\ \ 0
\end{array}
$$

$\longrightarrow \quad 9x \div x = 9$

$\longrightarrow \quad (x+3)(9x) = 9x+27$

Therefore, the quotient is x^2-6x+9.

In general, when a polynomial is divided by another polynomial, we express the result in the following form:

$$\frac{P(x)}{d(x)} = Q(x) + \frac{r(x)}{d(x)}$$

Where $P(x)$ is the dividend, $d(x) \neq 0$ is the divisor, $Q(x)$ is the quotient, and $r(x)$ is the remainder.

Example 2. Divide $(x^4 + 2x^3 - 4x^2 - 10x + 5)$ by $(x^2 - 5)$.

Solution:

Follow the procedures shown from example 1.

$$
\begin{array}{rll}
 & x^2 + 2x + 1 & \longrightarrow \text{ Quotient} \\
x^2 - 5 \,\overline{)}\, x^4 + 2x^3 - 4x^2 - 10x + 5 & & \\
\underline{-(x^4 \quad -5x^2)} & & \longrightarrow \text{ Multiply: } x^2(x^2 - 5) \\
2x^3 + x^2 - 10x & & \longrightarrow \text{ Subtract. Bring down } -10x \\
\underline{-(2x^3 \quad -10x)} & & \longrightarrow \text{ Multiply: } 2x(x^2 - 5) \\
x^2 + 5 & & \longrightarrow \text{ Subtract. Bring down 5} \\
\underline{-(x^2 \quad -5)} & & \longrightarrow \text{ Multiply: } 1(x^2 - 5) \\
10 & & \longrightarrow \text{ Remainder}
\end{array}
$$

$$
\therefore \frac{x^4 + 2x^3 - 4x^2 - 10x + 5}{x^2 - 5} = x^2 + 2x + 1 + \frac{10}{x^2 - 5}
$$

LESSON

2

Dividing Polynomials Using Synthetic Division

There is a more efficient way of dividing polynomials if the divisor is a linear binomial in the form $x - a$. This method is called synthetic division. A detailed discussion on how this synthetic division will be done is given below. Just like long division, arrange the polynomials first in descending powers of x and write 0 as coefficient of any missing term.

Example 3: Divide $(x^3 - 9x - 3x^2 + 27)$ by $(x + 3)$ using synthetic division.

(*These polynomials are the same as example 1. Let's find out if synthetic and long division will give the same quotient).*

Arrange the dividend in descending order: $x^3 - 3x^2 - 9x + 27$

-3	1	-3	-9	27	Write the coefficient of the polynomials. The divisor is $x + 3$, so use $a = -3$

-3	1	-3	-9	27	
	1				Bring down the first coefficient

-3	1	-3	-9	27	
		-3			Multiply -3 by 1 and write the result below -3
	1				

-3	1	-3	-9	27	
		-3			
	1	-6			Add -3 and -3

-3 |	1	-3	-9	27
		-3	18	-27
	1	-6	9	0

Multiply -3 by -6 and write the result below -9

Add -9 and 18. Repeat the process until all columns are filled

-3 |	1	-3	-9	27
		-3	18	-27
	1	-6	9	0

The degree of the quotient is one less than the degree of the dividend.

Thus, the quotient is $x^2 - 6x + 9$.

Coefficient of the quotient

remainder

In this example, we were able to see that both long division and synthetic division yield the same answer.

Example 4: Divide $(2x^4 - 3x^2 + x - 4)$ by $(x - 2)$

2 |	2	0	-3	1	-4

Write the coefficient of the polynomials. Since x^3 is a missing term, write 0 as its coefficient. The divisor is $x - 2$, so use $a = 2$

2 |	2	0	-3	1	-4
		4	8	10	22
	2	4	5	11	18

Perform the synthetic division.

2 |	2	0	-3	1	-4
		4	8	10	22
	2	4	5	11	18

Coefficient of the quotient

remainder

Identify the quotient and the remainder.

$$\therefore \frac{2x^4 - 3x^2 + x - 4}{x - 2} = 2x^3 + 4x^2 + 5x + 11 + \frac{18}{x - 2}$$

Example 5: Divide $(3x^3 - 16x^2 + 3x + 12)$ by $(3x + 2)$

In this example, the leading coefficient of the divisor is not 1. Hence, divide both terms of the divisor by 3 so that it will be in the form $x - a$. So the new divisor will now be $x + \frac{2}{3}$.

$$\begin{array}{r|llll} -\frac{2}{3} & 3 & -16 & 3 & 12 \\ \hline & & & & \end{array}$$

Write the coefficient of the polynomials.

The divisor is $x + \frac{2}{3}$, so use $a = -\frac{2}{3}$.

$$\begin{array}{r|llll} -\frac{2}{3} & 3 & -16 & 3 & 12 \\ & & -2 & 12 & -10 \\ \hline & 3 & -18 & 15 & 2 \end{array}$$

Perform the synthetic division.

$$\begin{array}{r|llll} -\frac{2}{3} & 3 & -16 & 3 & 12 \\ & & -2 & 12 & -10 \\ \hline & 3 & -18 & 15 & 2 \end{array}$$

Coefficient of the quotient — remainder

Identify the quotient and the remainder.

Quotient: $3x^2 - 18x + 15$
Remainder: 2

Since the divisor $3x + 2$ was divided by 3 to get $a = -\frac{2}{3}$, then divide also every terms in the quotient (except remainder) by 3. Hence, the quotient will be:

$$x^2 - 6x + 5.$$

$$\therefore \frac{3x^3 - 16x^2 + 3x + 12}{3x + 2} = x^2 - 6x + 5 + \frac{2}{3x + 2}$$

What's More

Now, your turn!

Activity 1: Divide the following polynomials using long division.

a) $(2x^3 + 9x^2 + 3x - 4) \div (x + 4)$

b) $(8x^3 + 27) \div (2x + 3)$

c) $\dfrac{11x - 20x^2 + 12x^3 - 14}{x - 2}$

Activity 2: Divide the following polynomials using synthetic division

a) $(4x^2 + x - 3) \div (x - 3)$

b) $(3x^2 + 4x - x^4 - 2x^3 - 4) \div (x + 2)$

c) $\left(2x^5 - 2x^3 + 4x^2 - 3\right) \div (x + 1)$

d) $\left(-x^4 + 2x^5 - 2x - 3x^2 + 1\right) \div (x - 2)$

e) $(2x^3 + 5x^2 - 4x - 5) \div (2x + 1)$

What I Have Learned

Let us sum up what we had learned in this module.

A) Fill in the blank with the correct term. Write your answer on a separate sheet of paper.

When dividing polynomials, we express the result in the following form:

$$\frac{P(x)}{d(x)} = Q(x) + \frac{r(x)}{d(x)}$$

Where $P(x)$ is the_____1_____, $d(x) \neq 0$ is the _____2_____, $Q(x)$ is the _____3_____, and $r(x)$ is the_____4_____ .

B) Use the synthetic division below to find the following:

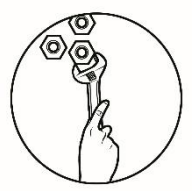
2	2	0	0	–	−3
				1	6
		4	8	16	30
	2	4	8	15	−6

a. Dividend: _____

b. Divisor: _____

c. Remainder: _____

d. Quotient:



What I Can Do

In this activity, you will apply dividing polynomial in solving word problems.

Solve the following problems:

1) Pedro bought $(18x^3 - 39x^2 + 8x + 16)$ pesos worth of tokens for your classroom Christmas party. If each token is worth $(3x - 4)$ pesos, how many tokens did Peter buy?

2) Lita works for $(x + 5)$ hours as a service crew in a fast-food chain. She earns $(2x^3 + 23x^2 - 26x + 3)$ pesos today. How much does Lita earn per hour?

3) The area of a rectangle is $4x^4 + 4x^3 + 4x^2 + 2x + 1$ square centimeter. If the length of the rectangle is $2x^2 + 1$ centimeter, what is the width of the rectangle?

Assessment

DIRECTION: Choose the letter of your answer from the given choices. Write your answer on a separate sheet of paper.

1) If a sixth degree polynomial is divided by a second degree polynomial, what is the degree of the quotient?

   A) 1 B) 2 C) 3 D) 4

2) Divide: $x^3 + 2x^2 - 5x - 10$ by $x^2 - 5$.

   A) $x^2 - 3x + 10$ B) $x^2 + 7x + 30$ C) $x + 2$ D) $x - 2$

3) In the division algorithm $\frac{P(x)}{d(x)} = Q(x) + \frac{r(x)}{d(x)}$, what is the divisor?

   A) $P(x)$ B) $d(x)$ C) $r(x)$ D) $Q(x)$

4) Find the remainder when $x^3 - 2x^2 + 4x - 3$ is divided by $x + 2$.

   A) 27 B) 5 C) -5 D) -27

5) If $x^3 - 2x^2 - 5x + 6$ is divided by $x + 1$, the remainder is zero.

   A) True B) False C) Cannot be determined

For #s 6 to 8, use the illustration of long division below:

Divide $(2x^3 + 3x^2 - 10x + 12)$ *by* $(x - 3)$

$$
\begin{array}{r}
2x^2 + 9x + 17 \\
x - 3 \overline{)\,2x^3 + 3x^2 - 10x + 12} \\
\underline{\left(2x^3 - 6x^2\right)} \\
9x^2 - 10x \\
\underline{-\left(9x^2 - 27x\right)} \\
17x + 12 \\
\underline{-\left(17x - 51\right)} \\
63
\end{array}
$$

6) What is the remainder?

A) 17 B) 63 C) $x - 3$ D) $17x - 51$

7) Which is the divisor?

A) $2x^2 + 9x + 17$ B) $x - 3$ C) $2x^3 + 3x^2 - 10x + 12$ D) 63

8) Which is the quotient?

A) $2x^2 + 9x + 17$ B) $x - 3$ C) $2x^3 + 3x^2 - 10x + 12$ D) 63

9) Using synthetic division to divide $7y^3 - 3y^2 - 20$ by $y + 3$, which of the following is the correct first row of the algorithm?

A) $3\rfloor\ 7\ \ -3\ \ 0\ \ -20$ C) $-3\rfloor\ 7\ \ -3\ \ -20$

B) $-3\rfloor\ 7\ \ -3\ \ 0\ \ -20$ D) $3\rfloor\ 7\ \ -3\ \ -20$

For #s 10 to 11, use the following synthetic division:

$$\begin{array}{r|rrrr} 3 & 1 & -6 & 2 & 21 \\ & & 3 & -9 & -21 \\ \hline & 1 & -3 & -7 & 0 \end{array}$$

10) Which polynomial is the dividend?

A) $x^3 - 6x^2 + 2x + 21$ B) $x^4 - 6x^3 + 2x^2 + 21x$
C) $x^3 - 3x^2 - 7x$ D) $x^2 - 3x - 7$

11) Which polynomial is the quotient?

A) $x^3 - 6x^2 + 2x + 21$ B) $x^4 - 6x^3 + 2x^2 + 21x$
C) $x^3 - 3x^2 - 7x$ D) $x^2 - 3x - 7$

12) Find the quotient when $(x^3 + 2x^2 - 19x - 20)$ is divided by $(x + 5)$.

A) $x^2 + 3x + 4$ B) $x^2 - 3x + 4$
C) $x^2 + 3x - 4$ D) $x^2 - 3x - 4$

13) What is the quotient when $(2x^3 + 9x^2 - 2x - 3)$ is divided by $(2x + 1)$?

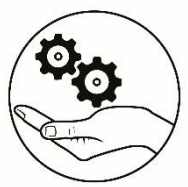
A) $x^2 + 4x - 3$ B) $x^2 - 4x + 1$
C) $2x^2 + 8x - 6$ D) $2x^2 - 8x - 6$

14) What will be multiplied to $x^2 - 6x + 2$ to get $3x^3 - 17x^2 + 2$?

A) $x + 3$ B) $3x + 2$ C) $3x + 1$ D) $3x - 1$

15) The volume of a rectangular prism is $(2x^3 + 11x^2 + 11x - 4)cm^3$ and its height is $(x + 4)\ cm$. What is the area of its base?

A) $(2x^2 - 3x + 1)\ cm^2$ B) $(2x^2 + 19x + 76)\ cm^2$
C) $(2x^2 + 3x - 1)\ cm^2$ D) $(2x^2 - 19x - 76)\ cm^2$



Additional Activity

Answer the following problems:

A) Complete the synthetic division given the polynomial

$2x^4 - 3x^3 - 2x + 4$ divided by $x - 2$.

□	2	−3	□	−2	4
		4		4	4
	2	□	2	2	□

B) The long division below is incorrect. What mistake was made?

Divide: $(x^3 - 6x^2 + 2x - 3) \div (x - 2)$

$$
\begin{array}{r}
x^2 - 4x + 10 \\
x-2 \;\overline{)\; x^3 - 6x^2 + 2x - 3} \\
\underline{\left(x^3 - 2x^2\right)} \\
-4x^2 + 2x \\
\underline{-\left(4x^2 + 8x\right)} \\
10x - 3 \\
\underline{-(10x - 20)} \\
17
\end{array}
$$

C) Find the constant C such that the denominator will divide evenly into the numerator.

1) $\dfrac{2x^3 + 9x^2 - x + C}{x + 4}$

2) $\dfrac{x^4 - x^3 - 3x^2 - Cx - 3}{x - 3}$

Answer Key

What I know

1. B	6. D	11. D
2. D	7. A	12. A
3. A	8. C	13. C
4. B	9. D	14. A
5. A	10. B	15. A

What's in

1) $x + 1$	2	Binomial	1	Linear
2) $2x^4 + 3x^2 + 4x + 1$	4	Multinomial	4	Quartic
3) $-5x^3$	1	Monomial	3	Cubic
4) $x^6 - 3x^3 + 1$	3	Trinomial	6	6^{th} Degree
5) $3x^3 + 2x$	2	binomial	3	Cubic

What's More

Activity 1
a) $2x^2 + x - 1$
b) $4x^2 - 6x + 9$
c) $12x^2 + 4x + 19 + \frac{24}{x-2}$

Activity 2
a) $4x + 13 + \frac{36}{x-3}$
b) $-x^3 + 3x - 2$
c) $2x^4 - 2x^3 + 4x - 4 + \frac{1}{x+1}$
d) $2x^4 + 3x^3 + 6x^2 + 9x + 16 + \frac{33}{x-2}$
e) $x^2 + 2x - 6 - \frac{2}{2x+1}$

What I have learned

A) 1) dividend
2) divisor
3) quotient
4) remainder

B) 1) $2x^4 - x - 36$
2) $x - 2$
3) -6
4) $2x^3 + 4x^2 + 8x - 15$

What I can do

$(6x^2 - 5x - 4)$
$2x^2 + 13x - 91 + \frac{458}{x+5}$
3. $(2x^2 + 2x + 1)$ centimeter

Assessment

1. D	6. B	11. D
2. C	7. B	12. D
3. B	8. A	13. A
4. D	9. B	14. C
5. B	10. A	15. C

Additional Activity

A)

2	2	−3	**0**	−2	4
		4	**2**	4	4
	2	**1**	2	2	**8**

B) $2x - 8x$ is not $10x$
C) 1) $C = -20$
2) $C = -8$

REFERENCES:

Algebraic Division taken from http://mathematics.laerd.com

Larson, R. (2006). *Precalculus with limits.* Boston, MA: Houghton Mifflin Co.

Leithold, L. (1989). *College Algebra and Trigonometry.* Reading Mass.: Addison – Wesley.

Young, C. (2010). *Precalculus*. Hoboken, N.J.: Wiley.

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