Algebra 2 Guideline for Week 3 May,4 – May,8

There are 5 Review assignments to complete this week. You can either write on binder paper or print worksheets. Make sure to

- write very neat
- show all the work
- write your name in pen

After you are done with each assignment, open it on schoology.com, take a photo and submit. **Due date for these assignments is May 8th**, but I strongly recommend completing and submitting your assignments daily.

Please, message me on schoology if you have questions and need help. Also, there are will be live Q&A meetings with me through Zoom scheduled on schoology if you need an additional help.

May,4

Assignment HMH 6.5 Practice A/B "Dividing Polynomial, Long Division and Synthetic Division"

Complete assignment and submit on schoology.

Use the following resources to review:

- **Notes from our class**
- **On-line HMH interactive lesson 6.5**
- **HMH 6.5 Reteach page (attached)**

May,5

Assignment HMH 7.1 Practice A/B "Finding Rational Solutions of Polynomial Equations"

Complete assignment and submit on schoology.

Use the following resources to review:

- **Notes from our class**
- **On-line HMH interactive lesson 7.1**
- **HMH 7.1 Reteach page (attached)**

May,6

Assignment HMH 7.2 Practice A/B "Finding Complex Solutions of Polynomial Equations"

Complete assignment on paper, take a photo and submit on schoology.

Use the following resources to review:

- **Notes from our class**
- **On-line HMH interactive lesson 7.2**
- **HMH 7.2 Reteach page (attached)**

May,7

Assignment HMH 9.1 Practice A/B "Adding and Subtracting Rational Expressions"

Complete assignment on paper, take a photo and submit on schoology.

Use the following resources to review:

- **Notes from our class**
- **On-line HMH interactive lesson 9.1**
- **HMH 9.1 Reteach page (attached)**

May,8

Assignment HMH 9.2 Practice A/B "Multiplying and Dividing Rational Expressions"

Complete assignment on paper, take a photo and submit on schoology.

Use the following resources to review:

- **Notes from our class**
- **On-line HMH interactive lesson 9.2**
- **HMH 9.2 Reteach page (attached)**

Name _____ Date _____ Class_____

LESSON 6-5

Dividing Polynomials

Reteach

Example Divide $(x^3 - 2x^2 - 22x + 45)$ by $(x - 5)$ using synthetic division.

$$\begin{array}{r|} 5 \\ \hline \\ \hline \quad\quad \lfloor \end{array} \rightarrow \begin{array}{r|cccc} 5 & 1 & -2 & -22 & 45 \\ \hline \\ \hline \quad\quad & & & & \lfloor \end{array} \rightarrow \begin{array}{r|cccc} 5 & 1 & -2 & -22 & 45 \\ \hline & & & & \\ \hline 1 & & & & \lfloor \end{array} \rightarrow$$

$$\rightarrow \begin{array}{r|cccc} 5 & 1 & -2 & -22 & 45 \\ \hline & & 5 & & \\ \hline 1 & & & & \lfloor \end{array} \rightarrow \begin{array}{r|cccc} 5 & 1 & -2 & -22 & 45 \\ \hline & & 5 & & \\ \hline 1 & 3 & & & \lfloor \end{array} \rightarrow \begin{array}{r|cccc} 5 & 1 & -2 & -22 & 45 \\ \hline & & 5 & 15 & \\ \hline 1 & 3 & & & \lfloor \end{array} \rightarrow$$

$$\rightarrow \begin{array}{r|cccc} 5 & 1 & -2 & -22 & 45 \\ \hline & & 5 & 15 & \\ \hline 1 & 3 & -7 & & \lfloor \end{array} \rightarrow \begin{array}{r|cccc} 5 & 1 & -2 & -22 & 45 \\ \hline & & 5 & 15 & -35 \\ \hline 1 & 3 & -7 & & \lfloor \end{array} \rightarrow \begin{array}{r|cccc} 5 & 1 & -2 & -22 & 45 \\ \hline & & 5 & 15 & -35 \\ \hline 1 & 3 & -7 & & \lfloor 10 \end{array}$$

Quotient: $x^2 + 3x - 7$
Remainder: 10

Name _____ Date _____ Class _____

LESSON 6-5

Dividing Polynomials

Practice and Problem Solving: A/B

Divide by using long division.

1. $(x^2 - x - 6) \div (x - 3)$

2. $(2x^3 - 10x^2 + x - 5) \div (x - 5)$

3. $(-3x^2 + 20x - 12) \div (x - 6)$

4. $(3x^3 + 9x^2 - 14) \div (x + 3)$

Divide by using synthetic division.

5. $(3x^2 - 8x + 4) \div (x - 2)$

6. $(5x^2 - 4x + 12) \div (x + 3)$

7. $(9x^2 - 7x + 3) \div (x - 1)$

8. $(-6x^2 + 5x - 10) \div (x + 7)$

Use synthetic substitution to evaluate *P*(*x*) for the given value.

9. $P(x) = 4x^2 - 9x + 2$ for $x = 3$

10. $P(x) = -3x^2 + 10x - 4$ for $x = -2$

Determine whether the given binomial is a factor of *P*(*x*).

11. $(x - 4)$; $P(x) = x^2 + 8x - 48$

12. $(x + 5)$; $P(x) = 2x^2 - 6x - 1$

Solve.

13. The total number of dollars donated each year to a small charitable organization has followed the trend $d(t) = 2t^3 + 10t^2 + 2000t + 10{,}000$, where d is dollars and t is the number of years since 1990. The total number of donors each year has followed the trend $p(t) = t^2 + 1000$. Write an expression describing the average number of dollars per donor.

Name _____ Date _____ Class _____

LESSON 7-1

Finding Rational Solutions of Polynomial Equations

Reteach

Rational Root Theorem:	Possible rational roots are of the form $\frac{m}{n}$ where m = factor of the constant term n = factor of the leading coefficient

Example Find the rational zeros of $x^3 - 11x^2 + 23x + 35$, then write the function in factored form.

Step 1: List possible rational roots.

$x^3 - 11x^2 + 23x + 35$	Constant term: 35 Factors: $\pm 1, \pm 5, \pm 7, \pm 35$	Leading Coefficient: 1 Factors: ± 1
Possible Rational Roots: $\frac{m}{n} = \frac{\pm 1, \pm 5, \pm 7, \pm 35}{\pm 1} = \pm 1, \pm 5, \pm 7, \pm 35$		

Step 2: Use synthetic division to test for a zero remainder.

$\underline{1}\,\vert\; 1 \quad -11 \quad 23 \quad 35$ $\qquad\quad 1 \quad -10 \quad 13$ $\qquad 1 \quad -10 \quad 13 \quad \vert\underline{48}$	$\underline{5}\,\vert\; 1 \quad -11 \quad 23 \quad 35$ $\qquad\quad 5 \quad -30 \quad -35$ $\qquad 1 \quad -6 \quad -7 \quad \vert\underline{0}$
Remainder is not 0, so 1 is not a root.	Remainder is 0, so 5 is a root.

Step 3: Factor the remaining quadratic to find the zeros and write the polynomial in factored form.

$x^3 - 11x^2 + 23x + 35 = (x-5)(x^2 - 6x - 7)$ $= (x-5)(x-7)(x+1)$	Rational zeros are 5, 7, and -1, and $f(x) = (x-5)(x-7)(x+1)$.

Name _____ Date _____ Class _____

LESSON 7-1

Finding Rational Solutions of Polynomial Equations

Practice and Problem Solving: A/B

Solve each polynomial equation by factoring.

1. $4x^3 + x^2 - 4x - 1 = 0$

_____

2. $x^5 - 2x^4 - 24x^3 = 0$

_____

3. $3x^5 + 18x^4 - 21x^3 = 0$

_____

4. $-x^4 + 2x^3 + 8x^2 = 0$

_____

Identify the rational zeros of each function. Then write the function in factored form.

5. $f(x) = x^3 + 3x^2 + 3x + 1$

_____

6. $f(x) = x^3 + 5x^2 - 8x - 48$

_____

Identify all the rational roots of each equation.

7. $x^3 + 10x^2 + 17x = 28$

_____

8. $3x^3 + 10x^2 - 27x = 10$

_____

Solve.

9. An engineer is designing a storage compartment in a spacecraft. The compartment must be 2 meters longer than it is wide, and its depth must be 1 meter less than its width. The volume of the compartment must be 8 cubic meters.

   a. Write an equation to model the volume of the compartment.

   _____

   b. List all possible rational roots. _____

   c. Use synthetic division to find the roots of the polynomial equation. Are the roots all rational numbers?

   _____

   d. What are the dimensions of the storage compartment? _____

Name _____ Date _____ Class _____

LESSON 7-2

Finding Complex Solutions of Polynomial Equations

Reteach

$a + bi$ and $a - bi$ are complex conjugates.

Example Give the complex conjugate of each number.

$-2 - i$ Complex Conjugate: $-2 + i$

$4 + 3i$ Complex Conjugate: $4 - 3i$

$5i$ Complex Conjugate: $-5i$

Complex Conjugate Root Theorem:	If $a + bi$ is an imaginary root of a polynomial equation with real-number coefficients, then $a - bi$ is also a root.

Example Write the polynomial function with the least degree and a leading coefficient of 1 that has zeros $1 - 2i$, 5, and -1.

Complex roots come in conjugate pairs $\rightarrow$ zeros are $1 - 2i$, $1 + 2i$, 5, and -1.

Write the function in factored form.
$$p(x) = (x - (1 - 2i))(x - (1 + 2i))(x - 5)(x + 1)$$

Multiply the complex conjugate factors using FOIL, then simplify.
$$= \left[x^2 - (1 + 2i)x - (1 - 2i)x + (1 - 2i)(1 + 2i)\right](x - 5)(x + 1)$$
$$= \left[x^2 + (-1 - 2i - 1 + 2i)x + (1 - 4i^2)\right](x - 5)(x + 1)$$
$$= (x^2 - 2x + 5)(x - 5)(x + 1)$$

Multiply the binomials.
$$= (x^2 - 2x + 5)(x^2 - 4x - 5)$$

Use the distributive property.
$$= x^2(x^2 - 4x - 5) - 2x(x^2 - 4x - 5) + 5(x^2 - 4x - 5)$$
$$= x^4 - 4x^3 - 5x^2 - 2x^3 + 8x^2 + 10x + 5x^2 - 20x - 25$$

Combine like terms.
$$= x^4 - 6x^3 + 8x^2 - 10x - 25$$

Name _____ Date _____ Class _____

LESSON 7-2

Finding Complex Solutions of Polynomial Equations

Practice and Problem Solving: A/B

Write the simplest polynomial function with the given roots.

1. 1, 4, and -3

2. $\frac{1}{2}$, 5, and -2

3. $2i$, $\sqrt{3}$, and 4

4. $\sqrt{2}$, -5, and $-3i$

Solve each equation by finding all roots.

5. $x^4 - 2x^3 - 14x^2 - 2x - 15 = 0$

6. $x^4 - 16 = 0$

7. $x^4 + 4x^3 + 4x^2 + 64x - 192 = 0$

8. $x^3 + 3x^2 + 9x + 27 = 0$

Solve.

9. An electrical circuit is designed such that its output voltage, V, measured in volts, can be either positive or negative. The voltage of the circuit passes through zero at $t = 1$, 2, and 7 seconds. Write the simplest polynomial describing the voltage $V(t)$.

Name _____ Date _____ Class _____

LESSON 9-1

Adding and Subtracting Rational Expressions

Reteach

To add or subtract rational expressions, they must have common denominators.

Example Add $\frac{x+2}{x-3}+\frac{x-1}{x+1}$.

Step 1 Multiply each rational expression by a common factor to get equivalent fractions with a common denominator.

$$\frac{x+2}{x-3}+\frac{x-1}{x+1}$$

Multiply by $\frac{x+1}{x+1}$

Multiply by $\frac{x-3}{x-3}$

$$\frac{x+2}{x-3}\cdot\frac{x+1}{x+1}=\frac{(x+2)(x+1)}{(x-3)(x+1)}=\frac{x^2+3x+2}{(x-3)(x+1)} \qquad \frac{x-1}{x+1}\cdot\frac{x-3}{x-3}=\frac{(x-1)(x-3)}{(x+1)(x-3)}=\frac{x^2-4x+3}{(x-3)(x+1)}$$

Common Denominators

Step 2 Add the fractions.

$$\frac{x^2+3x+2}{(x-3)(x+1)}+\frac{x^2-4x+3}{(x+1)(x-3)}=\frac{2x^2-x+5}{(x+1)(x-3)}$$

Step 3 Give excluded values that make the denominator 0.

$x \neq -1,\ x \neq 3$

Name _____ Date _____ Class _____

LESSON 9-1

Adding and Subtracting Rational Expressions

Practice and Problem Solving: A/B

Identify the excluded values for each expression.

1. $\frac{x-7}{9x^2-63x}$

2. $\frac{x^2+3x-18}{-x^2+6x-9}$

Simplify the given expression stating any excluded values.

3. $\frac{2x^2-12x+16}{7x^2-28x}$

4. $\frac{5x^2+6x-8}{6x^2-24}$

5. $\frac{9x^3+9x^2}{7x^2-2x-9}$

6. $\frac{2x^2+13x-24}{7x+56}$

Add or subtract. Identify any *x*-values for which the expression is undefined.

7. $\frac{2x-3}{x+4}+\frac{4x-5}{x+4}$

8. $\frac{x+12}{2x-5}-\frac{3x-2}{2x-5}$

9. $\frac{x+4}{x^2-x-12}+\frac{2x}{x-4}$

10. $\frac{3x^2-1}{x^2-3x-18}-\frac{x+2}{x-6}$

11. $\frac{x+2}{x^2-2x-15}+\frac{x}{x+3}$

12. $\frac{x+6}{x^2-7x-18}-\frac{2x}{x-9}$

Solve.

13. A messenger is required to deliver 10 packages per day. Each day, the messenger works only for as long as it takes to deliver the daily quota of 10 packages. On average, the messenger is able to deliver 2 packages per hour on Saturday and 4 packages per hour on Sunday. What is the messenger's average delivery rate on the weekend?

Name _____ Date _____ Class _____

LESSON 9-2

Multiplying and Dividing Rational Expressions

Reteach

Example Find the product and any excluded values. $\frac{x^2-2x-8}{x^2-1} \cdot \frac{x-1}{x^2-x-6}$

Step 1 Factor and multiply. $= \frac{(x-4)(x+2)(x-1)}{(x+1)(x-1)(x-3)(x+2)}$

Step 2 Cancel common factors. $= \frac{(x-4)\cancel{(x+2)}\cancel{(x-1)}}{(x+1)\cancel{(x-1)}(x-3)\cancel{(x+2)}}$

Step 3 Write simplified product. $= \frac{x-4}{(x+1)(x-3)}$

Step 4 Note excluded values. $x \neq -2, x \neq -1, x \neq 1, x \neq 3$

Example Find the quotient and any excluded values. $\frac{x^2-x-12}{x+5} \div \frac{x^2+9x+18}{2x+10}$

Step 1 Rewrite as multiplication by reciprocal of divisor. $= \frac{x^2-x-12}{x+5} \cdot \frac{2x+10}{x^2+9x+18}$

Step 2 Factor $= \frac{(x-4)(x+3)}{x+5} \cdot \frac{2(x+5)}{(x+6)(x+3)}$

Step 3 Multiply $= \frac{2(x-4)(x+3)(x+5)}{(x+5)(x+6)(x+3)}$

Step 4 Cancel common factors. $= \frac{2(x-4)\cancel{(x+3)}\cancel{(x+5)}}{\cancel{(x+5)}(x+6)\cancel{(x+3)}}$

Step 5 Write simplified product. $= \frac{2(x-4)}{(x+6)}$

Step 6 Note excluded values. $x \neq -6, x \neq -5, x \neq -3$

Name _____ Date _____ Class _____

LESSON 9-2

Multiplying and Dividing Rational Expressions

Practice and Problem Solving: A/B

Multiply. State any excluded values.

1. $\frac{6x}{10} \cdot \frac{6x}{3x^3}$

2. $\frac{4x}{3} \cdot \frac{8x}{2}$

3. $\frac{1}{x+9} \cdot \frac{7x^3+49x^2}{x+7}$

4. $\frac{6x^2-54x}{x-9} \cdot \frac{7x}{6x}$

5. $\frac{18x-36}{4x-8} \cdot \frac{2}{9x+18}$

6. $\left(56+11x-15x^2\right) \cdot \frac{10}{15x^2-11x-56}$

Divide. State any excluded values.

7. $\frac{4x}{5x} \div \frac{4x}{6}$

8. $\frac{6(x-2)}{(x-1)(x-10)} \div \frac{x-2}{x-10}$

9. $(2x+6) \div \frac{14x^2+42x}{10}$

10. $\frac{27x+9}{10} \div \frac{3x^2-8x-3}{10}$

11. $\frac{24x+56}{10x^3-90x^2} \div \frac{15x+35}{5}$

12. $\frac{2x+20}{12x^3-30x^2} \div \frac{2}{14x-35}$

Solve.

13. The distance, d, traveled by a car undergoing constant acceleration, a, for a time, t, is given by $d = v_0 t + \frac{1}{2}at^2$, where v_0 is the initial velocity of the car. Two cars are side by side with the same initial velocity. One car accelerates, $a = A$, and the other car does not accelerate, $a = 0$. Write an expression for the ratio of the distance traveled by the accelerating car to the distance traveled by the nonaccelerating car as a function of time.