Algebra 1

March 23-27

Time Allotment: 40 minutes per day

Student Name: _____

Teacher Name: _____

Teacher emails: Vanessa.steger@greatheartsnorthernoaks.org and melanie.brintnall@greatheartsnorthernoaks.org. Ms. Brintnall will be teaching Mrs. Chubb's Algebra 1 class for the remainder of the school. If you were in Mrs. Chubb's class, you should email Ms. Brintnall for help if needed!

Packet Overview

Date	Objective(s)	Page Number
Monday, March 23	Refresh your Chapter 11 memory (rational and irrational numbers).	3
Tuesday, March 24	Simplify square roots of variable expressions.	7
Wednesday, March 25	Multiply and divide radicals. Rationalize the denominator.	11
Thursday, March 26	Simplify sums and differences of radicals.	14
Friday, March 27	Practice simplifying expressions.	18

Dear Algebra 1 students,

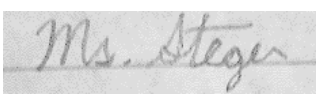
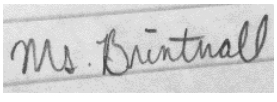
Ms. Brintnall, Ms. Steger, and Mrs. Chubb truly miss you. No word yet on Mrs. Chubb's baby as of Friday 3/20, but we will keep you posted!

There are many uncertainties in our world today. It is our privilege as your algebra teachers to provide you with this packet, which represents much more than the pages you see on the screen or the desk in front of you. Please indulge us and read this next paragraph carefully:

You are embarking not on a mundane task, but on an ambitious mission. The British mathematician G.H. Hardy exhorts people, young people particularly, to the noblest ambition of leaving something behind of permanent value. "A mathematician, like a painter or a poet, is a maker of patterns," he writes, "If his patterns are more permanent than theirs, it is because they are made with ideas." *By using algebra, the language of symbols and number, you are speaking a universal language. When you write expressions and solve equations, you are recording symbols of permanent ideas*. Though we cannot touch the quantity "2," we can write the numeral and use it with our operations and equations. The number two could represent two chinchillas, two donuts, two friends, but the real meaning of two is permanent and immaterial.

Just as we were doing in class before spring break, we will ask you to review examples and solve problems about radicals (such as $\sqrt{9}$ and $\sqrt{32}$). We hope that as you work on the details of simplifying $\sqrt{16x^6}$, you will also notice and enjoy your participation in the permanent. How amazing is it that across the world this symbol $\sqrt{36}$ represents the question, "What number times itself is 36?"

Amidst all the change in our world, mathematics is your encounter with the permanent and universal. As your algebra teachers, we hope that these problems provide some refuge from uncertainty and a way to prove to yourself that there is order in the world. Now, let's get down to business!

With much love,  and 

To start, gather about 15 pieces of loose-leaf and STAPLE them together (any kind of lined paper or graph paper will do). Put your name on the very top of EVERY PAGE (front and back) of these loose-leaf papers like this:

This is the equivalent of your notebook during class, and we will refer to it throughout this packet as you "loose-leaf packet." We will ask you to write certain problems with particular titles, and all of this will be done in that loose-leaf packet. **At a later point, we will ask you to turn in that loose-leaf packet. Do not worry right now about whether that will be online or in person, simply do the problems as we instruct with the proper titles and labels.**

- ☐ ***I have gathered around 15 pieces of lined paper, put my name at the very top of every sheet on both the front and the back, and stapled them. I am ready to go!***

"The study of mathematics, like the Nile, begins in minuteness but ends in magnificence."
Charles Caleb Colton

Academic Honesty

I certify that I completed this assignment independently in accordance with the GHNO Academy Honor Code. Right now in my Algebra I class, this means that I will NOT use a calculator except to check my answers when I am finished with them.

Student signature:

_____

I certify that my student completed this assignment independently in accordance with the GHNO Academy Honor Code. Right now in this Algebra I class, this means that the student will NOT use a calculator except to check answers when finished with them.

Parent signature:

_____

Monday, March 23

Algebra 1 Unit: Chapter 11 Rational and Irrational Numbers
Lesson 1: Refresh of Chapter 11

Objective: Be able to do this by the end of this lesson.
Distinguish between a rational and irrational number

Let's start with a quick review of the beginning of Chapter 11. Read over this page of the textbook:

11-1 Properties of Rational Numbers

Objective To learn and apply some properties of rational numbers.

In Chapter 1, you learned that the positive numbers, the negative numbers, and zero are called real numbers.

A real number that can be expressed as the quotient of two integers is called a **rational number.**

Each number below is a rational number.

$$0 = \frac{0}{1} \qquad 7 = \frac{7}{1} \qquad 5\frac{2}{3} = \frac{17}{3} \qquad 0.43 = \frac{43}{100} \qquad -\frac{4}{9} = \frac{-4}{9}$$

A rational number can be written as a quotient of integers in an unlimited number of ways.

Example 1 Write as a quotient of integers: **a.** 3 **b.** $-1\frac{4}{5}$ **c.** 48% **d.** 0.6

Solution **a.** $3 = \frac{6}{2} = \frac{12}{4} = \frac{-15}{-5} = \ldots$ **b.** $-1\frac{4}{5} = \frac{-9}{5} = \frac{18}{-10} = \ldots$

c. $48\% = \frac{48}{100} = \frac{24}{50} = \ldots$ **d.** $0.6 = \frac{6}{10} = \frac{12}{20} = \ldots$

To determine which of two rational numbers is greater, you can write them with the same positive denominator and compare their numerators.

Example 2 Which rational number is greater, $\frac{8}{3}$ or $\frac{17}{7}$?

Solution The LCD is 21.

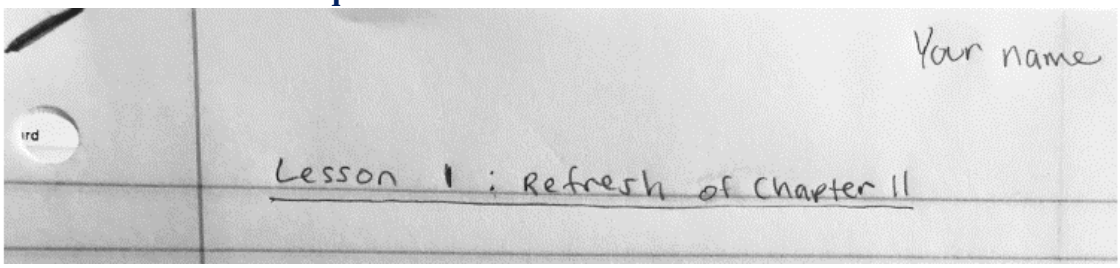
$\frac{8}{3} = \frac{56}{21}$ and $\frac{17}{7} = \frac{51}{21}$.

Compare $\frac{56}{21}$ and $\frac{51}{21}$.

Since $56 > 51$, $\frac{56}{21} > \frac{51}{21}$.

$\therefore \frac{8}{3} > \frac{17}{7}$ ***Answer***

It's time for your first item for your loose-leaf packet! Title your page like this and then answer the questions with numbers next to them. As long as you label the number, you do not need to re-write the question.



1. What is a rational number?

2. Why do you think the word "ratio" is inside of the word rational?

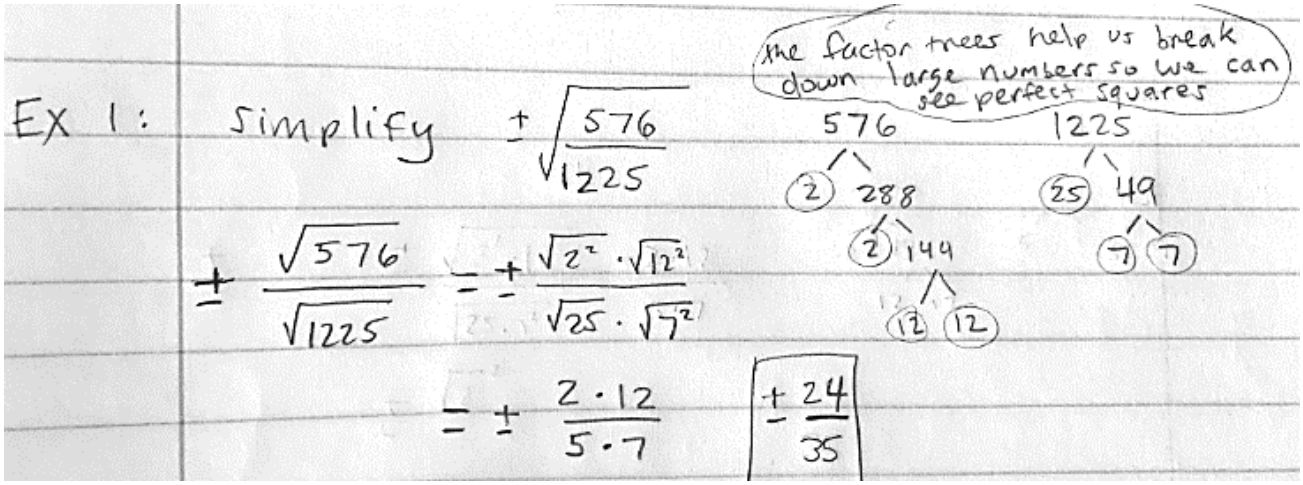
3. What is $\frac{8}{3}$ as a decimal? SHOW YOUR WORK.

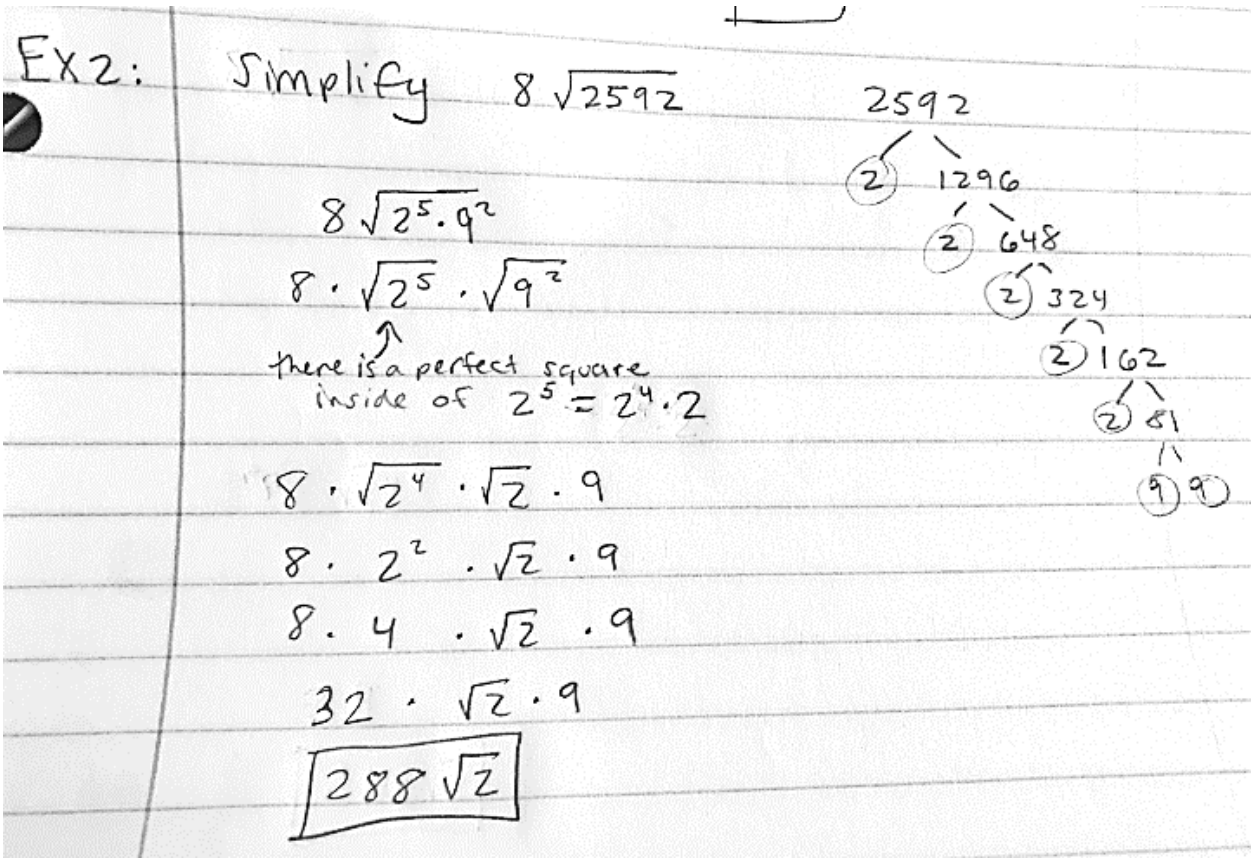
4. Is $0.\overline{3}$ a rational number? Why or why not?

5. List the perfect squares from 1^2 through 20^2. Show your work as needed on your loose-leaf page! Once you are finished, feel free to check your work with a calculator.

$$1^2 = 1$$
$$2^2 = 4$$
$$3^2 = 9$$
$$4^2 = 16$$
$$\vdots$$

Okay now that we have reviewed some core ideas from the beginning of Chapter 11, let's start simplifying some radicals! First, review two examples below to remind yourself what we did in class before break:





Back in your loose-leaf packet, simplify the following expressions. SHOW YOUR WORK (including your factor trees when needed).

Remember, "Beauty is the first test: there is no permanent place in the world for ugly mathematics." (G.H. Hardy…. Clearly we algebra teachers were really enjoying the words of G.H. Hardy over Spring Break 😊 😊)

6. $-\sqrt{\frac{12}{75}}$

7. $\pm\sqrt{\frac{180}{845}}$

8. $\sqrt{864}$

9. $5\sqrt{567}$

☐ ***I have completed these problems to the best of my ability, using the examples to help me.***

Now, check your answers with the answer sheet on the very last page of this packet. *If you got any wrong, try to find the source of your error and correct it*. This does not need to be done in a different color, unless that helps you.

At this point, check in with yourself – do you have any questions about this content or these problems right now? If you do, write those questions here:

My questions at the end of Algebra 1 Lesson 1 (if any):

_____
_____

_____
_____

What action are you going to take to try to answer these questions?

- ☐ Ask my parent or family member.
- ☐ Have my parent help me email Ms. Steger or Ms. Brintnall.
- ☐ I may have to hold on to this question for a later time.

☐ ***I have done the nine Lesson 1 problems in my loose-leaf packet, checked my answers, recorded my questions (if any), and made a plan for answering my questions if needed. I am finished with Lesson 1 of Algebra 1 for Monday March 23rd!***

Tuesday, March 24

Algebra 1 Unit: Chapter 11 Rational and Irrational Numbers
Lesson 2: Square roots of variable expressions

Objective: Be able to do this by the end of this lesson.
Simplify square roots of variable expressions.

Read this quick review to refresh this idea from our class discussions before break. Thanks to coolmath.com for these nice visuals!

$\sqrt{x^2} = ?$

What goes in here?

$(\ )^2 = (\ )(\ ) = x^2$

Is it just x?

What if x = 3?

$\sqrt{(3)^2} = \sqrt{9} = 3$

Yeah, that works.

What if x = -3?

$\sqrt{(-3)^2} = \sqrt{9} = 3$

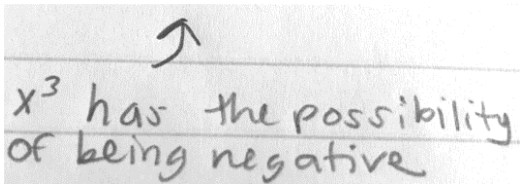
Not the same!

So, $\sqrt{x^2} \neq x$ when x is negative!

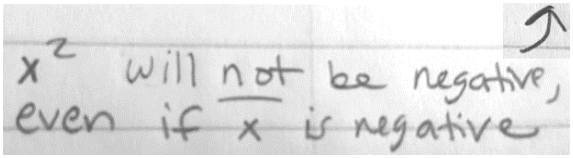
When we simplify an expression, we want to write something that ALWAYS works, not something that works only sometimes. So, we use absolute value bars *when our result from simplifying a square root has the possibility of being negative.*

$\sqrt{x^2} = |x|$

$\sqrt{x^6} = |x^3|$



$\sqrt{x^4} = x^2$



(therefore we don't need absolute value bars)

Read this page carefully, paying special attention to my handwritten notes by the examples:

11-5 Square Roots of Variable Expressions

Objective To find square roots of variable expressions and to use them to solve equations and problems.

Is it always true that $\sqrt{x^2} = x$? Recall that the symbol $\sqrt{\ }$ names the principal, or positive, square root of a positive number. Thus, when $x = -9$, you have

$$\sqrt{(-9)^2} = \sqrt{81} = 9.$$

Therefore, it is not always true that $\sqrt{x^2} = x$. If x is positive, $\sqrt{x^2} = x$, but if x is negative, then $\sqrt{x^2} = -x$. In either case, it *is* true that

$$\sqrt{x^2} = |x|.$$

When you are finding square roots of variable expressions, you must be careful to use absolute value signs when needed to ensure that your answer is positive.

Example 1 Simplify:

a. $\sqrt{196y^2}$ **b.** $\sqrt{36x^8}$ **c.** $\sqrt{m^2 - 6m + 9}$ **d.** $\sqrt{18a^3}$

Solution

a. $\sqrt{196y^2} = \sqrt{196} \cdot \sqrt{y^2} = 14|y|$

b. $\sqrt{36x^8} = \sqrt{36} \cdot \sqrt{(x^4)^2} = 6x^4$ (x^4 is always nonnegative.)

c. $\sqrt{m^2 - 6m + 9} = \sqrt{(m-3)^2} = |m - 3|$

d. $\sqrt{18a^3} = \sqrt{9 \cdot 2 \cdot a^2 \cdot a} = \sqrt{9} \cdot \sqrt{a^2} \cdot \sqrt{2a} = 3a\sqrt{2a}$

Example 2 Solve $9x^2 = 64$.

Solution 1

$$9x^2 = 64$$
$$9x^2 - 64 = 0$$
$$(3x + 8)(3x - 8) = 0$$
$$3x = -8 \text{ or } 3x = 8$$
$$x = -\frac{8}{3} \text{ or } x = \frac{8}{3}$$

making everything equal to zero and factoring.

Check: $9\left(\frac{8}{3}\right)^2 \stackrel{?}{=} 64$ and $9\left(-\frac{8}{3}\right)^2 \stackrel{?}{=} 64$

$64 = 64$ ✓ and $64 = 64$ ✓

$\therefore$ the solution set is $\left\{\frac{8}{3}, -\frac{8}{3}\right\}$. *Answer*

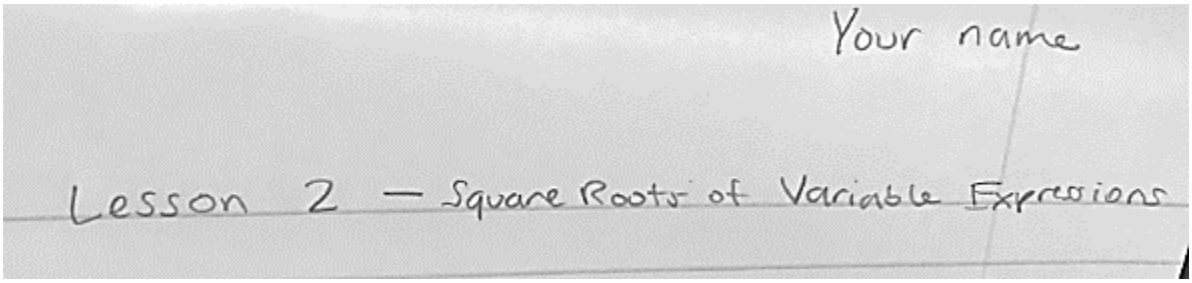
Solution 2

$$9x^2 = 64$$
$$x^2 = \frac{64}{9} \rightarrow \sqrt{x^2} = |x|$$
$$x = \pm\sqrt{\frac{64}{9}} \quad |x| = \sqrt{\frac{64}{9}}$$
$$x = \pm\frac{8}{3} \quad |x| = \frac{8}{3}$$

$x = \frac{8}{3}$ $x = -\frac{8}{3}$

The second solution of Example 2 is based upon the following property.

Now it's time for your second item for your loose-leaf packet! *Start a new sheet of loose-leaf* and title your page like this. Then answer the questions with numbers next to them.



1. $\sqrt{x^{24}y^6} = x^{12}|y^3|$ because $x^{12} \cdot x^{12} = x^{24}$ and $y^3 \cdot y^3 = y^6$. What is $\sqrt{m^{36}p^{98}}$?

Simplify.

2. $\sqrt{100z^2}$
3. $\sqrt{32b^4}$
4. $\pm\sqrt{\frac{256}{400s^6}}$
5. $\sqrt{16x^{16}y^2}$
6. $\sqrt{1.96k^6}$
7. $\sqrt{y^2 - 8y + 16}$ (look at Example 1 letter c to help you on this one!)

Solve.

To remind you what we say in class: Isolate the variable, use equal sign highway, use inverse operations! You can also use Example 2 to help you.

8. $0 = m^2 - 81$
9. $50b^2 - 450 = 0$
10. $0 = 80b^2 - 125$

☐ ***I have completed these problems to the best of my ability, using the examples to help me.***

Now, check your answers with the answer sheet on the very last page of this packet. *If you got any wrong, try to find the source of your error and correct it*. This does not need to be done in a different color, unless that helps you.

At this point, check in with yourself – do you have any questions about this content or these problems right now? If you do, write those questions here:

My questions at the end of Algebra 1 Lesson 2 (if any):

_____
_____

_____
_____

What action are you going to take to try to answer these questions?

- ☐ Ask my parent or family member.
- ☐ Email Ms. Steger or Ms. Brintnall.
- ☐ I may have to hold on to this question for a later time (if you also had questions on Lesson 1, it may not be a good idea to select this one – seek out help! We are available over email).

- ☐ ***I have done the ten Lesson 2 problems in my loose-leaf packet, checked my answers, recorded my questions (if any), and made a plan for answering my questions if needed. I am finished with Lesson 2 of Algebra 1 for Tuesday March 24th!***

Wednesday, March 25

Algebra 1 Unit: Chapter 11 Rational and Irrational Numbers
Lesson 3: Multiplying, Dividing, and Simplifying Radicals

Objective: Be able to do this by the end of this lesson.
Multiply and divide radicals. Rationalize the denominator when the denominator is irrational.

First, a reminder of what we discussed in class before the break.

$\frac{7}{3}$ represents taking 7 and dividing it into 3 groups.

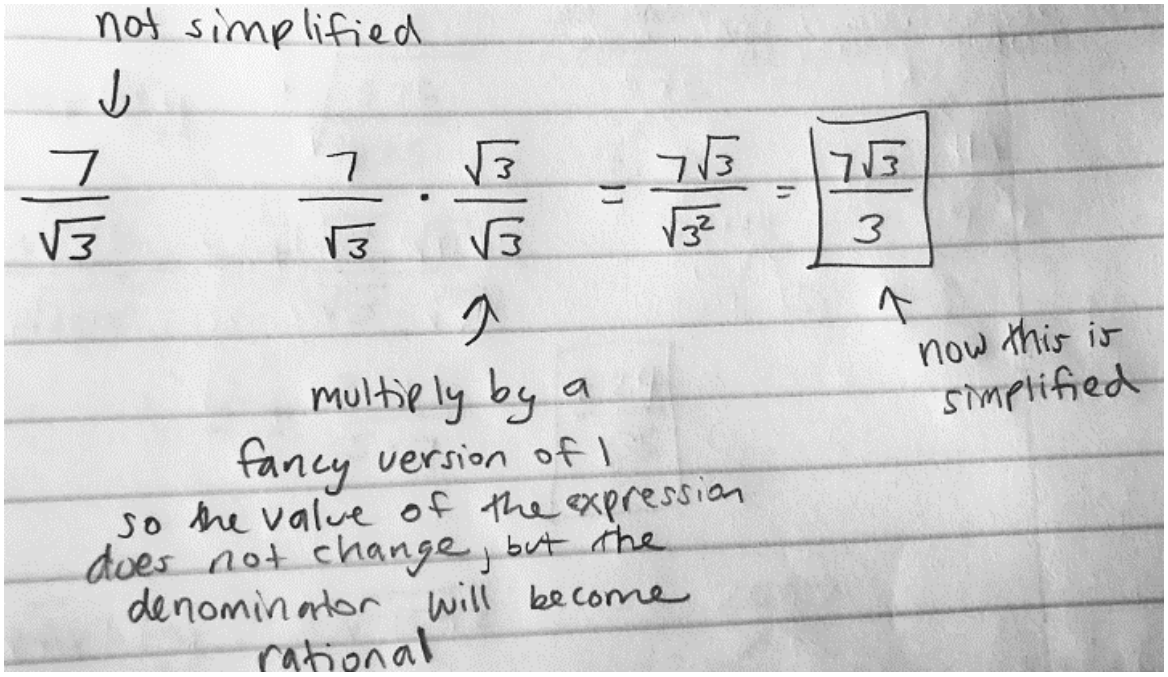
$-\frac{90}{6}$ represents taking -90 and dividing it into 6 groups.

Now imagine $\frac{7}{\sqrt{3}}$. This would mean taking 7 and dividing it into $\sqrt{3}$ groups. What would $\sqrt{3}$ groups look like????

$\sqrt{3}$ is an IRRATIONAL number whose decimal version goes on forever without a pattern. It is approximately 1.732050807568877293527446341505872366942805253810380628055 80….

So we can't take 7 and divide it into $\sqrt{3}$ groups because the denominator is IRRATIONAL!

Therefore, $\frac{7}{\sqrt{3}}$ is NOT SIMPLIFIED. We have to do some algebra to *make the denominator rational* in order to simplify the expression. We call this process <u>rationalizing the denominator.</u>



Before we do some practice problems in your loose-leaf packet, review these examples from the textbook as well. Notice that I circled the fancy versions of 1 that the textbook used on the problems, or showed how they simplified the radicand in letter d).

Example 3 Simplify: a. $\frac{3}{\sqrt{5}}$ b. $\sqrt{\frac{7}{8}}$ c. $\frac{9\sqrt{3}}{\sqrt{24}}$ d. $\sqrt{3\frac{3}{7}} \cdot \sqrt{2\frac{1}{3}}$

fancy version of 1

Solution

a. $\frac{3}{\sqrt{5}} = \frac{3}{\sqrt{5}} \cdot \frac{\sqrt{5}}{\sqrt{5}} = \frac{3\sqrt{5}}{(\sqrt{5})^2} = \frac{3\sqrt{5}}{5}$

fancy 1

b. $\sqrt{\frac{7}{8}} = \frac{\sqrt{7}}{\sqrt{8}} = \frac{\sqrt{7}}{2\sqrt{2}} = \frac{\sqrt{7}}{2\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{\sqrt{7 \cdot 2}}{2(\sqrt{2})^2} = \frac{\sqrt{14}}{4}$

c. $\frac{9\sqrt{3}}{\sqrt{24}} = \frac{9\sqrt{3}}{2\sqrt{6}} = \frac{9\sqrt{3}}{2\sqrt{6}} \cdot \frac{\sqrt{6}}{\sqrt{6}} = \frac{9\sqrt{18}}{2(\sqrt{6})^2} = \frac{9\sqrt{9 \cdot 2}}{2 \cdot 6} = \frac{9 \cdot 3\sqrt{2}}{2 \cdot 6} = \frac{9\sqrt{2}}{4}$

d. $\sqrt{3\frac{3}{7}} \cdot \sqrt{2\frac{1}{3}} = \sqrt{\frac{24}{7}} \cdot \sqrt{\frac{7}{3}} = \sqrt{\frac{24}{7} \cdot \frac{7}{3}} = \sqrt{8} = 2\sqrt{2}$

$\sqrt{4} \cdot \sqrt{2}$

Example 4 Multiply. Assume that all variables represent positive real numbers.

a. $3\sqrt{ab^2}(-2\sqrt{a})$ b. $\sqrt{r}(5 - \sqrt{r})$

Solution

a. $3\sqrt{ab^2}(-2\sqrt{a}) = 3(-2)\sqrt{ab^2 \cdot a} = -6\sqrt{a^2b^2} = -6ab$

b. $\sqrt{r}(5 - \sqrt{r}) = 5\sqrt{r} - (\sqrt{r})^2 = 5\sqrt{r} - r$

Oral Exercises

Simplify.

1. $\sqrt{2} \cdot \sqrt{5}$ $\sqrt{10}$
2. $\frac{\sqrt{32}}{\sqrt{2}}$ 4
3. $\frac{\sqrt{45}}{\sqrt{5}}$ 3
4. $4\sqrt{2} \cdot \sqrt{3}$ $4\sqrt{6}$
5. $\sqrt{3} \cdot \sqrt{6}$ $3\sqrt{2}$
6. $\sqrt{3} \cdot \sqrt{12}$ 6
7. $\frac{\sqrt{18}}{\sqrt{3}}$ $\sqrt{6}$
8. $\frac{\sqrt{48}}{\sqrt{2}}$ $2\sqrt{6}$
9. $\frac{\sqrt{5}}{\sqrt{15}}$ $\frac{\sqrt{3}}{3}$
10. $\sqrt{\frac{2}{7}}$ $\frac{\sqrt{14}}{7}$

Written Exercises

Simplify. Assume that all variables represent positive real numbers.

A

1. $5\sqrt{3} \cdot 2\sqrt{3}$
2. $4\sqrt{7} \cdot 2\sqrt{7}$
3. $\sqrt{3} \cdot \sqrt{3} \cdot \sqrt{4}$
4. $\sqrt{5} \cdot \sqrt{5} \cdot \sqrt{9}$
5. $2\sqrt{5} \cdot \sqrt{7}$
6. $6\sqrt{2} \cdot \sqrt{5}$
7. $\sqrt{3} \cdot \sqrt{27}$
8. $\sqrt{5} \cdot \sqrt{20}$
9. $\sqrt{11} \cdot \sqrt{44}$
10. $\sqrt{7} \cdot \sqrt{35}$
11. $6\sqrt{72}$
12. $9\sqrt{242}$
13. $\sqrt{\frac{3}{8}} \cdot \sqrt{\frac{8}{3}}$
14. $\sqrt{\frac{4}{9}} \cdot \sqrt{\frac{18}{4}}$
15. $\sqrt{\frac{8}{11}} \cdot \sqrt{\frac{22}{32}}$
16. $\sqrt{\frac{7}{3}} \cdot \sqrt{\frac{3}{28}}$
17. $\sqrt{\frac{3}{4}} \cdot \sqrt{\frac{8}{9}}$
18. $\sqrt{\frac{4}{5}} \cdot \sqrt{\frac{10}{36}}$
19. $\sqrt{3\frac{3}{5}} \cdot \sqrt{2\frac{1}{2}}$
20. $\sqrt{2\frac{2}{5}} \cdot \sqrt{1\frac{2}{3}}$

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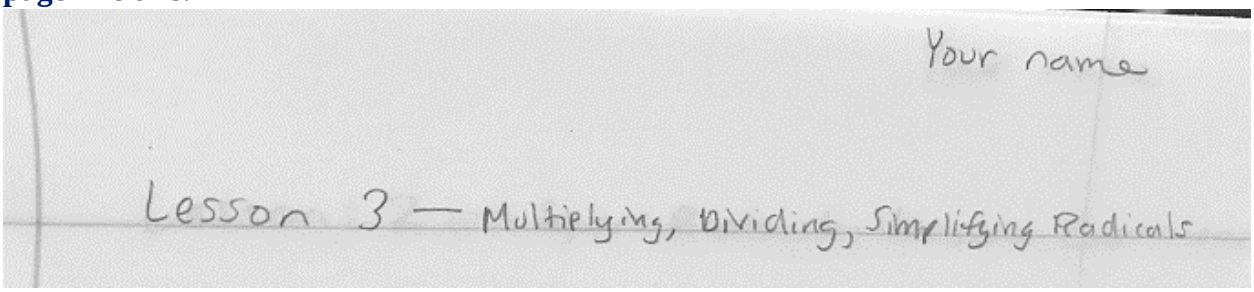
Your third item for your loose-leaf packet! *Start a new sheet of loose-leaf* and title your page like this.



Now complete Written Exercises #2-20 evens from page 538 (on the previous page of this packet).

- ☐ ***I have completed these problems to the best of my ability, using the examples to help me.***

Now, check your answers with the answer sheet on the very last page of this packet. *If you got any wrong, try to find the source of your error and correct it*. This does not need to be done in a different color, unless that helps you.

At this point, check in with yourself – do you have any questions about this content or these problems right now? If you do, write those questions here:

My questions at the end of Algebra 1 Lesson 3 (if any):

_____
_____

_____
_____

What action are you going to take to try to answer these questions?

- ☐ Ask my parent or family member.
- ☐ Email Ms. Steger or Ms. Brintnall.
- ☐ I may have to hold on to this question for a later time.

- ☐ ***I have done the ten Lesson 3 problems in my loose-leaf packet, checked my answers, recorded my questions (if any), and made a plan for answering my questions if needed. I am finished with Lesson 3 of Algebra 1 for Wednesday March 25th!***

Thursday March 26

Algebra 1 Unit: Chapter 11 Rational and Irrational Numbers
Lesson 4: Adding and Subtracting Radicals

Objective: Be able to do this by the end of this lesson.
Simplify sums and differences of radicals.

11-8 Adding and Subtracting Radicals is the first section in this packet we had NOT discussed in class before break. However, it is very logical and builds on all the ideas we just reviewed. First, a review of like terms, an idea we are very familiar with. Thanks to coolmath.com for these nice visuals!

We want to add these terms:

$\sqrt{2} + \sqrt{8}$

First simplify every term:

$\sqrt{2}$ **is already done. Now** $\sqrt{8} = \sqrt{4 \cdot 2} = \sqrt{4}\sqrt{2} = 2\sqrt{2}$

So, $\sqrt{2} + \sqrt{8} = \sqrt{2} + 2\sqrt{2}$

Now, we can treat the radicals like variables.

$y + 2y = 3y$
$\sqrt{2} + 2\sqrt{2} = 3\sqrt{2}$

Just like y **and** $2y$ **are like terms,** $\sqrt{2}$ **and** $2\sqrt{2}$ **are like terms!**

Here's another one:

$$\sqrt{48} - \sqrt{3} + \sqrt{75} = \sqrt{16 \cdot 3} - \sqrt{3} + \sqrt{25 \cdot 3}$$
$$= 4\sqrt{3} - \sqrt{3} + 5\sqrt{3}$$

You can think of this step as $4x - x + 5x$

$$= 8\sqrt{3}$$

Okay, now that we've got that basic idea down, review the three textbook examples given here:

11-8 Adding and Subtracting Radicals

Objective To simplify sums and differences of radicals.

You can use the distributive property to simplify the sum of $4\sqrt{7}$ and $5\sqrt{7}$ because each term has $\sqrt{7}$ as a common factor.

Example 1 Simplify $4\sqrt{7} + 5\sqrt{7}$.

Solution $4\sqrt{7} + 5\sqrt{7} = (4 + 5)\sqrt{7} = 9\sqrt{7}$

On the other hand, terms that have unlike radicands *cannot* be combined.

Example 2 Simplify $3\sqrt{6} - 2\sqrt{13} + 5\sqrt{6}$.

Solution $3\sqrt{6} - 2\sqrt{13} + 5\sqrt{6} = (3 + 5)\sqrt{6} - 2\sqrt{13} = 8\sqrt{6} - 2\sqrt{13}$

By expressing each radical in simplest form, you can sometimes combine terms in sums and differences of radicals.

Example 3 Simplify $7\sqrt{3} - 4\sqrt{6} + 2\sqrt{48} - 6\sqrt{54}$.

Solution

$$\begin{aligned} 7\sqrt{3} - 4\sqrt{6} + 2\sqrt{48} - 6\sqrt{54} &= 7\sqrt{3} - 4\sqrt{6} + 2\sqrt{16 \cdot 3} - 6\sqrt{9 \cdot 6} \\ &= 7\sqrt{3} - 4\sqrt{6} + 2(4\sqrt{3}) - 6(3 \cdot \sqrt{6}) \\ &= 7\sqrt{3} - 4\sqrt{6} + 8\sqrt{3} - 18\sqrt{6} \\ &= 15\sqrt{3} - 22\sqrt{6} \quad \textit{Answer} \end{aligned}$$

To simplify sums or differences of square-root radicals:
1. Express each radical in simplest form.
2. Use the distributive property to add or subtract radicals with like radicands.

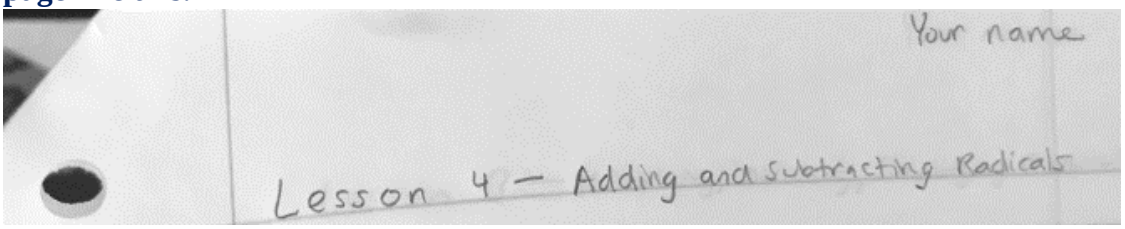
Oral Exercises

State the terms in each expression that can be expressed with the same radicand. Simplify the expression if possible. 6. not possible 9. $4\sqrt{17}$

1. $3\sqrt{5} + 2\sqrt{5}$ $5\sqrt{5}$
2. $8\sqrt{3} - 5\sqrt{3}$ $3\sqrt{3}$
3. $4\sqrt{11} - 8\sqrt{11}$ $-4\sqrt{11}$
4. $6\sqrt{7} + 9\sqrt{7} + 2\sqrt{7}$ $17\sqrt{7}$
5. $8\sqrt{14} - 5\sqrt{14} + \sqrt{3}$
6. $3\sqrt{17} - 3\sqrt{13} + 5\sqrt{11}$
7. $12\sqrt{3} - 7\sqrt{3}$ $5\sqrt{3}$
8. $8\sqrt{15} - 5\sqrt{15} + 7\sqrt{15}$
9. $6\sqrt{17} - 5\sqrt{17} + 3\sqrt{17}$
10. $\sqrt{27} - \sqrt{3}$ $2\sqrt{3}$
11. $\sqrt{48} + \sqrt{3}$ $5\sqrt{3}$
12. $\sqrt{24} + \sqrt{6}$ $3\sqrt{6}$

5. $3\sqrt{14} + \sqrt{3}$ 8. $10\sqrt{15}$

Your fourth item for your loose-leaf packet! *Start a new sheet of loose-leaf* and title your page like this.



Now complete Written Exercises #1-18 on page 541 below. We know 18 problems is a little more than other pages, but some of these are very simple, 1 step problems.

Written Exercises

Simplify.

A
1. $8\sqrt{3} - 6\sqrt{3}$
2. $9\sqrt{5} + 4\sqrt{5}$
3. $-13\sqrt{17} - 7\sqrt{17}$
4. $5\sqrt{80} - 12\sqrt{5}$
5. $5\sqrt{3} + 2\sqrt{75}$
6. $-2\sqrt{24} - 3\sqrt{6}$
7. $3\sqrt{32} - 4\sqrt{63}$
8. $3\sqrt{45} + 7\sqrt{36}$
9. $5\sqrt{28} - 2\sqrt{45}$
10. $-4\sqrt{75} + 3\sqrt{147}$
11. $-11\sqrt{8} - 7\sqrt{12}$
12. $\sqrt{150} - 5\sqrt{96}$
13. $9\sqrt{13} - 6\sqrt{11} + \sqrt{13}$
14. $-4\sqrt{2} + 6\sqrt{72} - 8\sqrt{32}$
15. $5\sqrt{28} + 2\sqrt{7} - \sqrt{14}$
16. $-3\sqrt{72} + 6\sqrt{52} - 7\sqrt{128}$
17. $-\sqrt{338} - \sqrt{200} + \sqrt{162}$
18. $4\sqrt{112} + 5\sqrt{56} - 9\sqrt{126}$

Sample

$$\sqrt{15} - \sqrt{\frac{3}{5}} = \sqrt{15} - \frac{\sqrt{3}}{\sqrt{5}}$$
$$= \sqrt{15} - \frac{\sqrt{3}}{\sqrt{5}}$$
$$= \sqrt{15} - \frac{\sqrt{15}}{5}$$
$$= \frac{5\sqrt{15} - \sqrt{15}}{5}$$
$$= \frac{4\sqrt{15}}{5}$$ *Answer*

B
19. $\sqrt{55} - 7\sqrt{\frac{5}{11}}$
20. $\sqrt{3} - \sqrt{\frac{1}{3}}$
21. $3\sqrt{18} + \sqrt{\frac{2}{25}}$
22. $2\sqrt{75} + \sqrt{\frac{3}{16}}$
23. $\sqrt{\frac{5}{11}} - \sqrt{\frac{11}{5}}$
24. $\sqrt{\frac{2}{7}} - \sqrt{\frac{7}{2}}$
25. $4\sqrt{\frac{5}{6}} - \sqrt{\frac{3}{10}}$
26. $5\sqrt{\frac{16}{3}} - \sqrt{\frac{9}{2}}$
27. $3\sqrt{3} - 2\sqrt{12} + 4\sqrt{\frac{1}{3}}$
28. $8\sqrt{10} - 3\sqrt{40} + 5\sqrt{\frac{1}{10}}$
29. $2\sqrt{\frac{7}{2}} + 4\sqrt{\frac{7}{8}} - \frac{1}{2}\sqrt{98}$
30. $3\sqrt{\frac{5}{12}} + \sqrt{\frac{12}{5}} - \frac{1}{3}\sqrt{60}$
31. $5\sqrt{3}(\sqrt{6} + 2\sqrt{8})$
32. $5\sqrt{2}(4\sqrt{8} - 2\sqrt{12})$

Simplify. Assume that all variables represent positive real numbers.

C
33. $2\sqrt{49x^3} - 3\sqrt{16x^5}$
34. $4\sqrt{72s^4} - 2s\sqrt{200s^2}$
35. $\sqrt{\frac{x^2}{16} + \frac{x^2}{25}}$
36. $\sqrt{\frac{x^2}{49} - \frac{x^2}{121}}$
37. $\sqrt{\frac{x^2}{a^2} + \frac{x^2}{b^2}}$
38. $\sqrt{\frac{x}{a}} - \sqrt{\frac{a}{x}}$

- ☐ ***I have completed these problems to the best of my ability, using the examples to help me.***

Now, check your answers with the answer sheet on the very last page of this packet. *If you got any wrong, try to find the source of your error and correct it*. This does not need to be done in a different color, unless that helps you.

At this point, check in with yourself – do you have any questions about this content or these problems right now? If you do, write those questions here:

My questions at the end of Algebra 1 Lesson 4 (if any):

_____
_____

_____
_____

What action are you going to take to try to answer these questions?

- ☐ Ask my parent or family member.
- ☐ Email Ms. Steger or Ms. Brintnall.
- ☐ I may have to hold on to this question for a later time. (at this point in the week, it is probably not a good idea to hold onto a question, unless it is more of an extension question that you are just curious about).

I have done the eighteen Lesson 4 problems in my loose-leaf packet, checked my answers, recorded my questions (if any), and made a plan for answering my questions if needed. I am finished with Lesson 4 of Algebra 1 for Thursday March 26th!

Friday, March 27

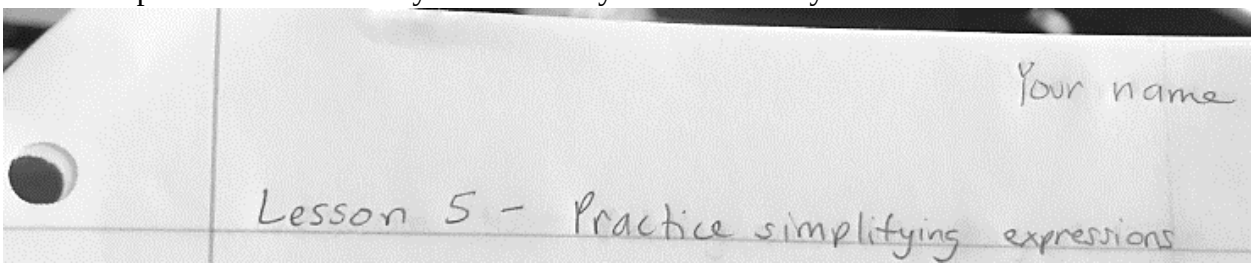
Algebra 1 Unit: Chapter 11 Rational and Irrational Numbers
Lesson 5: Practice simplifying expressions

Your 40 minutes of Algebra 1 today will look roughly like this. *These are estimates to help you manage your time, not requirements.*

A. **20 minutes of practice**
B. **10 minutes of review**
C. **10 minutes for the minor assessment.**

A. 20 minutes of practice

On our last day of this week, we want you to spend time sharpening your algebraic skills before completing some problems that will be counted for accuracy as a minor assessment (quiz). Again, do not worry right now about how you will turn this in. Simply title your pages in your loose-leaf packet as we instruct you and show your work clearly.



Complete problems #20-32 evens on page 541 (this page is shown in Lesson 4 on page 16 of this packet). With these practice problems, you should check the answers after you finish each individual problem so that you can know immediately if you made a mistake. You may even look ahead at the answers to know what type of answer you should get. With this type of practice, seeing the answer ahead of time will not take away from your thought process. *Make sure to show your work in your loose-leaf packet though!! EVERY problem needs work shown!*

- ☐ ***I have completed these problems to the best of my ability, using the answers to check my work as I went along.***

B. 10 minutes of review

The purpose of minor assessments (in our Algebra 1 classes we call these quizzes and sometimes Functions of the Week), is to *make sure you understood something*. It is important that we try problems by ourselves to ensure we really know what to do on our own.

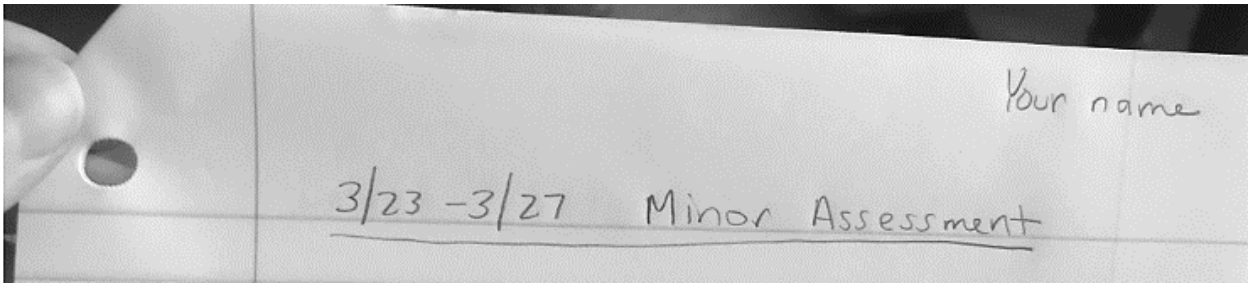
Today's minor assessment allows you to use this packet of notes and your loose-leaf packet that you have been working on all week. However, these should be your ONLY resources. You may NOT get help from a different resource (including the internet or a calculator), or from another person on this minor assessment. **This is the time to ask your parent any questions that you might have BEFORE you start the quiz!!** Even if you don't think you have questions, review the packet for a few minutes to make things fresh in your mind.

C. 10 minutes for the minor assessment.

Please read these boxes carefully before starting on the minor assessment.

- ☐ I understand that I am allowed to use every page of this packet during my quiz.
- ☐ I understand that I am allowed to use the problems in my own loose-leaf packet during my quiz.
- ☐ I understand that while Ms. Steger and Ms. Brintnall estimate that the quiz will take 10 minutes, it is okay to spend the time I need.
- ☐ I understand that I am NOT allowed to ask a parent, family member, or friend for help during my quiz.
- ☐ I understand that I am NOT allowed to use the internet or any other resource to help with my quiz.

Make sure to start on a completely new page of in your loose-leaf packet (NOT on the back of another page). Title your page like you see below:



Simplify:

1. $\sqrt{144m^2n^2}$
2. $\sqrt{0.25a^4}$
3. $\sqrt{c^2 - 10c + 25}$
4. $\sqrt{2\frac{2}{3}}$
5. $-13\sqrt{17} - 7\sqrt{17} + 5\sqrt{17}$
6. $3\sqrt{18} + \sqrt{\frac{2}{25}}$

Solve:

7. $25x^2 - 1 = 15$

At this point, check in with yourself – do you have any questions about this content or these problems right now? If you do, write those questions here:

My questions at the end of Algebra 1 Lesson 5 (if any):

_____
_____

_____
_____

What action are you going to take to try to answer these questions?

- ☐ Ask my parent or family member.
- ☐ Email Ms. Steger or Ms. Brintnall.
- ☐ I may have to hold on to this question for a later time.

- ☐ ***I have finished the 7 practice problems in my loose-leaf packet as well as the 7 quiz questions on my minor assessment page in my loose-leaf packet. I will keep my loose-leaf packet in a safe place until I get further directions about how to turn it in. I am finished with this week of Algebra 1!***

Have a wonderful weekend! 😊 😊 😊

~ Ms. Steger and Ms. Brintnall

Answer Key for Lessons 1, 2, and 3

Lesson 1 – Refresh of Chapter 11	#1-5 are free response. 6. $-\frac{2}{5}$ 7. $\pm\frac{6}{13}$	8. $12\sqrt{6}$ 9. $45\sqrt{7}$ (if you didn't spot that 567 was divisible by 3, remember the trick about the digits adding up to be multiples of 3!)
Lesson 2 – Square Roots of Variable Expressions	1. $m^{18}\lvert p^{49}\rvert$ 2. $10\lvert z\rvert$ 3. $4b^2\sqrt{2}$ 4. $\pm\frac{4}{5s^6}$ 5. $4x^8\lvert y\rvert$	6. $1.4\lvert k^3\rvert$ 7. $\lvert y-4\rvert$ 8. $m=9,-9$ 9. $m=3,-3$ 10. $m=\frac{5}{4},-\frac{5}{4}$
Lesson 3 – Multiplying, Dividing, and Simplifying Radicals	2. 56 4. 15 6. $6\sqrt{10}$ 8. 10 10. $7\sqrt{5}$	12. $99\sqrt{2}$ 14. $\sqrt{2}$ 16. $\frac{1}{2}$ 18. $\frac{\sqrt{2}}{3}$ 20. 2

Answer Key for Lessons 4 and 5

Lesson 4 – Adding and Subtracting Radicals	1. $2\sqrt{3}$ 2. $13\sqrt{5}$ 3. $-20\sqrt{17}$ 4. $8\sqrt{5}$ 5. $15\sqrt{3}$ 6. $-7\sqrt{6}$ 7. $12\sqrt{2}-12\sqrt{7}$ 8. $9\sqrt{5}+42$ 9. $10\sqrt{7}-6\sqrt{5}$	10. $\sqrt{3}$ 11. $-22\sqrt{2}-14\sqrt{3}$ 12. $-15\sqrt{6}$ 13. $10\sqrt{13}-6\sqrt{11}$ 14. 0 15. $12\sqrt{7}-\sqrt{14}$ 16. $-74\sqrt{2}+12\sqrt{13}$ 17. $-14\sqrt{2}$ 18. $16\sqrt{7}-17\sqrt{14}$
Lesson 5 – Practice Simplifying Expressions	20. $\frac{2\sqrt{3}}{3}$ 22. $\frac{41\sqrt{3}}{4}$ 24. $-\frac{5\sqrt{14}}{14}$ 26. $\frac{40\sqrt{3}-9\sqrt{2}}{6}$	28. $\frac{5\sqrt{10}}{2}$ 30. $\frac{7\sqrt{15}}{30}$ 32. $80-20\sqrt{6}$