Monday, August 6, 2018

Convert to decimals:

$\frac{3}{5}$ $\qquad -\frac{2}{7}$ $\qquad \frac{12}{21}$

Convert to fractions:

0.247

12.35

Jul 31-4:26 PM

Foundations of Algebra Unit 1 – Rational and Irrational Numbers Notes

Day 3 - Irrational Numbers

An irrational #s is:

- Any number that can be expressed in the form of a fraction.
- In decimal form, these decimals are NON-repeating and NON-ending.
- In radical form, these radicals are unable to be simplified to an perfect square like.... $\sqrt{9}=3$

Examples: $\pi = 3.14159265358979323846264 3$ ......
$e = 2.71828182845904523536028 7$ ......
$\sqrt{2} = 1.41421356237309504880168$ ......

Estimating Irrational Numbers

Use your calculator to estimate the following irrational numbers, round to the nearest hundredth. 2 places past the decimal

1) $\sqrt{3}$ 1.73 $\qquad$ 2) $\sqrt{17}$ 4.12 $\qquad$ 3) $\sqrt{19}$ 4.36 4.358 $\qquad$ 4) $\sqrt{67}$ ~~8.18~~ 8.19

Graphing Irrational Numbers on a Number Line

When graphing irrational numbers, always remember to convert to a decimal first (if not already in this form), this helps you to gauge its numerical position.

Graph the following irrational numbers on the number line.

1) $\sqrt{37} = 6.08$
2) $\sqrt{29}$
3) $\sqrt{11}$

0 $\sqrt{11}$ $\sqrt{29}$ $\sqrt{37}$

Comparing Rational and Irrational Numbers

Put the following numbers in order from least to greatest (remember to convert to a decimal first!).

1) $\sqrt{10}$, π, $\frac{22}{6}$, 3 $\qquad$ 3, π, $\sqrt{10}$, $\frac{22}{6}$

2) $\sqrt{4}$, e, 1, 2.3 $\qquad$ 1, $\sqrt{4}$, 2.3, e

~~$\sqrt{10}=3.16$~~
~~$\pi=3.14$~~
$\frac{22}{6}=3.60$
~~3=3.00~~

3, π, $\sqrt{10}$, $\frac{22}{6}$

~~$\sqrt{4}=2.00$~~
~~e=2.71~~
~~1=1.00~~
~~2.3=2.30~~

1, 2, 2.3, e

Aug 2-3:23 PM

Foundations of Algebra Unit 1 – Rational and Irrational Numbers Practice

Name Groups $\quad$ KA JD ML $\quad$ MG SH AG $\quad$ IC TD JC $\quad$ MD DF JP Date

The Real Number System Sort

Mark an X for each category that applies.

ONLY THROUGH 24

non repeating π $\quad$ -1,0,1,2 $\rightarrow$ 0,1,2 etc $\rightarrow$ 1,2 etc

	Number	Real	Rational	Irrational	Integer	Whole	Natural
1	-6						
2	62% = .62						
3	0						
4	π/2 = 1.57						
5	2.7						
6	2/5						
7	√7 = 2.64						
8	√25 = 5						
9	1						
10	½						
11	-3						
12	4.75						
13	3π/4						
14	1%						
15	9/2						
16	4 ½						
17	4.5						
18	5√2						
19	2√3/3						
20	2/3						
21	12 5/8 = .66667						
22	1,000,000						
23	-4982						
24	17.1						
25	-17.1						
26	3						
27	√9						
28	3/1						
29	3.0						
30	-15/3						

Aug 2-3:23 PM

Tuesday, August 7, 2018

Classify the following into as many categories as possible:

rational, irrational, integer, whole, and natural

3/5 $\qquad$ -12.643 $\qquad$ 0.4517248...

-16 $\qquad$ 14π $\qquad$ √27

Jul 31-4:26 PM

Foundations of Algebra Unit 1 – Rational and Irrational Numbers Quiz Review

Name ______________________ Date ______________

UNIT 1 QUIZ REVIEW

Compare using <, >, or =. "<" Less than

1. -2 < 4 $\qquad$ 2. -3 > -6 $\qquad$ -6 -3 0

Find the absolute value of the following numbers.

3. |25| = 25 $\qquad$ 4. |-8| = 8 $\qquad$ |-8| = 8 $\quad$ |7| = 7

Give the opposite of each number.

5. 45 $\;$ -45 $\qquad$ 6. -12 $\;$ 12 $\qquad$ 7. -6 $\;$ 6 $\qquad$ 8. 0 $\;$ 0

Classify the following into as many categories as possible – Rational, Irrational, Integer, Whole, Natural irrationals → NON ending & non-repeating decimal

9. -4.5 $\;$ Rational $\qquad$ 10. 8 $\;$ rational integer whole natural

RATIONAL numbers CAN be: (Circle all that apply)

Written as percents
Written as non- terminating decimals
Whole numbers
π
Written as fractions
Written as terminating decimals -4.5
Written as repeating decimals
Simplified square roots
Written as ratios
Zero
Written as non-repeating decimals
Perfect squares

How can we classify zero? Rational, Whole, Integer

Convert the following fractions into decimals.

11. $\frac{12}{17}$ = 0.71 $\qquad$ 12. $1\frac{2}{12}$ = $1.1\overline{6}$ $\qquad$ 13. $-\frac{2}{5}$ = -0.4

Convert the following decimals into fractions.

14. 6.23 = $\frac{623}{100}$ $\qquad$ 15. 0.025 = $\frac{1}{40}$ $\qquad$ 16. -0. 7 = $-\frac{7}{6}$ $\;$ $\frac{-7}{10}$

Aug 2-3:28 PM

Foundations of Algebra Unit 1- Rational and Irrational Numbers

Name ______________________ Date ______________

UNIT 1 Quiz #1

Classifying Numbers.

Classify each number as rational or irrational:

1) $\frac{1}{2}$ = ______ $\qquad$ 2) 3.4872872 .... = ______ $\qquad$ 3. $3\sqrt{100}$ = ______

Name all the sets of numbers to which each belongs. (Irrational, Rational, Integers, Whole, Natural)

4) $\frac{22}{7}$ $\qquad$ 5) $\sqrt{400}$ $\qquad$ 6. 16π

Operations with Rational Numbers.

Evaluate the following expressions:

7) $|-47|$ = ______ $\qquad$ 8) $\left|\frac{3}{4}\right|$ = ______ $\qquad$ 9. $|14.23|$ = ______

Find the Opposite of each number:

10) 27.4 = ______ $\qquad$ 11) -24= ______ $\qquad$ 12) 0 = ______

Converting and Rounding Numbers.

Convert the following fractions into decimals to the nearest hundredth.

13) $\frac{42}{61}$ = ______ $\qquad$ 14) $\frac{116}{84}$ = ______ $\qquad$ 15.) $2\frac{3}{7}$ = ______

Aug 2-3:28 PM

Wednesday, August 8, 2018

Determine the prime factorization of the following numbers:

40 = 2·2·2·5   52   64   125

40 → 10, 4 → 2 5, 2 2

52 → 13, 4

Jul 31-4:26 PM

Quiz Review ?

4) $\frac{22}{7}$ IRRATIONAL < Non ending, non repeating

3.142857143...

6) 16π IRRATIONAL

50.26548246

Aug 8-9:01 AM

Foundations of Algebra Unit 1 – Rational and Irrational Numbers Notes

Name: ______________________ Date: ____________

Day 5 - Simplifying Radical Expressions

A **radical** is any number with a radical symbol ($\sqrt{\ }$).

'4' is the coefficient. Technically, 4 is being multiplied by $\sqrt{10}$.

radical symbol

$4\sqrt[2]{10} = 4\sqrt{10}$

'10' is the radicand. The radicand is the number "in the house".

A **radical expression** is an expression (coefficients and/or variables) with radical.

index → $\sqrt[3]{4x^6}$ ← radical symbol; $4x^6$ radicand

Square Root Table

Complete the table below.

	1	2	3	4	5	6	7	8	9	10	x	11
Square each of the following numbers. Show what squaring a number really means	1^2	2^2	3^2	4^2	5^2	6^2	7^2	8^2	9^2	10^2	x^2	11^2
Perfect Squares	1	4	9	16	25	36	49	64	81	100	x^2	121
Take the square root of each of your perfect squares.	$\sqrt{1}$	$\sqrt{4}$	$\sqrt{9}$	$\sqrt{16}$	$\sqrt{25}$	$\sqrt{36}$	$\sqrt{49}$	$\sqrt{64}$	$\sqrt{81}$	$\sqrt{100}$	$\sqrt{x^2}$	$\sqrt{121}$
Square Roots	1	2	3	4	5	6	7	8	9	10	x	11

Perfect Squares are the product of a number multiplied by itself (4 · 4 = 16, 16 is the perfect square).

$\sqrt{55}$

Think about the process we just performed: **Number → Squared It → Take Square Root → Same Number**

A root and an exponent are **inverses** of each other (they undo each other). Therefore, square roots and squaring a number are **inverses** or they undo each other, just like adding and subtracting undo each other.

Estimating Square Roots

Sometimes the radicand is not a perfect square, cube, etc. In some of these cases, we may be asked to estimate the square root. The square root has to be in between two numbers. So think about the perfect squares that are less than or greater than the number.

Example: $\sqrt{55}$

So 55 is between 49 and 64, so therefore the $\sqrt{55}$ has to be between 7 and 8.

Aug 2-3:31 PM

Foundations of Algebra Unit 1 – Rational and Irrational Numbers Notes

Practice:

1) $\sqrt{17}$ between 4 & 5   2) $\sqrt{90}$ 9 & 10   3) $\sqrt{80}$ 8 & 9   4) $\sqrt{105}$ 10 & 11

When are Radical Expressions in Simplest Form?

A RADICAL expression is in **simplest form** if:

- No perfect square factors other than 1 are in the radicand (ex. $\sqrt{20} = \sqrt{4 \cdot 5}$)
- No perfect squares are under the radical.
- No radicals are in the denominator

Prime Factorization

One of the first steps to simplifying radicals is finding the prime factorization of the radicand. You may remember this as creating a factor tree to find the prime factors. What are prime factors?

A **prime factor** is a number greater than one that only has the factors of one and itself.

Examples: 2, 3, 5, 7, 11, 13, ...

Practice: Find the prime factorization of each number.

1) 54 = 2·3·3·3 (9, 6 → 3 3, 2 3)   Understood 2   2) 45 3·3·5·1 (9, 5 → 3 3, 5 1)   3) 98 = 2·7·7 (14, 7 → 7 2)

Simplifying Radicals

Guided Example: Simplify $\sqrt{108}$.

Step 1: Find the prime factorization of the number inside the radical.	2·2·3·3·3
Step 2: Determine the index of the radical. Since we are only talking about square roots, the index will be 2, which means we will circle all of our two of a kind.	$\sqrt{2 \cdot 2 \cdot 3 \cdot 3 \cdot 3}$
Step 3: Move each circled pair of numbers or variables from inside the radical to outside the radical. List your circled pair as just one factor outside the radical.	$2 \cdot 3\sqrt{3}$
Step 4: Simplify the expressions both inside and outside the radical by multiplying.	$6\sqrt{3}$

108 → 2, 54 → 9, 6 → 3 3, 3 2

$\sqrt[3]{\ }$ $\sqrt{\ } = \sqrt[2]{\ }$

Aug 2-3:31 PM

Foundations of Algebra Unit 1 – Rational and Irrational Numbers Notes

Practice: Simplify. Pick a column

R1 → $\sqrt{x^2}$

1) $\sqrt{45}$ C1 ↓ $3\sqrt{5}$

2) $-\sqrt{98}$ C2 ↓ $-7\sqrt{2}$

3) $\sqrt{48}$ C3 ↓ $= 4\sqrt{3}$ CAL

2 24 → 2 12 → 2 6 → 2 3; 2·2·2·2·3 → $2 \cdot 2\sqrt{3}$ → $4\sqrt{3}$ Factor Tree

4) ~~$2\sqrt{45}$~~ $\sqrt{90}$

5) $\sqrt{20}$

6) ~~$2\sqrt{30}$~~ $\sqrt{30}$

7) $-\sqrt{99}$

8) $\sqrt{108}$

9) $\sqrt{125}$

10) $\sqrt{12}$

11) $\sqrt{200}$

12) $\sqrt{14}$

Aug 2-3:31 PM

Foundations of Algebra Unit 1 – Rational and Irrational Numbers Practice

Name: ______________________ Date: ____________

Day 5 - Simplifying Radical Expressions

Simplify:

1. $\sqrt{18}$ 2. $\sqrt{48}$ 3. $\sqrt{64}$

4. $\sqrt{125}$ 5. $\sqrt{81}$ 6. $\sqrt{54}$

7. $\sqrt{63}$ 8. $\sqrt{27}$ 9. $\sqrt{121}$

10. $\sqrt{40}$ 11. $-\sqrt{26}$ 12. $\sqrt{150}$

13. $\sqrt{90}$ 14. $\sqrt{168}$ 15. $\sqrt{36}$

Aug 2-3:31 PM

Thursday, August 9, 2018

Use prime factorization to simplify the following radicals

Simplify:

1. $\sqrt{18} = \sqrt{3 \cdot 3 \cdot 2}$ — $9\ 2$, $3\ 3$ — $\boxed{3\sqrt{2}}$
2. $\sqrt{125}$
3. $\sqrt{72}$
4. $\sqrt{180}$

Use factor trees on 1 & 2
Use the calculator on 3 & 4

Jul 31-4:26 PM

Foundations of Algebra | Unit 1 – Rational and Irrational Numbers | Notes

Name: T Date: x, y, z, a

Day 6 - Simplifying Radical Expressions with Variables

When simplifying radical expressions, you simplify the variables using the same method as you did previously (Remember $\sqrt{x^2} = x$; square and square roots undo each other).

If I see x^2, that just means $x \cdot x$.

If I see x^3, that just means $x \cdot x \cdot x$.

The power or exponent of the variable tells us how many times to multiply the variable by itself.

2 Simplify the following radical expressions.

1. $\sqrt{x^8} = \sqrt{x \cdot x \cdot x \cdot x \cdot x \cdot x \cdot x \cdot x}$ — $x \cdot x \cdot x \cdot x$ — x^4
2. $\sqrt{x^5} = \sqrt{x \cdot x \cdot x \cdot x \cdot x}$ — $x \cdot x\sqrt{x}$ — $x^2\sqrt{x}$
3. $\sqrt{y^4x^8} = \sqrt{y \cdot y \cdot y \cdot y \cdot x \cdot x \cdot x \cdot x \cdot x \cdot x \cdot x \cdot x}$ — $y \cdot y \cdot x \cdot x \cdot x \cdot x$ — y^2x^4

☆ Please don't enter variables in the calcular!

Understanding Exponents

For some, listing out the variables may be beneficial. Others, may see a pattern for when we have variables as our radicand and choose to follow that pattern as their method.

When we have variables as the radicand, we want to pay attention to their exponents.

When we have an **even exponent**, we are going to take 1/2 out and there will be nothing left under the radical.

When we have an **odd exponent**, we are going to leave 1 under the radical and take 1/2 of the rest out.

Observe Example 1 above, $\sqrt{x^8}$. What was the exponent of the variable? 8 How many 'x's did we take out? 4. Was there anything left under the radical? NO.

Observe Example 2 above, $\sqrt{x^5}$. What was the exponent of the variable? 5 How many 'x's did we take out? 2. Was there anything left under the radical? 1.

Practice: Simplify the following radical expressions.

1. $\sqrt{x^{10}}$ — $\frac{10}{2} = 5$ — x^5
2. $\sqrt{r^{52}}$ — $\frac{52}{2}$ — r^{26}
3. $\sqrt{q^{19}} = \sqrt{q^{18}} \cdot \sqrt{q^1}$ — $\frac{18}{2}$ — $\boxed{q^9\sqrt{q}}$
4. $\sqrt{x^{15}y^7} = \sqrt{x^{14} \cdot x \cdot y^6 \cdot y}$ — $x^7y^3\sqrt{xy}$

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Foundations of Algebra | Unit 1 – Rational and Irrational Numbers | Notes

Putting it All Together

When simplifying radical expressions, you simplify **BOTH** the coefficients and variables using the same method as you did previously (Remember $\sqrt{x^2} = x$; square and square roots undo each other). Remember, anything that is left over stays under the radical!

a. $\sqrt{9x^6}$ KA, AG, TD — $3x^3$

b. $\sqrt{4x^4}$ IC, JD — $2x^2$

c. $\sqrt{32z^7}$ TT, SH — $\sqrt{2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 z^6 \cdot z}$ — $2 \cdot 2z^3\sqrt{2z}$ — $4z^3\sqrt{2z}$ (32: 2 16; 2 8; 2 4; 2 2) (12: 6 2; 3 2)

d. $\sqrt{45y^2}$ JP, JC — $3y^1\sqrt{5}$

e. $\sqrt{108x^5y^9}$ — (108: 2 54; 9 6; 3 3 3 2) — $\sqrt{2 \cdot 2 \cdot 3 \cdot 3 \cdot 3 \cdot x^4 \cdot x \cdot y^8 \cdot y}$ — $2 \cdot 3 \cdot x^2y^4\sqrt{3xy}$ — $6x^2y^4\sqrt{3xy}$

f. $3\sqrt{12x^2}$ DF, ML — $3\sqrt{3 \cdot 2 \cdot 2 x^{2}}$ — $3 \cdot 2x\sqrt{3}$ — $6x\sqrt{3}$

g. $3\sqrt{18a^4}$ MG, MD — $9a^2\sqrt{2}$

h. $-2\sqrt{36f^3g^4}$ — (36: 2 18; 2 9; 3 3) — $-2\sqrt{2 \cdot 2 \cdot 3 \cdot 3 \cdot f^2 \cdot f \cdot g^{4/2}}$ — $-2 \cdot 2 \cdot 3fg^2\sqrt{f}$ — $-12fg^2\sqrt{f}$

i. $5\sqrt{20x^{16}y^{10}}$ — (20: 2 10; 2 5) — $5\sqrt{2 \cdot 2 \cdot 5 \cdot x^{16/2}y^{10/2}}$ — $5 \cdot 2 \cdot x^8y^5\sqrt{5}$ — $10x^8y^5\sqrt{5}$

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Foundations of Algebra | Unit 1 – Rational and Irrational Numbers | Practice

Name ______ Date ______

Day 6 - Simplifying Radical Expressions with Variables

RADICALS ARE IN SIMPLEST FORM WHEN…

- ☆ NO perfect square factors other than 1 are under the radical.
- ☆ NO fractions are under the radical
- ☆ NO radicals are in the denominator

Simplify:

1. $\sqrt{x^6}$	2. $\sqrt{49x^5}$	3. $\sqrt{36y^4}$
4. $\sqrt{16x^2}$	5. $\sqrt{a^3b^5}$	6. $\sqrt{18x^7y^4}$
7. $\sqrt{90x^5y}$	8. $\sqrt{24x^2y^9}$	9. $-2\sqrt{15x^2y^8}$

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Foundations of Algebra | Unit 1 – Rational and Irrational Numbers | Practice

10. $\sqrt{196x^7y^8}$	11. $\sqrt{450c^5}$	12. $3\sqrt{48y^{12}}$
13. $\sqrt{48a^3b^9c^7}$	14. $\sqrt{27x^8}$	15. $\sqrt{121y^{12}}$
16. $\sqrt{81g^4h^8}$	17. $\sqrt{54x^3}$	18. $\sqrt{128x^9y^{12}}$
19. $\sqrt{54x^5}$	20. $\sqrt{98a^3b^6c^7}$	21. $\sqrt{48x^4y^5z^{11}}$

Aug 2-3:33 PM

Friday, August 10, 2018

Simplify the following radicals

1. $\sqrt{a^2b^4}$
2. $\sqrt{49a^8x^{12}}$
3. $\sqrt{32m^7n^{11}}$
4. $\sqrt{20x^{10}y^5}$

Jul 31-4:26 PM

Foundations of Algebra Unit 1 – Rational and Irrational Numbers Notes

Name: ____________________ Date: ____________

Day 7 – Radical Operations

Yesterday, we learned how to simplify radicals. Today, we are going to learn some operations we can perform with radicals. The first operation we will explore is multiplication.

The ________ ________ of ________ states the square root of a product equals the product of the square roots of the factors.

$$\sqrt{ab} = \sqrt{a} \cdot \sqrt{b} \text{ where } a \geq 0 \text{ and } b \geq 0$$

When multiplying radicals, follow the following rules:

Multiplying Radicals – RULES

1. Multiply the ________ together.
2. Multiply the ________ together.
3. ________ the radical.

Directions: Multiply the following radicals. Make sure they are in simplest form.

a. $\sqrt{2} \cdot \sqrt{18}$ b. $\sqrt{5} \cdot \sqrt{10}$ c. $\sqrt{8} \bullet \sqrt{32}$

d. $4\sqrt{6} \bullet 4\sqrt{6}$ e. $-\sqrt{6} \bullet 3\sqrt{8}$ f. $6\sqrt{15} \bullet \sqrt{10}$

Aug 2-3:39 PM

Foundations of Algebra Unit 1 – Rational and Irrational Numbers Notes

Multiplying Radicals with Variables

Recall: Do you remember what the rule is when you multiply two variables with exponents together? Work through the following examples to come up with the rule for multiplying exponents.

1. $x^2 \cdot x^5 =$

2. $a^3 \cdot a^4 =$

3. $y^2 \cdot y^5 \cdot z^2 =$

Law of Exponents: When multiplying expressions with the same bases, ______ the exponents.

$$x^m \cdot x^n =$$

Directions: Multiply the following radicals. Make sure they are in simplest form.

a. $\sqrt{a^3 b} \cdot \sqrt{a \cdot b}$ b. $\sqrt{3x} \bullet \sqrt{15x}$ c. $5\sqrt{2y^3} \cdot \sqrt{32y}$

d. Challenge: $-3\sqrt{8x^4 z} \bullet -7\sqrt{y^3 z^5}$

Adding and Subtracting Radicals

To add and subtract radicals, you have to use the same concept of combining "like terms", in other words, your radicands must be the same before you can add or subtract.

Explore: Simplify the following expressions:

a. $4x + 6x$ b. $5x^2 - 2x^2$ c. $8x^2 + 3x - 4x^2$

Adding/Subtracting Radicals – RULES

1. __________ all radicals.
2. Then add/subtract the ______ radicals.

Aug 2-3:40 PM

Foundations of Algebra Unit 1 – Rational and Irrational Numbers Notes

Practice:

a. $2\sqrt{5} + 6\sqrt{5}$ b. $3\sqrt{7} + 2\sqrt{7}$ c. $4\sqrt{15} - 6\sqrt{15}$

d. $6\sqrt{7} + 8\sqrt{10} - 3\sqrt{7}$ e. $11\sqrt{5} - 2\sqrt{20}$ f. $3\sqrt{3} + 6\sqrt{27}$

g. $3\sqrt{5} + 2\sqrt{500}$ h. $3\sqrt{3} - 2\sqrt{12}$ i. $12\sqrt{50} + 6\sqrt{2}$

Putting it all Together

a. $\sqrt{12}(\sqrt{9} - \sqrt{4})$ b. $\sqrt{3}\left(\sqrt{3} + 2\sqrt{5}\right)$ c. $\sqrt{5}(\sqrt{10} + \sqrt{15})$

Aug 2-3:41 PM

Foundations of Algebra Unit 1 – Rational and Irrational Numbers Practice

Name: ____________________ Date: ____________

Day 7 – Operations with Radicals

Multiply each expression.

1. $8\sqrt{3} \cdot 5\sqrt{2}$	2. $-4\sqrt{5} \cdot 9\sqrt{6}$	3. $3\sqrt{8} \cdot 2\sqrt{5}$
4. $-6\sqrt{32}\left(-6\sqrt{2}\right)$	5. $\sqrt{2x} \cdot \sqrt{6x}$	6. $\sqrt{30x} \cdot \sqrt{3x^3}$
7. $\sqrt{15x^2} \cdot \sqrt{10x^2}$	8. $\sqrt{8x^2} \cdot \sqrt{4x}$	9. $5\sqrt{xy} \cdot 3\sqrt{xy^2}$
10. $\sqrt{2x} \cdot \sqrt{6x}$	11. $\sqrt{10xy} \cdot \sqrt{2xy^2}$	12. $\sqrt{5}\left(\sqrt{15} + \sqrt{2}\right)$
13. $\sqrt{2}\left(\sqrt{8} - 5\right)$	14. $\sqrt{3}\left(1 + \sqrt{27}\right)$	15. $8\sqrt{3}\left(2\sqrt{3} + \sqrt{8}\right)$

Aug 2-3:41 PM

Foundations of Algebra Unit 1 – Rational and Irrational Numbers Practice

Simplify each expression.

1. $\sqrt{150} - 7\sqrt{24}$	2. $-2\sqrt{90} - 5\sqrt{40}$	3. $3\sqrt{98} - 6\sqrt{18}$

4. $\sqrt{2a} - 15\sqrt{7} - 5\sqrt{2a} + 3\sqrt{7}$	5. $-9\sqrt{x} + 4\sqrt{y} - 4\sqrt{x} + 2\sqrt{y}$
6. $x\sqrt{27} + \sqrt{75x^2} + 2x\sqrt{12}$	7. $x\sqrt{63} - x\sqrt{28} + x\sqrt{700}$
8. $5\sqrt{8xy} + 9\sqrt{200xy} + \sqrt{32xy}$	9. $-2\sqrt{54} + 7\sqrt{150} + 3\sqrt{144}$
10. $-10\sqrt{9x} + 3\sqrt{36x} - \sqrt{50x}$	11. $5\sqrt{160x} + 12\sqrt{75x} - 4\sqrt{250x}$

Aug 2-3:41 PM