11-26-18

Aim: SWBAT simplify radical expressions.

HW: Packet Page 13

Quiz Wednesday

Do Now: Correct hw, then top of Page 9

Homework – Square Roots: Rational or Irrational

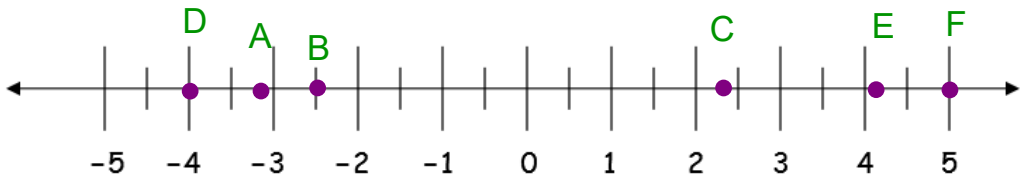
- Step 1 – Decide if the number is a "Perfect Square." Answer yes or no.
- Step 2 – State whether the square root is Rational or Irrational.
- Step 3 – If the square root is Irrational then name the two consecutive whole numbers that the non-perfect square root lies between.
- Step 4 – Round the answer to the nearest whole number.

	-Step 1-	-Step 2-	-Step 3-	-Step 4-
	Perfect Square? Yes or No	Rational or Irrational	2 Consecutive Whole Numbers it Lies Between	Rounded answer to the nearest whole number
EX: $\sqrt{8}$	No	Irrational	2 and 3	3
1) $\sqrt{5}$	No	Irrational	2 & 3	2
2) $\sqrt{21}$	No	Irrational	4 & 5	5
3) $\sqrt{35}$	No	Irrational	5 & 6	6
4) $\sqrt{49}$	Yes	Rational		
5) $\sqrt{75}$	No	Irrational	8 & 9	9
6) $\sqrt{89}$	No	Irrational	9 & 10	9
7) $\sqrt{144}$	Yes	Rational		
8) $\sqrt{162}$	No	Irrational	12 & 13	13
9) $\sqrt{196}$	Yes	Rational		
10) $\sqrt{200}$	No	Irrational	14 & 15	14
11) $\sqrt{40}$	No	Irrational	6 & 7	6
12) $\sqrt{400}$	Yes	Rational		

$\sqrt{16}$ $\sqrt{17}$ $\sqrt{25}$

between 4 and 5
closer to 4

13) Use the number line below to graph the following: A $-\pi$, B $-2\frac{4}{8}$, C 2.3, D $-\sqrt{16}$, E $\sqrt{17}$, F $\sqrt[3]{125}$



State whether the following numbers are RATIONAL or IRRATIONAL.

14) π Irrational

15) $0.\overline{3}$ Rational

16) $\sqrt{64}$ Rational

17) 0.242242224... Irrational

18) 2.17 Rational

19) $\sqrt{21}$ Irrational

20) 24 Rational

21) $-2\frac{1}{3}$ Rational

22) $\sqrt{100}$ Rational

23) $\sqrt[3]{8}$ Rational

24) $-\sqrt{4}$ Rational

25) $\sqrt[3]{-729}$ Rational

Evaluate.

26) $\sqrt{225}$ = 15

27) $-\sqrt{64}$ = -8

28) $\pm\sqrt{1}$ = ±1

29) $-\sqrt{9}$ = -3

30) $\sqrt[3]{-343}$ = -7

31) $\sqrt[3]{125}$ = 5

32) $\sqrt[3]{64}$ = 4

33) $\sqrt[3]{27}$ = 3

When we simplify a fraction, we take out as many common factors as we can.

$$\frac{225}{675} \div \frac{25}{25} = \frac{9}{27} \div \frac{9}{9} = \frac{1}{3}$$

When we simplify a radical (square root) we take out as many perfect squares as we can.

AIM: SWBAT simplify radical expressions.

DO NOW:
List the first 15 Perfect Square.

1, 4, 9, 16, 25, 36, 49, 64, 81, 100, 121, 144, 169, 196, 225

When is a square root in simplest form?
When its radicand **DOES NOT** contain any perfect square factors other than 1.

the # inside the $\sqrt{}$

There are two ways to simplify a radical expression:

Method 1: Find the **largest perfect square** that is a factor of that number.

Example: $\sqrt{20}$ $\sqrt{20} = \sqrt{4 \cdot 5} = \sqrt{4} \cdot \sqrt{5} = 2\sqrt{5}$ (perfect square)

$\sqrt{20} = 2\sqrt{5}$

$\sqrt{4} \cdot \sqrt{5}$
$2 \cdot \sqrt{5}$
$2\sqrt{5}$

1) $\sqrt{75}$
$\sqrt{25 \cdot 3}$
$\sqrt{25} \cdot \sqrt{3}$
$5 \cdot \sqrt{3}$
$5\sqrt{3}$

2) $\sqrt{24}$
$\sqrt{4 \cdot 6}$
$\sqrt{4} \cdot \sqrt{6}$
$2 \cdot \sqrt{6}$
$2\sqrt{6}$

3) $\sqrt{200}$
$\sqrt{100 \cdot 2}$
$\sqrt{100} \cdot \sqrt{2}$
$10\sqrt{2}$

4) $4\sqrt{27}$
$4 \cdot \sqrt{27}$
$4 \cdot \sqrt{9 \cdot 3}$
$4 \cdot \sqrt{9} \cdot \sqrt{3}$
$4 \cdot 3 \cdot \sqrt{3}$
$12\sqrt{3}$

5) $\sqrt{50}$
$\sqrt{25 \cdot 2}$
$\sqrt{25} \cdot \sqrt{2}$
$5\sqrt{2}$

6) $3\sqrt{63}$
$3 \cdot \sqrt{9 \cdot 7}$
$3 \cdot \sqrt{9} \cdot \sqrt{7}$
$3 \cdot 3 \cdot \sqrt{7}$
$9\sqrt{7}$

7) $\sqrt{50y^2}$
$\sqrt{50} \cdot \sqrt{y^2}$
$\sqrt{25 \cdot 2} \cdot y$
$\sqrt{25} \cdot \sqrt{2} \cdot y$
$5 \cdot \sqrt{2} \cdot y$
$5y\sqrt{2}$

8) $4\sqrt{45}$
$4 \cdot \sqrt{9 \cdot 5}$
$4 \cdot \sqrt{9} \cdot \sqrt{5}$
$4 \cdot 3 \cdot \sqrt{5}$
$12\sqrt{5}$

Method 2: Use its **prime factorization** to find all the perfect squares.

Example: $\sqrt{20} = \sqrt{2 \cdot 2 \cdot 5} = \sqrt{2^2 \cdot 5} = 2\sqrt{5}$

9) $\sqrt{75}$

10) $\sqrt{24}$

11) $\sqrt{200}$

12) $\sqrt{27}$

$\sqrt{x} = \sqrt{x}$

$\sqrt{x^2} = x$

$\sqrt{x^3} = \sqrt{x^2 \cdot x}$

$\sqrt{x^2} \cdot \sqrt{x}$

$x \cdot \sqrt{x}$

$x\sqrt{x}$

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

$\sqrt{x^2} \cdot \sqrt{x^2}$

$x \cdot x$

x^2

$\sqrt{x^5} = \sqrt{x^2 \cdot x^2 \cdot x}$

$\sqrt{x^2} \cdot \sqrt{x^2} \cdot \sqrt{x}$

$x \cdot x \cdot \sqrt{x}$

$x^2\sqrt{x}$

$\sqrt{x^6} = \sqrt{x^2 \cdot x^2 \cdot x^2}$

$\sqrt{x^2} \cdot \sqrt{x^2} \cdot \sqrt{x^2}$

$x \cdot x \cdot x$

x^3

$\sqrt{x^8} = x^4$

$\sqrt{x^7} = x^3\sqrt{x}$

Homework - Simplifying Radical Expressions

List the first 15 perfect squares starting with 1.

_____, _____, _____, _____, _____, _____, _____, _____, _____, _____, _____, _____, _____, _____, _____,

Simplify each radical expression. Justify your answer.

1) $\sqrt{63}$

2) $\sqrt{99}$

3) $3\sqrt{99}$

4) $\sqrt{108}$

5) $\sqrt{242}$

6) $\sqrt{128}$

7) $5\sqrt{18}$

8) $3\sqrt{8}$

9) $4\sqrt{200}$

10) $\frac{2}{3}\sqrt{12}$

11) $\frac{1}{3}\sqrt{18}$

12) $\frac{1}{2}\sqrt{20}$