Warm-Up

Take out your homework

Simplify the following expressions:

$$\frac{2x^{4}y^{-4}}{8x^{7}y^{3}}$$

What characteristic of a parabola can be most easily identified when the standard form of a quadratic is given?

a. extremum
b. vertex
c. x-intercept(s)
d. y-intercept

Agenda:

1) Operations (+/-) with RADicals!!! - Notes.

2) Practice in Pairs

3) Individual Art Project

4) Exit Ticket

Rules and Properties: Square Root Expressions in Simplest Form

An expression involving square roots is in *simplest form* if

1. There are no perfect-square factors in a radical.
2. No fraction appears inside a radical.
3. No radical appears in the denominator.

Radicals

Add/Sub and Mult.

There are three important rules when adding and subtracting radicals.

Rule #1 - When adding or subtracting two radicals, you must **simplify the radicands first**.

What is the radicand of: $3\sqrt{5}$

Look at $\sqrt{180} + 7\sqrt{20}$.

What do you notice about the expression?

Let's Take: $\sqrt{180} + 7\sqrt{20}$

In order to add these radicals, you must simplify each radical if it can be simplified.

Simplify $\sqrt{180}$: $2 \cdot 3\sqrt{5}$ $6\sqrt{5}$

180 → 90 · 2 → 30 · 3 → 15 · 2 → 3 · 5

90 → 30 · 3 → 15 · 2 → 3 · 5

Then simplify $7\sqrt{20}$: $7 \cdot 2\sqrt{5} = 14\sqrt{5}$

20 → 4 · 5 → 2 · 2

Rewrite the expression as simplified radicals:

$6\sqrt{5} + 14\sqrt{5}$

Rule #2 - In order to add or subtract two radicals, they must have the **same radicand**.

This is similar to saying that the two radicals must be "like terms".

$\sqrt{180} + 7\sqrt{20}$ = $6\sqrt{5}$ + $14\sqrt{5}$

Do they have the same radicand?

yes

If they do, then simply add the coefficients and leave the radical. $20\sqrt{5}$

If there are no common radicands, then it is simpified.

Can these radicals be added/subtracted?

$3\sqrt{2} + 2\sqrt{3}$ = no

$4\sqrt{5} - 1\sqrt{5} = 3\sqrt{5}$

$22\sqrt{7} - 22\sqrt{6}$ no

$10\sqrt{11} + 24\sqrt{11} = 34\sqrt{11}$

Rule #3: When adding or subtracting, you only add the coefficients. The radicands stay the same.

$$4\sqrt{7} + 10\sqrt{7} = (4 + 10)\sqrt{7} = 14\sqrt{7}$$

Notice: The radicand stays 7!

Simplify the following:

a) $17\sqrt{8} + 5\sqrt{44}$

$17 \cdot 2\sqrt{2}$ $5 \cdot 2\sqrt{11}$

$4 \cdot 2$ $11 \cdot 4$ $(2 \cdot 2)$ $(2 \cdot 2)$

$34\sqrt{2} + 10\sqrt{11}$

b) $20\sqrt{3} - 4\sqrt{27}$

$4 \cdot 3\sqrt{3}$ $9 \cdot 3$ $(3 \cdot 3)$

$20\sqrt{3} - 12\sqrt{3}$

$8\sqrt{3}$

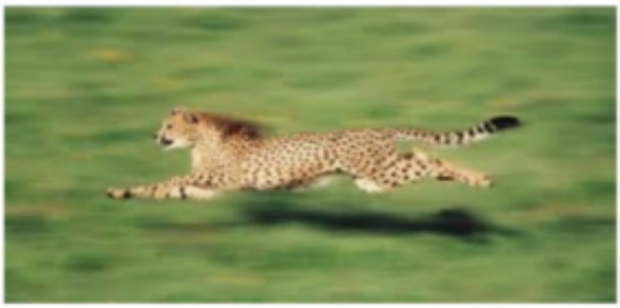
c) $2\sqrt{15} + 7\sqrt{15}$

$9\sqrt{15}$

le #1 - When adding or subtracting two radicals, you must *simplify the radicands first*.

le #2 - In order to add or subtract two radicals, they must have the *same radicand*.

le #3 - When adding or subtracting two radicals, *you only add the coefficients*. The radicand remains the same.



Simplify.

a) $10\sqrt{19} - 7\sqrt{17}$

b) $8\sqrt{7} - 12\sqrt{7} = -4\sqrt{7}$

c) $3\sqrt{6} + 5\sqrt{24}$

$2 \cdot 3$ $\quad 6 \cdot 4$ $\quad 4 \cdot 2$

$5 \cdot 2\sqrt{6}$

$3\sqrt{6} + 10\sqrt{6}$

$13\sqrt{6}$

YOUR TURN: $3\sqrt{5}+2\sqrt{5}+1\sqrt{5}-5\sqrt{5}$

$$\sqrt{45}+\sqrt{20}+\sqrt{5}-\sqrt{125}$$

$9\cdot5$ $5\cdot4$ $1\cdot5$ $25\cdot5$

$3\cdot3$ $2\cdot2$ $5\cdot5$

$3\sqrt{5}$
$2\sqrt{5}$
$1\sqrt{5}$
$-5\sqrt{5}$

$1\sqrt{5}$

$$\sqrt{48}-\sqrt{3}+\sqrt{75}$$

$5\cdot16$ $4\cdot4$

$3\cdot25$ $5\cdot5$

$4\sqrt{3}-\sqrt{3}+5\sqrt{3}$

$8\sqrt{3}$

The distributive property applies to radicals as it does to any other quantity.

Simplify:

$\sqrt{5}(3\sqrt{7}-2\sqrt{6})$

$(\sqrt{5}\cdot3\sqrt{7})-(\sqrt{5}\cdot2\sqrt{6})$

$3\sqrt{35}-2\sqrt{30}$

$3\sqrt{2}(9\sqrt{2}-7)$

$(3\sqrt{2}\cdot9\sqrt{2})-(3\sqrt{2}\cdot7)$

$27\cdot4-21\sqrt{2}$

$54-21\sqrt{2}$

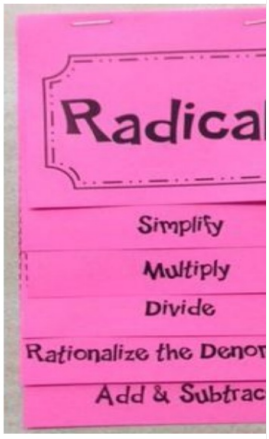
$2\cdot2$

$(4+\sqrt{2})(5+\sqrt{3})$

$(2-\sqrt{5})(3\sqrt{3}-\sqrt{10})$

Art Project

Listen for directions!



Pair Practice

- One riddle sheet for you and your partner.
- Solution on the sheet, work on other paper.
  - Attempt the problem individually (in your own notebook!).
  - Compare work.
  - Check each other's work at the end.

Expectations:

1. Talking volume < Music volume
2. 30 minutes
3. Turn it in once finished.