

Lesson 5.3- SWBAT simplify radical expressions.

Kick off-

1) Simplify the following radicals.

a) $\sqrt{28}$
 $\sqrt{4 \cdot 7} = 2\sqrt{7}$

b) $3\sqrt{72}$
 $3\sqrt{36 \cdot 2} = 3 \cdot 6\sqrt{2} = 18\sqrt{2}$

Perfect Squares: 4, 9, 16, 25, 36, 49, 64, 81, 100

2) Find the inverse ($f^{-1}(x)$) of

a) $f(x) = 3x + 2$
 $\frac{x-2}{3} = f^{-1}(x)$

b) $f(x) = \frac{1}{2}x - 8$
 $x = 2y - 16$
 $x + 16 = 2y$
 $\frac{x+16}{2} = y = f^{-1}(x)$

⑦ 8

⑧ $\frac{3}{8}x - \frac{6}{5} = f^{-1}(x)$

⑨ $8\sqrt{2}$

⑩ $\frac{x-1}{-6} = f^{-1}(x)$

⑪ $\frac{x-7}{4} = f^{-1}(x)$

⑫ $15\sqrt{2}$

⑬ $-3x - 15 = f^{-1}(x)$

⑭ $10\sqrt{10}$

⑮ 12

⑯ $\frac{x-6}{-2} = f^{-1}(x)$

⑰ $15\sqrt{7}$

⑱ $5\sqrt{5}$

⑲ $40\sqrt{2}$

⑳ $x - 2 = f^{-1}(x)$

Perfect Squares involving variables

1) $\sqrt{x^2}$ → x or x

2) $\sqrt{x^4}$ → x^2

3) $\sqrt{x^6}$ → x^3

4) $\sqrt{x^8}$ → x^4

Rule: divide the even exponents by 2.

To Simplify a Radical Expression

- Find the factors of the inside number and one of the factors must be a perfect square.
- Split the inside numbers into two different radicals
- The perfect square, and the highest even exponent variable first and then the other factor and any odd exponent variables.
- Take the square root of the perfect square and divide the variables exponent by 2 and if there is a number on the outside multiply it to the number.

Examples: Put each of the following in simplest radical form.

1) $\sqrt{12}$
 $\sqrt{4 \cdot 3} = 2\sqrt{3}$

2) $\sqrt{6x^6}$
 $\sqrt{36x^4 \cdot 2x^2} = 6x^2\sqrt{2x}$

3) $\sqrt{27x^3}$
 $\sqrt{9x^2 \cdot 3x} = 3x\sqrt{3x}$

4) $\sqrt{-3 \cdot 18y^5}$
 $\sqrt{-36y^4 \cdot 2y} = -6y^2\sqrt{2y}$

5) $\sqrt{63x^2y^6}$
 $\sqrt{9x^2y^4 \cdot 7y^2} = 3xy^2\sqrt{7y^2}$

6) $\sqrt{32x^3y^9}$
 $\sqrt{16x^2y^8 \cdot 2xy} = 4xy^4\sqrt{2xy}$

7) $\sqrt{72x^7y^6}$

8) $9\sqrt{75x^3y^7}$

9) $2\sqrt{50x^5y^7}$

$\sqrt{25x^4y^6} \sqrt{2xy}$

$\rightarrow 5x^2y^3 \sqrt{2xy}$

$10x^2y^3 \sqrt{2xy}$

11) $\sqrt{x^3y^5z^9}$

$\sqrt{x^2y^4z^8} \sqrt{xyz}$

$1xy^2z^4 \sqrt{xyz}$

10) $\sqrt{18x^{10}y^8}$

$\frac{+18}{2 \cdot 9} \sqrt{9x^{10}y^8} \cdot \sqrt{2}$

$3x^5y^4\sqrt{2}$

12) $2\sqrt{45x^5y^6z^3}$

$\sqrt{9x^4y^2z^2} \sqrt{5xz}$

$2 \cdot 3x^2y^2z \sqrt{5xz}$

$6x^2y^2z \sqrt{5xz}$

