## U3 Radical and <br> Exponential Functions

U2 D2

## Warm=up

Simplify:

1. $\left(2 m n^{2}\right)\left(2 m^{7} n^{3}\right)^{4}$
2. $\frac{\left(3 y^{2} z\right)^{-1}}{2 y z^{4}}$
3. $\left(\left(\frac{2\left(a^{4} b\right)}{c^{2} b^{5}}\right)^{0}\right)^{4}$
4. $\frac{g^{-3} h^{6}}{(g h)^{-2}(4 h)}$

What is $x^{0}$ ?
$12^{0}$ ?
$\left(13 x^{2}\right)^{0}$ ?

# Solving Radical Equations 

## To Solve Radical Equations:

Use Reverse order of operations P/LER/MD/AS.
Start at the bottom and work your way up to invert/undo operations until the variable is alone again.
Use an Exponent to undo a radical. The index of the radical and the exponent must match.

## Solving an Equation

 with Rational Exponents- Convert rational exponent to root, then inverse plermdas
- Example:

$$
2 x^{3 / 2}=250
$$

## Solving an Equation with Rational Exponents

- Convert rational exponent to root, then inverse plermdas
- Example:

$$
4 x^{\frac{2}{3}}=16
$$

## Solving an Equation with One Radical

- Convert rational exponent to root (already done), then inverse plermdas
- Example:

$$
\sqrt{4 x-7}+2=5
$$

## Solving an Equation

with Two Realdicgel krinde, मle square both sides!

- Example:

$$
\sqrt{3 x+2}-2 \sqrt{x}=0
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YOU TRYII $\underset{1 .) x-4=\sqrt{2 x}}{\text { (1) }}$
2.) $(x+7)^{3 / 2}-20=7$
3.) $(2 x+5)^{1 / 2}=4$
4.) $\sqrt{x^{2}+5}=x+3$
5.) $\sqrt{x-6}-\sqrt{1 / 3 x}=0$

## $5^{x} * 5^{2}=5^{7} \quad$ 2. $3^{-2} * 3^{x}=3^{2}$

$$
\text { 3. }\left(5^{3}\right)^{x}=5^{6} \quad \text { 4. } \frac{5^{6}}{5^{x}}=5^{4}
$$

$$
5^{x+2}=5^{7}
$$

## Day 4 Warm Up



## Homework

1. $(5,5)$ and $(-5,-5)$
2. $(5,1)$ and (-5, -1)
3. D
4. C
5. ( 0,3 ) and ( $-3,0$ )

Solving radical equations
3.

$$
\begin{gathered}
\sqrt[3]{x+1}^{5}=3^{3} \\
\frac{x+1=27}{x=26} \\
\frac{2}{2}
\end{gathered}
$$

5. $(2 x+3)^{\frac{2}{3}}=9$
6. $\left.\begin{gathered}(x+1)^{\frac{13}{3}}{ }^{\frac{3}{3}}=2^{\frac{3}{3}} \\ x+1=8 \\ x=7 \\ x=7 \\ x=7\end{gathered} \right\rvert\, \begin{gathered}x^{x^{5}}=2^{3} \\ x+1=8 \\ x=7\end{gathered}$

$$
\begin{aligned}
& \sqrt[x]{\sqrt[3]{(2 x+3)^{2}}}=\sqrt[5]{9}
\end{aligned}
$$

6. $(3 x-7)^{\frac{3}{2}}=-32$

$$
\sqrt[{\sqrt[2]{(3 x-7)^{7}}}]{\sqrt[2]{-32}}
$$

$\sqrt[2]{3 x-7}=(-2)^{2}$

$$
3 x-7=4
$$

$3 x=11$
$x=\frac{11}{2}$

## Solving Radical Equations: CHECK YOUR SOLUTION (S)!!

$$
\begin{array}{rl|l}
\text { 1. } \sqrt{x+2}-2=x \\
x^{2}+2 & +2 & =x^{2}+3 x+2 \\
(x+2)(x+1) & \text { 2. } & (3 x-2)^{\frac{1}{2}}=-5 \\
\sqrt[2]{(3 x-2)}=-5^{2} \\
3 x+2 & =(x+2)^{2} & x=-2 \quad x=-1 \\
3 x-2=25 \\
3 x=27 \\
x+2=x^{2}+4 x+4 & & \text { 4. } 3 x^{\frac{4}{3}}+5=53
\end{array}
$$



$$
\begin{aligned}
& 3 \sqrt[3]{x^{4}}+5=53 \\
& \sqrt[{3 \sqrt[3]{x^{4}}}]{4}=48 \\
& \sqrt[3]{x^{4}}=\sqrt[4]{16} \\
& \sqrt[3]{x}=2 \\
& \begin{array}{l}
\sqrt[3]{x}=-2 \\
x=8 \\
\hline
\end{array} x=-8
\end{aligned}
$$

## Applications of radical equations

1. The volume of a sphere is 2145 . If the formula $V=\frac{4}{3} \pi r^{3}$ is used to calculate the volume of a sphere, what is the radius of the sphere?

## Applications of radical equations

2. The equation $v=\sqrt{2.5 r}$ allows you to calculate the maximum velocity, v , that a car can safely travel around a curve with a radius of $r$ feet. This is used by the Department of Transportation to determine the best speed limit for a given stretch of road. If a road has a speed limit of 45 mph , what is the tightest turn on that road?
