
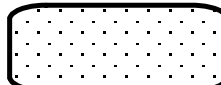
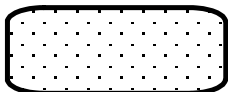


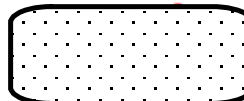
Write each expression in radical form.

1) $(10x)^{\frac{3}{4}}$


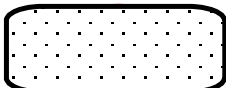
2) $(2x)^{\frac{6}{5}}$


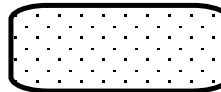
Write each expression in exponential form.

3) $\sqrt{10r}$


4) $(\sqrt{7x})^3$


Simplify.

5) $(x^6)^{\frac{1}{2}}$


6) $(343x^9)^{\frac{2}{3}}$


Notes: 6.2 Applying Prop. of Exponents of Rational Exponents

Review:

$$x^2 \cdot x^3 = \boxed{\text{dotted}}$$

$$(x^3)^2 = \boxed{\text{dotted}}$$

$$x^{-3} = \boxed{\text{dotted}}$$

$$\frac{x^6}{x^2} = \boxed{\text{dotted}}$$

$$(x^2 y)^2 = \boxed{\text{dotted}}$$

$$\left(\frac{x^2}{y^3}\right)^2 = \boxed{\text{dotted}}$$

Properties of Rational Exponents

Let a and b be real numbers and let m and n be rational numbers. The following properties have the same names as those listed on page 330, but now apply to rational exponents as illustrated.

Property	Example
1. $a^m \cdot a^n = a^{m+n}$	$5^{1/2} \cdot 5^{3/2} = 5^{(1/2 + 3/2)} = 5^2 = 25$
2. $(a^m)^n = a^{mn}$	$(3^{5/2})^2 = 3^{(5/2 \cdot 2)} = 3^5 = 243$
3. $(ab)^m = a^m b^m$	$(16 \cdot 9)^{1/2} = 16^{1/2} \cdot 9^{1/2} = 4 \cdot 3 = 12$
4. $a^{-m} = \frac{1}{a^m}, a \neq 0$	$36^{-1/2} = \frac{1}{36^{1/2}} = \frac{1}{6}$
5. $\frac{a^m}{a^n} = a^{m-n}, a \neq 0$	$\frac{4^{5/2}}{4^{1/2}} = 4^{(5/2 - 1/2)} = 4^2 = 16$
6. $\left(\frac{a}{b}\right)^m = \frac{a^m}{b^m}, b \neq 0$	$\left(\frac{27}{64}\right)^{1/3} = \frac{27^{1/3}}{64^{1/3}} = \frac{3}{4}$

Quick practice review:

$$x^{-3}$$

$$\left(\frac{x^2}{y^3}\right)^2$$

$$(3x^2y^3)^4$$

$$x^{-2} \cdot x^{-3}$$

$$3x^{\frac{3}{2}} \cdot 4x^3$$

$$\left(x^{\frac{1}{2}} y^{\frac{4}{5}} \right)^{\frac{4}{3}}$$

Applying Prop to Rational Exponents

$$x^{1/3} \cdot x^{2/3}$$

$$x^{1/2} \cdot x^{1/4}$$

$$\left(\frac{x^{15}}{y^6}\right)^{1/3}$$

$$\sqrt[3]{27x^5y^9}$$

$$\sqrt[4]{32x^5y^4}$$

KEY CONCEPT*For Your Notebook***Properties of Radicals****Product property of radicals**

$$\sqrt[n]{a \cdot b} = \sqrt[n]{a} \cdot \sqrt[n]{b}$$

Quotient property of radicals

$$\sqrt[n]{\frac{a}{b}} = \frac{\sqrt[n]{a}}{\sqrt[n]{b}}, b \neq 0$$

EXAMPLE 3**Use properties of radicals**

Use the properties of radicals to simplify the expression.

a. $\sqrt[3]{12} \cdot \sqrt[3]{18} = \sqrt[3]{12 \cdot 18} = \sqrt[3]{216} = 6$ **Product property**

b. $\frac{\sqrt[4]{80}}{\sqrt[4]{5}} = \sqrt[4]{\frac{80}{5}} = \sqrt[4]{16} = 2$ **Quotient property**

$$\sqrt[3]{125} \cdot \sqrt[3]{8}$$

$$\frac{\sqrt[5]{96}}{\sqrt[5]{3}}$$

To add or subtract radicals, the radicand must be the same! Always simplify the radical.

Adding/Subtracting *must have common radicand!

$$3\sqrt{2} + 8\sqrt{2}$$

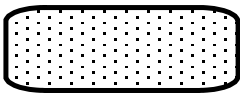
$$3(2)^{1/3} - 4(2)^{1/3}$$

$$4\sqrt[3]{54} - 3\sqrt[3]{2}$$

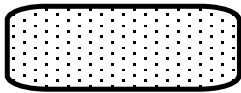
What do you do if it doesn't have the same radicand? Simplify the radical to see if it will be the same.

Simplify.

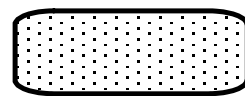
1) $-2\sqrt{12} + 3\sqrt{12}$



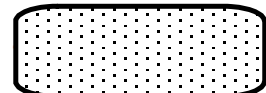
3) $-3\sqrt{3} + 3\sqrt{6} - 2\sqrt{24}$





2) $-3\sqrt{24} + 3\sqrt{54}$



4) $-3\sqrt{8} - 3\sqrt{8} - 3\sqrt{54}$



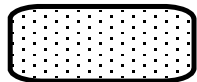
 <https://create.kahoot.it/details/30379d87-fd8f-48ed-bc58-4c9ba0f064c3>

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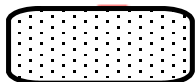
Whiteboard Practice

Simplify.

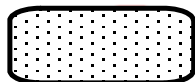
1) $-2\sqrt{18} - 2\sqrt{18}$



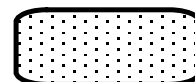
3) $-3\sqrt{27} + 2\sqrt{27}$



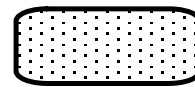
5) $-2\sqrt{18} + 3\sqrt{2}$



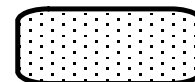
2) $-\sqrt{3} + 2\sqrt{3}$



4) $-\sqrt{6} + 2\sqrt{24}$

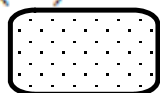


6) $-2\sqrt{8} - \sqrt{18}$

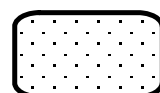


Write each expression in radical form.

1) $(7n)^{\frac{1}{2}}$



2) $n^{\frac{5}{6}}$



Write each expression in exponential form.

3) $(\sqrt[5]{x})^7$

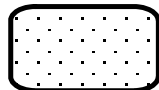


4) $(\sqrt[5]{3a})^7$

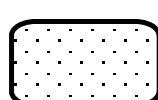


Simplify.

5) $(216r^6)^{\frac{4}{3}}$

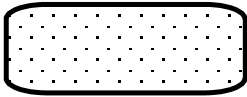


6) $(81b^2)^{\frac{3}{2}}$

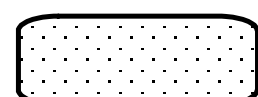


Simplify.

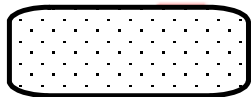
1) $\sqrt[3]{81m^2}$



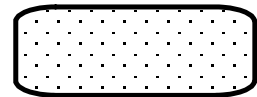
2) $\sqrt[4]{324k^5}$



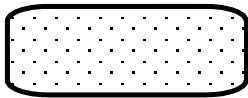
3) $\sqrt{384x^3}$



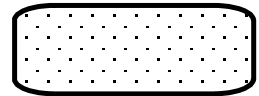
4) $\sqrt[3]{54x^7}$



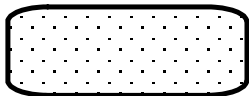
5) $\sqrt{200a^4b^3}$



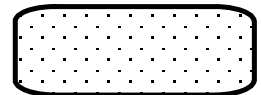
6) $\sqrt[3]{512x^6y^8}$



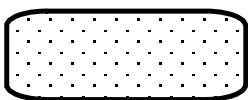
7) $6\sqrt{32p}$



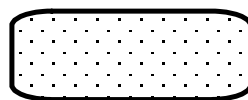
8) $-7\sqrt{108v^3}$



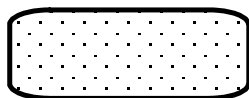
5) $\sqrt{4b} \cdot \sqrt{4b^2}$



6) $\sqrt[6]{4x^2} \cdot \sqrt[6]{400x^4}$



7) $-2\sqrt[4]{10b^4} \cdot 2\sqrt[4]{375b^2}$



8) $-2\sqrt[3]{-6p^2} \cdot 3\sqrt[3]{12p^4}$

