Let u and v be real numbers, variables, or algebraic expressions, and m and n be positive integers greater than 1. We assume that all of the roots are real numbers and all of the denominators are not zero.

Property

1.
$$\sqrt[n]{uv} = \sqrt[n]{u} \cdot \sqrt[n]{v}$$

2. $\sqrt[n]{u} = \sqrt[n]{u}$

3. $\sqrt[m]{v} = \sqrt[m]{u}$

4. $\sqrt[n]{u} = u$

5. $\sqrt[n]{u} = \left(\sqrt[n]{u}\right)^m$

6. $\sqrt[n]{u} = \left(\sqrt[n]{u}\right)^m$

Example

$$\sqrt{75} = \sqrt{25 \cdot 3} = \sqrt{15} \cdot \sqrt{3} = \sqrt{3} = \sqrt{3}$$

$$\sqrt[n]{496} = 4\sqrt{96} = 4\sqrt{96} = 4\sqrt{16} = 2$$

$$\sqrt[n]{496} = 2$$

$$\sqrt[n]{496} = 2$$

$$\sqrt[n]{496} = 2$$

$$\sqrt[n]{496} = 2$$

$$\sqrt[n]{496}$$

AM: Prime Factorization

1. Write 126 as a product of primes.

[A] $2^2 \cdot 3 \cdot 7$

[B] $2 \cdot 3^2 \cdot 5$ [C] $2^2 \cdot 3^2 \cdot 7$

[D] none of these

2.3207

Note: Exponential Notation is a convenient and mathematically Sound system for expressing repeated multiplication.

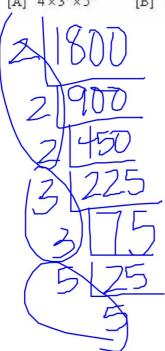


AM: Prime Factorization

2. Which shows 1800 as a product of primes?

[A] $4 \times 3^2 \times 5^2$

[B] $2 \times 3 \times 5$ [C] $2^3 \times 3^2 \times 5^2$ [D] $2 \times 3^2 \times 5^2$



23.32.51

AM:	Cube	and	Fou	irth	Ro	ots
TATATO	Cucc	MIIM	IVU	T CIT	TFF	CU

			di di itoots	19
Simplify: 3	2 = 2 ($(2)^2 = 2^2 + 4$		
1. ₹64	[A] 4	[B] 16	[C] 5	[D] 21 R 1
2. ⁴ √81			2	64
			2	$\frac{32}{116} = 2^{6}$
LO: The _	is _— is equ	root of because ıal to		28 24 2 **********************************
LO: The _	is is equ	root of because ıal to	vou don't	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2
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Slide P-88

٨	N	1.	Cul	20	010	E	0111	+h	D	00	+0
A	IV			ne	and	IF	OUI	Th	K	00	ES

- 3. $\sqrt[3]{-8}$ [A] 2 [B] -2 [C] 4 [D] not a real number

4. ³√-216 What properties of radicals did you use?

LO: The _____ of is _____because ____ is equal to ____ LO: The _____ of ____ because

— is equal to ____

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AM: Simplify nth Roots

Simplify:

1. ∛48

[A] $2\sqrt[3]{6}$ [B] $6\sqrt[3]{2}$ [C] $4\sqrt[3]{12}$ [D] $2\sqrt[3]{12}$

AM: Simplify nth Roots



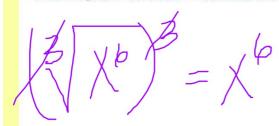


[B] $x^{3/2}$

[C] $x^{1/2}$

[D] x^{18}

Justify your answer with a Property of Radicals. State your answer as a complete sentence.



LO: **The quantity**, cube root of the **6**th **power of x**, cubed is equivalent to _____, by the _____ Property of Radicals.

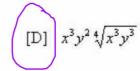
AM: Simplify nth Roots

3. $\sqrt[4]{x^{15}y^{11}}$

[A]
$$x^3y^2 \sqrt{x^3y^3}$$

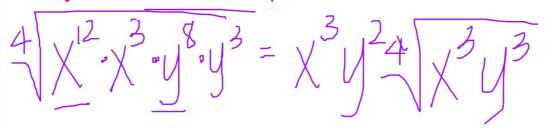
[B]
$$x^3y^3\sqrt[4]{x^3y^2}$$

[A]
$$x^3y^2\sqrt{x^3y^3}$$
 [B] $x^3y^3\sqrt[4]{x^3y^2}$ [C] $x^{11}y^7\sqrt{xy}$



Simplify. Show all work.

Justify your answer with the Properties of Radicals. State your answer as a complete sentence.



LO: The **fourth root** of the **product of** x to the fifteenth and y to the eleventh is equivalent to _____, by the Properties of Radicals.

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AM: Rationalizing denominators

Rationalize the denominator:

1.
$$\frac{\sqrt{15}}{\sqrt{5q}}$$

$$\overbrace{\left[\mathbb{A}\right]} \frac{\sqrt{3q}}{q} \qquad \qquad \left[\mathbb{B}\right] \frac{\sqrt{3}}{q} \qquad \qquad \left[\mathbb{C}\right] \frac{\sqrt{15}}{5q}$$

[B]
$$\frac{\sqrt{3}}{q}$$

[C]
$$\frac{\sqrt{15}}{5g}$$

[D]
$$\sqrt{15}$$

There are multiple ways to begin this problem. The goal is to eliminate radicals from the denominator.

$$\sqrt{\frac{5}{9}} = \sqrt{\frac{3}{9}} = \sqrt{\frac{3}{9}} = \sqrt{\frac{3}{9}}$$

$$\sqrt{\frac{5}{9}} = \sqrt{\frac{3}{9}} = \sqrt{\frac{3}{9}} = \sqrt{\frac{3}{9}}$$

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$$\sqrt{\frac{5}{9}} = \sqrt{\frac{3}{9}} = \sqrt{\frac$$

AM: Rationalizing denominators

2.
$$\frac{\sqrt{108x^7y}}{\sqrt{3x^5y^2}}$$

[A]
$$\frac{\sqrt{36x^2}}{\sqrt{y}}$$

[A]
$$\frac{\sqrt{36x^2}}{\sqrt{y}}$$
 [B] $\frac{\sqrt{324x^{12}y^3}}{\sqrt{3x^5y^2}}$ [C] $\frac{36x^4}{y}$ [D] $\frac{6x\sqrt{y}}{y}$

[C]
$$\frac{36x}{y}$$

$$\mathbb{D} \frac{6x\sqrt{y}}{y}$$

$$\sqrt{\frac{1000 \times^{7} y}{3 \times^{5} y^{2}}} = \sqrt{\frac{36 \times^{2} - 6 \times y}{36 \times^{2} - 6 \times y}} = \sqrt{\frac{36 \times^{2} - 6 \times y}{3}} = \sqrt{\frac{36 \times y}{3}} = \sqrt{\frac{36 \times y}{3}} = \sqrt{\frac{36 \times^{2} - 6 \times y}{3}} = \sqrt{\frac{36 \times^{2} - 6 \times y}{3}}$$

Definition: Rational Exponents

Let u be a real number, variable, or algebraic expression, and n an integer greater than 1, then

If m is a positive integer, $\frac{m}{n}$ is in reduced form, and all roots real numbers, then

$$u^{m/n} = (u^{1/n})^m = (\sqrt[n]{u})^m$$
 and $u^{m/n} = (u^m)^{1/n} = \sqrt[n]{u^m}$

AM: Write Roots as Exponential Expressions

1. Write $\sqrt{6y}$ in exponential form.

[A] $(6y)^{1/2}$ [B] $(6y)^{1/4}$ [C] $(6y)^2$ [D] $6y^2$

 $(0)^{1/2}$

AM: Write Roots as Exponential Expressions

2. Express using fractional exponents: $\sqrt[9]{c^5}$

[A] 5%

[B] c^{9/5}

[C] $c^{5/9}$

[D] $c^{1/45}$

 $\sqrt{C^5} = C^{5/9}$