PRODUCT RULE:

$$\sqrt[a]{x} \cdot \sqrt[a]{y} = \sqrt[a]{xy}$$

Example:

$$\sqrt{10} \cdot \sqrt{x} = \sqrt{10x}$$

QUOTIENT RULE:

$$\frac{\sqrt[a]{x}}{\sqrt[a]{y}} = \sqrt[a]{\frac{x}{y}}$$

Example:

$$\frac{\sqrt{10}}{\sqrt{2}} = \sqrt{\frac{10}{2}} = \sqrt{5}$$

More directly, when determining a product or quotient of radicals and the indices (the small number in front of the radical) are the same then you can rewrite 2 radicals as 1 or 1 radical as 2.

Simplify by rewriting the following using only one radical sign (i.e. rewriting 2 radicals as 1).

1.
$$\sqrt{3} \cdot \sqrt{12}$$

2.
$$\frac{\sqrt{12}}{\sqrt{3}}$$

3.
$$\sqrt{7x} \cdot \sqrt{2y}$$



Simplify by rewriting the following using multiple radical sign (i.e. rewriting 1 radical as 2).

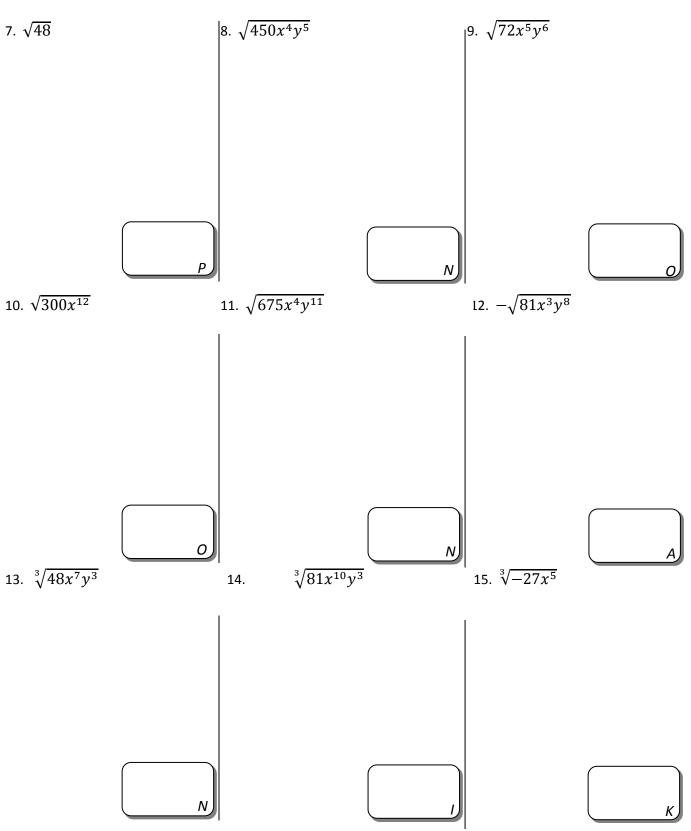
5.
$$\sqrt{\frac{144}{25}}$$

6.
$$\sqrt{\frac{x^6}{121}}$$





Express each radical in simplified form.



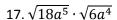
Use the letters and answers to match the answer to the riddle. **Only some answers will be used.**

"What is an opinion without
$$\pi$$
?"

$$-9xy^{4}\sqrt{x} \quad 15x^{2}y^{2}\sqrt{2y} \qquad \qquad 10x^{6}\sqrt{3} \quad 2x^{2}y\sqrt[3]{6x} \quad 3x^{3}y\sqrt[3]{3x} \quad 6x^{2}y^{3}\sqrt{2x} \quad 15x^{2}y^{5}\sqrt{3y}$$

Express each radical in simplified form.

16.
$$\sqrt{6x} \cdot \sqrt{12x}$$

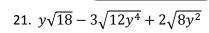


Simplify. Assume that all variable represent positive real numbers.

18.
$$5\sqrt{3} + \sqrt{2} - 2\sqrt{3} + 4\sqrt{2}$$

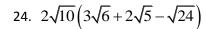
19.
$$\sqrt{108} + 5\sqrt{12} - 4\sqrt{44}$$

20.
$$2\sqrt{150} + \sqrt{18} + 3\sqrt{8} - \sqrt{24}$$



22.
$$x \sqrt{32x^2} + 2 \sqrt{18x^4}$$

23.
$$5\sqrt{18x^4} - 3x\sqrt{8x^2} - x^2\sqrt{2}$$



$$25. \quad \sqrt{2x} \left(\sqrt{6x} + 3\sqrt{x} \right)$$

26.
$$3\sqrt{6a}\left(\sqrt{4a} + 2\sqrt{15a^2}\right)$$





Simplify. Assume that all variable represent positive real numbers and rationalize all denominator
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18. $\frac{3}{\sqrt{5}}$	19. $\frac{6}{\sqrt{3}}$		20. $\frac{3\sqrt{2}}{\sqrt{6}}$	
21. $\sqrt{\frac{16}{27}}$	22. $\frac{\sqrt{12} + 8\sqrt{3} - \sqrt{2}}{\sqrt{2}}$	$2\sqrt{27}$	$23. \frac{\sqrt{2}(\sqrt{12}-\sqrt{3})}{\sqrt{3}}$	