

R2 Day 1

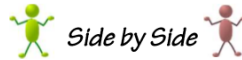
Wednesday, February 8, 2017 1:29 PM

A series of horizontal blue lines for writing, with a vertical red margin line on the left side.

R2 - Exponents

YOU MUST MEMORIZE THE FOLLOWING POWERS and any power of 10 (10^3 , 10^4 , etc)!

$2^2 = 4$	$3^2 = 9$	$4^2 = 16$	$5^2 = 25$	$6^2 = 36$	$13^2 = 169$
$2^3 = 8$	$3^3 = 27$	$4^3 = 64$	$5^3 = 125$	$6^3 = 216$	$14^2 = 196$
$2^4 = 16$	$3^4 = 81$	$4^4 = 256$	$5^4 = 625$	$7^2 = 49$	$15^2 = 225$
$2^5 = 32$	$3^5 = 243$			$7^3 = 343$	$16^2 = 256$
$2^6 = 64$				$8^2 = 64$	$17^2 = 289$
$2^7 = 128$				$8^3 = 512$	$18^2 = 324$
$2^8 = 256$					$19^2 = 361$



The Rules

1. $x^a \cdot x^b = x^{(a+b)}$
 $x^4 \cdot x^6 = x \cdot x \cdot x \cdot x \cdot x \cdot x \cdot x \cdot x$

2. $(x^a)^b = x^{a \cdot b}$

3. $\frac{x^a}{x^b} = x^{a-b}$

4. $(xy)^a = x^a \cdot y^a$

5. $\left(\frac{x}{y}\right)^a = \frac{x^a}{y^a}$

6. $x^{-n} = \frac{1}{x^n}$

7. x^0 , provided $x \neq 0$
 |

Example:

1. $-3b^4 \cdot 10b^5 = -30b^9$

2. $(-5a^6)^2 = (-5)^2 (a^6)^2$
 $= -5a^6 \cdot -5a^6$
 $= 25a^{12}$

3. $\frac{-5x^{10}}{15x^4} = \frac{-x^6}{3} \cdot \frac{1}{3}$

4. $(-3a^4b^6)^3 = (-3)^3 (a^4)^3 (b^6)^3$
 $= -27a^{12}b^{18}$

5. $\left(\frac{-3m^2n^4}{6m^5}\right)^3 = \left(\frac{-1 \cdot n^4}{2m^3}\right)^3$
 $= \frac{(-1)^3 (n^4)^3}{2^3 (m^3)^3} = -\frac{n^{12}}{8m^9}$

6. $-5x^{-4} = \frac{-5}{x^4}$
 eg. $(-5x)^{-4} = \frac{1}{(-5x)^4}$

7. $(4xy^2)^0 = \frac{1}{625x^4}$
 | (provided that $x \neq 0, y \neq 0$)

Simplify, leaving your answer with positive exponents.

$$8. (-2xy^4)(5x^4y^5)^3$$

$$-2xy^4 \cdot 125x^{12}y^{15}$$

$$= \underline{-250x^{13}y^{19}}$$

$$9. \left(\frac{x^6}{y^5}\right)^2 \left(\frac{x^2y}{x}\right)^8$$

$$= \frac{x^{12}}{y^{10}} \cdot \frac{x^{16}y^8}{x^8}$$

$$= \underline{\frac{x^{20}}{y^2}}$$

$$10. \frac{-4x^{-5}y^{-3}z}{8x^2y^{-4}z^2}$$

$$= \underline{\frac{-y}{2x^7z}}$$

$$11. \left(\frac{-6x^8y^3z^{-1}}{8x^4yz^3}\right)^{-2}$$

$$\left(\frac{-3x^4y^2}{4z^4}\right)^{-2}$$

$$= \underline{\frac{16z^8}{9x^8y^4}}$$

12. Challenge Question

$$\left(\frac{5x^3y^{-2}z^4}{-15x^{-4}z}\right)^{-3} \cdot \left(\frac{4x^5y^8z^0}{32z^{-3}y^{15}}\right)^4$$

$$\left(\frac{x^7z^3}{-3y^2}\right)^{-3} \cdot \left(\frac{x^5z^3}{8y^7}\right)^4$$

$$\frac{-27y^6}{x^{21}z^9} \cdot \frac{x^{20}z^{12}}{4096y^{28}}$$

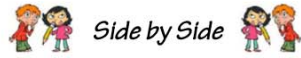
$$= \frac{-27z^3}{4096xy^{22}}$$

$$(60+4)(60+4)$$

$$3600 + 480 + 16$$

$$4000 + 96$$

R2 - Radicals and Exponential form



The Rules

a. $\sqrt[n]{x^m}$

b. $\sqrt[n]{x^m y^m}$

c. $\sqrt[n]{\frac{x}{y}}$

d. $x^{\frac{a}{b}}$

Example:

a. $\sqrt[5]{x^2}$

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

d. $\sqrt[3]{\frac{x}{y^2}}$

d. $16^{\frac{3}{4}}$

I. Evaluate over the real numbers:

1. $36^{\frac{1}{2}}$

2. $27^{\frac{1}{3}}$

3. $\sqrt[3]{-27}$

4. $\sqrt[4]{-16}$

5. $8^{\frac{2}{3}}$

6. $\sqrt[4]{3^{12}}$

7. $\sqrt[4]{625}$

8. $(-49)^{\frac{1}{2}}$

9. $-49^{\frac{1}{2}}$

II: A little harder:

10. $\sqrt[3]{64}$

11. $64^{\frac{4}{3}}$

12. $32^{\frac{7}{5}}$

III: Simplifying Radicals

13. $\sqrt{48}$

14. $\sqrt[3]{-54}$

15. $\sqrt[4]{48}$

16. $\sqrt{48x^6y^{16}z^7}$

17. $\sqrt[3]{24a^9b^{10}c^{17}}$

18. $\sqrt[3]{32} + \sqrt[3]{81}$

19. $\sqrt[3]{16} + \sqrt[5]{64} + \sqrt[5]{2} - 5\sqrt[3]{54}$

IV: Rationalizing

20. $\sqrt{\frac{7x^2}{3}}$

21. $\frac{30}{\sqrt[4]{2x}}$

18. $\frac{8}{\sqrt{3}-\sqrt{5}}$