RH Algebra
Review for Exam

Vocabulary

Zero Exponents	Negative Exponents	Product of Powers	Power of a Power
Power of a Product	Power of a Quotient	Exponential Expression	

Laws of Exponents

- ***Zero power and Negative Exponents*:** $a^0 = 1,\ a \neq 0$

  $$a^{-n} = \frac{1}{a^n} \text{ and } \frac{1}{a^{-n}} = a^n,\ a \neq 0$$

- ***Product of Powers Property*:** $a^m \bullet a^n = a^{m+n}$
- ***Power of a Power Property*:** $(a^m)^n = a^{m \bullet n}$
- ***Power of a Product Property*:** $(a \bullet b)^m = a^m \bullet b^m$
- ***Quotient of Powers Property*:** $\frac{a^m}{a^n} = a^{m-n},\ a \neq 0$
- ***Power of Quotient Property*:** $\left(\frac{a}{b}\right)^m = \frac{a^m}{b^m},\ b \neq 0$

What should you be able to do?

- Simplify exponential expressions (both numerical and algebraic) using laws of exponents and properties of exponents
- Simplify expressions that have fractional exponents
- Solve for a variable using the inverse of its exponent
- Solve for variable exponents

Practice Problem Set

Simplify each exponential expression. ***All simplified expressions must be written with positive exponents.***

1. $3^2 \bullet 3$
2. $\left(2^{-2}\right)^2$
3. $\left(\frac{3}{2}\right)^{-3}$
4. $\left(\frac{4^0 \bullet 5^3}{5^4}\right)^{-2}$
5. $\frac{x^4 \bullet x^{-6}}{x^5}$
6. $\left(\frac{1}{2}x^2\right)^3$
7. $-\left(x^3 y\right)^2$
8. $7x^{-5}y^{-1}$

9. $\left(\frac{2x}{x^2}\right)^4$

10. $\frac{1}{11x^{-2}y^{-7}}$

11. $\left(2^{-1}x^{-10}\right)^4$

12. $\left(-2x^2y\right)\left(x^3y\right)^{-4}$

13. $\frac{x^{-4}}{\left(12y^2\right)^{-2}}$

14. $\left(\frac{x^{-2}y}{x^8y^{-5}}\right)^3$

15. $\frac{3xy^4}{2x^5y} \bullet \frac{6x^{-3}y^2}{4y}$

16. $\left(\frac{4x^2y^{-1}}{xy}\right)^{-3} \div \frac{x^6y^2}{y^4}$

17. $64^{\frac{3}{2}}$

18. $27^{\frac{-4}{3}}$

19. $\left(\frac{125}{-64}\right)^{\frac{2}{-3}}$

20. $\left(\frac{625x^8y^{12}}{81w^4}\right)^{\frac{-3}{4}}$

Solve for the unknown exponent.

21. $8^{x+6} = 8^{11}$

22. $\left(\frac{1}{27}\right)^{16} = 3^{2x+4}$

23. $64^{x+5} = 32^{2x+1}$

24. $\left(\frac{1}{4}\right)^{2x} = (16)^{5x-12}$

25. $\frac{1}{m^3} = (m^b)^{\frac{6}{5}}$

26. $25^{c-4} = \left(\frac{1}{125}\right)^{4c+5}$