

Advanced Algebra - Helpful Review for Units 8 and 9

Rules of Exponents

Name	Example	Rule
Product Of Powers	$x^2 \cdot x^3 = x^5$	When multiplying like bases, add the exponents
Power of a Product	$(x^4)^2 = x^8$	When taking a power to a power, multiply exponents
Power of a Product	$(xy)^3 = x^3y^3$	Everything in the parentheses is affected by the power
Negative Exponent	$a^{-1} = \frac{1}{a}, a \neq 0$	Negative exponent - take the reciprocal
Zero Exponent	$r^0 = 1, r \neq 0$	Anything to the zero power equals one
Quotient of Power	$\frac{y^6}{y^4} = y^2$	When dividing like bases, subtract the exponents
Power of a Quotient	$\left(\frac{x}{y}\right)^2 = \frac{x^2}{y^2}$	Everything in the numerator and denominator is affected by the power

Practice:

1. $5^5 \cdot 5^{-2}$

2. $(3^4)^5$

3. $\left(\frac{4^{-3}}{5}\right)^2$

4. $\left(\frac{2a}{b^{-4}}\right)^3$

5. $(3x^{-5}y)(-4x^3y^{-8})$

6. $(5a^0b^{11})^2(2a^{-4}b)^{-3}$

7. $\frac{-9x^2y^{-3}}{15x^{-2}y^5}$

8. $\frac{(3xy^{-2})^2}{(xy^2)^{-3}}$

9. $\frac{(4x^{-6}y^3)^2(3x^{-1}y)^{-3}}{(5xy^{-6})^2(12xy^5)^0}$

Adding, Subtracting, Multiplying and Dividing Fractions

Adding and Subtracting	$\frac{1}{4} + \frac{3}{5} = \frac{5}{20} + \frac{12}{20} = \frac{17}{20}$	Need to get a common denominator
Multiplying	$\frac{2}{3} \cdot \frac{4}{5} = \frac{8}{15}$	Multiply across numerators and across denominators
Dividing	$\frac{3}{5} \div \frac{2}{7} = \frac{3}{5} \cdot \frac{7}{2} = \frac{21}{10}$	$\frac{3^{-1}(4x^2y^{\frac{3}{5}})^{\frac{1}{2}}}{x^3y^{\frac{1}{5}}}$ Change division to multiplying by the reciprocal

Practice:

10. $\frac{4}{7} + \frac{8}{9}$

11. $\frac{3}{4} - \frac{5}{6}$

12. $\frac{4}{7} \cdot \frac{-2}{3}$

13. $\frac{11}{3} \div \frac{5}{9}$

14. $\frac{3}{\frac{6}{5}}$

15. $\frac{2x}{y} + \frac{5}{x}$

16. $\frac{4}{x^2y} - \frac{6y}{x}$

17. $\frac{15}{x^2 - 4} \div \frac{3}{x + 2}$

18. $\frac{4a}{3b} - \frac{8}{5a}$

19. $x^{\frac{1}{4}} \cdot x^{\frac{2}{5}} \cdot x^{\frac{-3}{2}}$

20. $\frac{y^{\frac{-4}{3}}}{y^{\frac{-6}{7}}}$

21. $\frac{3^{-1}(4x^2y^{\frac{3}{5}})^{\frac{1}{2}}}{x^3y^{\frac{1}{5}}}$

Factoring Quadratics – Use the “X” method, the box, or reverse FOIL. Look for a GCF first.

22. $x^2 + 2x - 15$

23. $2x^2 - 7x + 6$

24. $30x^2 - 25x - 20$

Solve by Factoring

25. $x^2 - 5x = 36$

26. $4x^2 - 19x - 5 = 0$

27. $6x^3 - 38x^2 - 28x = 0$

Quadratic Formula:

$$x = \frac{-b \pm \sqrt{\quad}}{\quad}$$

Solve by using the Quadratic Formula

Simplify if possible and leave in radical form.

28. $x^2 + 3x = 2$ a=_____ b=_____ c=_____

29. $25x^2 - 18x = 12x - 9$ a=_____ b=_____ c=_____

30. $5x^2 + 10x = 3$ a=_____ b=_____ c=_____

Answers – Review for Units 8 and 9

1. 125
2. 3^{20}
3. $1/102,400$
4. $8a^3b^{12}$
5. $\frac{-12}{x^2y^7}$
6. $\frac{25b^{19}a^{12}}{8}$
7. $\frac{-3x^4}{5y^8}$
8. $9x^5y^2$
9. $\frac{16y^{15}}{675x^{11}}$
10. $92/63$
11. $-1/12$
12. $-8/21$
13. $33/5$
14. $5/2$
15. $\frac{2x^2+5y}{xy}$
16. $\frac{4-6xy^2}{x^2y}$
17. $5/x-2$
18. $\frac{20a^2-24b}{15ab}$
19. $x^{-\frac{17}{20}}$
20. $1/y^{\frac{10}{21}}$
21. $\frac{2y^{\frac{1}{10}}}{3x^2}$
22. $(x-3)(x+5)$
23. $(2x-3)(x-2)$
24. $5(3x-4)(2x+1)$
25. $x = 9, -4$
26. $x = -1/4, 5$
27. $x = 0, -2/3, 7$
28. $x = \frac{-3 \pm \sqrt{17}}{2}$
29. $x = 3/5$
30. $x = \frac{-5 \pm 2\sqrt{10}}{5}$