Academic Algebra 1 Name KEY ID: 1

Chapter 8 Review

Date_____ Period____

NAQ.c. STANDARDS #'S 1-3 Evaluate complex numeric expressions with whole number exponents demonstrating the ability to use the product, power, and quotient properties SHOW THE FOLLOWING WORK - (1) SHOW +,-,* OPERATIONS TO SIMPLIFY EXPONENTS, (2) EXPAND, then (2) EVALUATE

1) $2^2 \cdot 2^3 = 2^{2+3} = 2^5 = \boxed{32}$

2) $4^{\text{implied } 1} \cdot 4^0 \cdot 4^4 = 4^{1+0+4} = 4^5 = \boxed{1,024}$

3) $\frac{5^7}{5^3} = 5^{7-3} = 5^4 = \boxed{625}$

4) $\frac{15^3}{15^3} = 15^{3-3} = 15^0 = \boxed{1}$

ANYTHING TO THE "0" EXPONENT IS "1".

5) $((-3)^3)^2$ $(-3)^{3 \cdot 2} = (-3)^6 = \boxed{729}$

Remember Negative # to EVEN EXPONENT IS POSITIVE!

Negative numbers need ( )'s

6) $(-4)^3 = \boxed{-64}$

NO WORK TO SHOW! Negative Number to an ODD EXPONENT IS NEGATIVE!

Simplify. Clearly show work.

7) $3m^2 \cdot 6m^{(1)} \cdot 7m^2$ $3 \cdot 6 \cdot 7\, m^{2+1+2} = \boxed{126m^5}$

8) $8n^{(1)} \cdot 8n^4$ $8 \cdot 8\, n^{1+4} = \boxed{64n^5}$

9) $2x^3y^0 \cdot 3x^3y^2$ $2 \cdot 3\, x^{3+3}\, y^{0+2} = \boxed{6x^6y^2}$ *

10) $3x^3 \cdot y^{1}x^4 \cdot 8x^2y^2$ $3 \cdot 1 \cdot 8\, x^{3+4+2}\, y^{1+2} = \boxed{24x^9y^3}$

Remember: order variables ABC.

11) $\frac{2x^4y^3}{8xy} = \frac{1\, x^{4-1}\, y^{3-1}}{4} = \boxed{\frac{x^3y^2}{4}}$

12) $\frac{24x^3y^2}{3y^2} = 8\, x^3\, y^{2-2} = 8x^3y^0 = \boxed{8x^3}$ ($y^0 = 1$)

13) $(5xy^2)^3 = 5^3\, x^{1 \cdot 3}\, y^{2 \cdot 3} = \boxed{125x^3y^6}$

14) $(3a^2b^2)^4 = 3^4\, a^{2 \cdot 4}\, b^{2 \cdot 4} = \boxed{81a^8b^8}$

15) $(-3x^4y^3)^3 = (-3)^3 x^{4\cdot3} y^{3\cdot3}$

$= -27x^{12}y^9$

16) $(-12x^3y^2)^0$ ← anything to the "0" exponent is 1.

$= 1$

17) $(-a^2b^3)^2$ rewrite → $(-1 \cdot a^2b^3)^2$

$= (-1)^2 a^{2\cdot2} b^{3\cdot2}$

$= 1a^4b^6 = a^4b^6$ (1 implied)

18) $(-3x^4y^0)^3 = (-3)^3 x^{4\cdot3} y^{0\cdot3}$

$= -27x^{12}y^0$ ($y^0 = 1$)

$= -27x^{12}$

Simplify. Your answer should contain only positive exponents.

19) $\frac{6b^3}{2b^{-3}} = 3b^{3-(-3)} = 3b^6$

20) $\frac{100n^{-4}}{20n^{-2}} = 5n^{-4-(-2)} = \frac{5n^{-2}}{1} = \frac{5}{n^2}$

21) $\frac{18m^{-4}}{12m}$ (reduce) $= \frac{3m^{-4-1}}{2} = \frac{3m^{-5}}{2} = \frac{3}{2m^5}$

22) $\frac{70x}{20x^4} = \frac{7x^{1-4}}{2} = \frac{7x^{-3}}{2} = \frac{7}{2x^3}$

23) $\frac{6yx^2}{4x^{-1}y^4} = \frac{3x^{2-(-1)}y^{1-4}}{2} = \frac{3x^3y^{-3}}{2} = \frac{3x^3}{2y^3}$

24) $\frac{15x^2y^2}{5x^{-4}y^3} = 3x^{2-(-4)}y^{2-3} = \frac{3x^6y^{-1}}{1} = \frac{3x^6}{y}$

25) $\frac{-8x^{-2}\cdot y^2}{-6x^{-5}y^0} = \frac{4x^{-2-(-5)}y^{2-0}}{3} = \frac{4x^3y^2}{3}$

26) $-\frac{3x^2y^3}{12x^0y^{-2}} = -\frac{1x^{2-0}y^{3-(-2)}}{4} = \frac{-1x^2y^5}{4} = \frac{x^2y^5}{4}$

Rules for Simplifying Exponents:

1) Follow order of operations
   - ( )'s... in → out
   - Exponents
   - x, ÷... L → R
   - +, -... L → R

2) Treat numbers like numbers and follow OOPs
   - $(-N)^{EVEN} = +N$
   - $(-N)^{ODD} = -N$

3) Multiplying variable with the same base – ADD EXPONENTS

4) Power to Power – MULT EXPONENTS and use distributive property

5) Dividing variable with the same base – SUBTRACT EXPONENTS

6) Anything to the ZERO EXPONENT is ONE $X^0 = 1$