Name Key Math 8

Date _____ Period _____ Mrs. Zigrossi

Exponents Unit Study Guide

Be sure you know or are able to do each of the following...

Identify like terms

1) Identify two other terms that are like with $6x^2y$ anything with x^2y Ex. $2x^2y$ $-5x^2y$

2) Are 4mn and 5nm like? Why or why not? Yes they are like $m \cdot n = n \cdot m$

Add and subtract monomials

3) Simplify $3x + 4x^2 + x + x + 9x^2 = 13x^2 + 5x$

4) Simplify $6xyz + 5yz + 1xz - 10yxz = -4xyz + 5yz + 1xz$

5) Simplify $10ab^2 + a^2b^2 - 7a^2b - a^2b^2 = 10ab^2 - 7a^2b$

6) Simplify $3m^2n^3 + 5mn - 7m^2n^3 + nm = -4m^2n^3 + 6mn$

Multiply a monomial by a monomial

7) $7 \cdot 7 \cdot 7 \cdot 7^2 = 7^5$

8) $8 \cdot 8 \cdot 9 \cdot 9 \cdot 8 \cdot 8^3 = 8^6 9^2$

9) $x \cdot x \cdot x \cdot x \cdot 4x = 4x^5$

10) $-1mn^3(3mn^2) = -3m^2n^5$

11) $6x^3y^6(-2x^5y^4z^2) = -12x^8y^{10}z^2$

Divide a monomial by a monomial

12) $(-63m^6nq^5) \div (7m^4n\,q^5) = -9m^2n^0q^0 = -9m^2$

13) $\frac{8x^5y^3z^{12}}{-7=56xy^2z^{12}}$ $\frac{1x^4y}{-7}$ or $-\frac{1}{7}x^4y$

14) $\frac{8^6}{8^4} = 8^2 = 64$

15) $5^3 \div 5^2 = 5^1$

16) $12^7 \div 12^5 = 12^2 = 144$

Raise a monomial to a power

17) $(x^4)^8 = x^{32}$

18) $(9x^4y^6)^2 = 81x^8y^{12}$

19) $\left(\frac{5}{6}a^3bc^7\right)^3 = \frac{125}{216}a^9b^3c^{21}$

20) $(3^2)^2 = 3^4 = 81$

21) $(5x^4)^3 = 125x^{12}$

Simplify monomials with a zero or negative exponent

22) $5^0 = 1$

23) $6x^0 = 6 \cdot 1 = 6$

24) $5(3y)^0 = 5 \cdot 1 = 5$

25) $(72m^6nq^5) \div (-8q^{-5}m^{10}n) = -9m^{-4}n^0q^{10} = \frac{-9q^{10}}{m^4}$

26) $\left(\frac{6}{7}\right)^{-2} = \left(\frac{7}{6}\right)^2 = \frac{49}{36}$

Raise power to a power

39) $(3\times10^{-2})^3 = 27\times10^{-6} = 2.7\times10^{-5}$

40) $(-2\times10^{5})^4 = 16\times10^{20} = 1.6\times10^{21}$

Add and subtract

41) $(4\times10^{5}) - (2\times10^{5}) = 2\times10^{5}$

42) $(8\times10^{4}) + (3\times10^{5}) = 3.8\times10^{5}$

$(.8\times10^{5})$

43) $(7\times10^{9}) + (2.4\times10^{10}) = 3.1\times10^{10}$

$.7\times10^{10}$

Problem solve

44) The insect population is at least 1×10^8. If the average weight of each insect is 2.5×10^{-3} grams, what is the total weight of the insect population?

$(1\times10^{8})(2.5\times10^{-3})$

$2.5\times10^{5}\ g$

45) The total length of a drawer in a filing cabinet is 3.65×10^2 cm. If each file has a thickness of 2.5×10^0 cm, how many files will fit in the drawer?

$$\frac{3.65\times10^{2}}{2.5\times10^{0}}$$

1.46×10^{2} cm

46) The human population of the world is estimated at 4.5×10^9. If the average weight of each human is 5.5×10^4 grams, what is the total weight of the human population?

$(4.5\times10^{9})(5.5\times10^{4})$

$24.75\times10^{13} = 2.475\times10^{14}\ g$

27) $8x^{-3} = \frac{8}{x^3}$

28) $(3x^4y)^{-2} = \frac{1}{(3x^4y)^2} = \frac{1}{9x^8y^2}$

Use order of operations to simplify expressions with monomials

29) $(9x^4y)(-2x^2y) + (-4x^3y)^2$

$(9x^4y)(-2x^2y) + 16x^6y^2$

$-18x^6y^2 + 16x^6y^2 = -2x^6y^2$

30) $\frac{(12a^3b^8)(3a^2b^2)}{9b^4a} - (3a^2b^3)^2$

$\frac{36a^5b^{10}}{9ab^4} - 9a^4b^6 = 4a^4b^6 - 9a^4b^6 = -5a^4b^6$

31) $(24m^6n^3) \div (3m^4n^3)(2m^2n^4)^3 + 6m^2n^4$

$(24m^6n^3) \div (3m^4n^3)(8m^6n^{12})$

$(8m^2n^0)(8m^6n^{12}) + 6m^2n^4 = 64m^8n^{12} + 6m^2n^4$

Write a number in scientific notation

32) $56{,}000{,}000{,}000{,}000 = 5.6 \times 10^{13}$

33) $0.0000000786 = 7.86 \times 10^{-8}$

34) $25.6 \times 10^6 = 2.56 \times 10^7$

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Multiply two numbers written in scientific notation

35) $(3 \times 10^3)(2 \times 10^{-9}) = 6 \times 10^{-6}$

36) $(8 \times 10^{-4})(2 \times 10^3) = 16 \times 10^{-1} = 1.6 \times 10^0$

Divide two numbers written in scientific notation

37) $(6 \times 10^3) \div (3 \times 10^{-5}) = 2 \times 10^8$

38) $(1.2 \times 10^9) \div (6 \times 10^5) = .2 \times 10^4 = 2 \times 10^3$