EXPONENT & MONOMIAL WORKSHEET

FIND THE VALUE OF EACH EXPRESSION:

1) $5^5 =$

2) $2^{11} =$

3) $6^3 =$

4) $9^3 =$

5) $100^2 =$

6) $6^5 =$

7) $10^7 =$

8) $3^5 =$

9) $4^8 =$

10) $12^4 =$

11) $16^2 =$

12) $27^1 =$

SIMPLIFY EACH PRODUCT:

13) $10^{12} \bullet 10^{35} =$

14) $a^7 \bullet a^{12} =$

15) $c^3 \bullet c^8 =$

16) $d^7 \bullet d^9 =$

17) $x^{2e} \bullet x^{8e} =$

18) $w^{103} \bullet w^{1030} =$

19) $a^6 \bullet b^5 =$

20) $10^a \bullet 10^b =$

21) $g^{12} \bullet g^{19} \bullet g^{11} =$

SIMPLIFY EACH PRODUCT:

22) $\left(2x^2\right)\left(4x^3y^2\right) =$

23) $\left(-3a^2b\right)\left(6ab^4c\right) =$

24) $\left(7q^5\right)\left(12q^3r^5\right) =$

25) $\left(11c^8\right)\left(-10c^4d\right) =$

26) $\left(9x^{10}z^2\right)\left(-x^5y^3\right) =$

27) $\left(-8f^6g\right)\left(-7f^2g^5h\right) =$

28) $\left(1.3a^6b^{11}c^5\right)\left(0.5a^2bc^3\right) =$

29) $\left(-2x^2z\right)\left(-4y^2z\right)\left(-3xyz\right) =$

30) $\left(a^xb^yc^z\right)\left(a^rb^sc^t\right) =$

SIMPLIFY EACH EXPRESSION:

31) $\left(x^2\right)^3 =$ 32) $\left(a^7\right)^5 =$ 33) $\left(y^{13}\right)^4 =$ 34) $\left(w^{-21}\right)^{-15} =$

35) $\left(5^2\right)^3 =$ 36) $\left(23^7\right)^8 =$ 37) $\left(-y^5\right)^4 =$ 38) $\left(4y^3\right)^2 =$

39) $\left(8c^5\right)^2 =$ 40) $\left(-3h^9\right)^3$ 41) $\left(y^4d^6\right)^8 =$

41) $\left(-c^5h^6\right)^4 =$ 42) $\left(-15h^9k^7\right)^3 =$ 43) $\left(k^9\right)^5\left(k^3\right)^2 =$

44) $\left(3y^6\right)^2\left(x^5y^2z\right) =$ 45) $\left(4h^3\right)^2\left(-2g^3h\right)^3 =$ 46) $\left(14a^4b^6\right)^2\left(a^6c^3\right)^7 =$

EVALUATE EACH $X = 5$, $Y = -1$, AND $Z = 4$

47) $y^4 =$ 48) $3x^3 =$ 49) $2y^2 =$ 50) $z^2 =$

51) $(yz)^2 =$ 52) $(yx)^3 =$ 53) $x^2z^2 =$ 54) $y^x =$

55) What is the area of a square with the length of a side equaling $3a^5$?

56) What is the area of the rectangle with the width of $6x^2$ *and the length of* $12x^3$?

SIMPLIFY EACH QUOTIENT AND THEN FIND THE VALUE OF THE RESULT:

57) $\frac{10^6}{10^2} =$ 58) $\frac{4^{17}}{4^{14}} =$ 59) $\frac{9^{210}}{9^{207}} =$ 60) $\frac{2^{y+1}}{2^y} =$ 61) $\frac{8^{r+4}}{8^{r+1}} =$

SIMPLIFY EACH EXPRESSION:

62) $\left(\frac{x}{y}\right)^6 =$ 63) $\left(\frac{5c}{d^2}\right)^2 =$ 64) $\left(\frac{4d^3}{c^5}\right)^3 =$ 65) $\left(\frac{3w}{g^6}\right)^4 =$

66) $\left(\frac{-4s^6}{t^3r^5}\right)^3 =$ 67) $\left(\frac{-2d^{11}f^6}{c^{18}}\right)^2 =$ 68) $\left(\frac{2d^4}{4e}\right)^3 =$

69) $\frac{6r^3}{2r} =$ 70) $\frac{-40s^6}{20s^3} =$ 71) $\frac{21d^{18}e^5}{7d^{11}e^3} =$

72) $\frac{-16w^7r^2}{-4wr} =$ 73) $\frac{a^5b^5c^5}{-a^2b^3c^4} =$ 74) $\frac{4.2x^4y^{14}}{0.6x^9y^5} =$

75) $\left(\frac{-24t^6}{8t^3}\right)^5 =$ 76) $\left(\frac{d^{11}f^{16}}{d^6f^6}\right)^3 =$ 77) $\left(\frac{7d^2}{14d^4}\right)^5 =$

EVALUATE EACH QUOTIENT IF $X=2$, $Y=-2$, AND $Z=10$:

78) $\frac{x^3}{x} =$

79) $\frac{y^4}{y} =$

80) $\frac{x^3y}{xy^3} =$

81) $\frac{z^4x^2y}{zxy^2} =$

82) $\frac{(yz)^2}{z} =$

83) $\frac{y^3(3zx)^2}{9x^3} =$

84) $\frac{z^{x+1}}{z^x} =$

85) $\frac{z^{x+x}}{z^{y+3}} =$

86) $\left(\frac{xz}{y}\right)^3 =$

Exponent Rules Review Worksheet

Product Rule: When multiplying monomials that have the same base, add the exponents.

$$x^m \cdot x^n = x^{m+n}$$

Example 1: $x \cdot x^3 \cdot x^4 = x^{1+3+4} = x^8$

Example 2: $(2x^2y)(-3x^3y^4) = 2 \cdot (-3) \cdot x^2 \cdot x^3 \cdot y \cdot y^4 = -6x^5y^5$

Power Rule: When raising monomials to powers, multiply the exponents.

$$(x^m)^n = x^{m \cdot n}$$

Example 3: $(x^2y^3)^4 = x^{2\bullet 4}\, y^{3\bullet 4} = x^8y^{12}$

Example 4: $(2x^3yz^2)^3 = 2^3\, x^{3\bullet 3}\, y^3\, z^{2\bullet 3} = 8x^9y^3z^6$

Quotient Rule: When dividing monomials that have the same base, subtract the exponents.

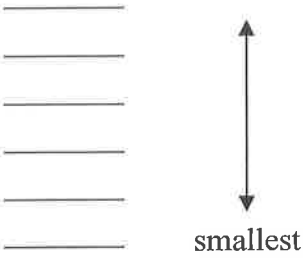
$$\frac{x^m}{x^n} = x^{m-n}$$

Example 5: $\frac{x^3}{x^{-2}} = x^{3-(-2)} = x^5$

Example 6: $\frac{5^6}{5^2} = 5^{6-2} = 5^4$

Example 7: $\frac{36m^3n^5}{-9mn^4} = \frac{36}{-9} \cdot \frac{m^3}{m} \cdot \frac{n^5}{n^4} = -4m^2n$

d. 8.5, -0.45 , 2.5 , -8.5 , 0.45 , -2.5



4. Circle the **largest value** in each pair.

a. 4.2×10^{1} or 4.2×10^{2}

b. 2.6×10^{4} or 7.1×10^{2}

c. 5.7×10^{3} or 9.3×10^{2}

HINT
If the numeric value and the exponent are both **positive**
as the exponent of 10 gets larger, the value gets **larger**.

5. Circle the **largest value** in each pair.

a. -4.8×10^{3} or -4.8×10^{4}

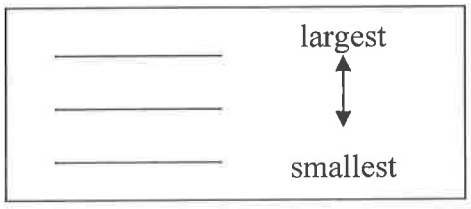
b. -9.2×10^{2} or -7.8×10^{2}

c. -1.5×10^{3} or -6.5×10^{2}

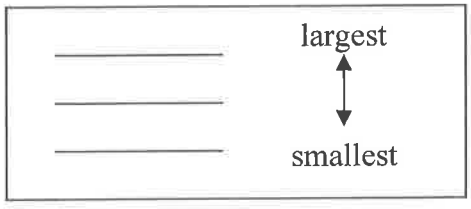
HINT
If the numeric value is **negative** and the exponent are **positive**
as the exponent of 10 gets larger, the value gets **smaller**.

6. Arrange each of the values in order from largest to smallest.

a. -4.5×10^{3}
1.7×10^{3}
-3.3×10^{1}



b. -6.7×10^{2}
-2.3×10^{3}
-5.5×10^{1}



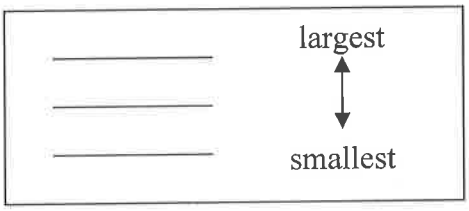
7. Order the values in scientific notation from largest to smallest using the powers of 10.

10^0 10^1 10^2 10^3 10^4 10^{-1} 10^{-2} 10^{-3} 10^{-4}

4.0×10^4	Largest	$-4.0 \times$ ____
$4.0 \times$ ____		-4.0×10^{-3}
$4.0 \times$ ____		$-4.0 \times$ ____
$4.0 \times$ ____		$-4.0 \times$ ____
4.0×10^0		$-4.0 \times$ ____
$4.0 \times$ ____		$-4.0 \times$ ____
$4.0 \times$ ____		$-4.0 \times$ ____
$4.0 \times$ ____		$-4.0 \times$ ____
$4.0 \times$ ____	Smallest	$-4.0 \times$ ____

8. Arrange the values in order from largest to smallest, and then complete the following statement below.

5.0×10^{-1}
5.0×10^{-3}
5.0×10^{-2}



As the exponent of 10 increases, the value of the number _____ .
(increases/decreases)

9. Circle the **larger value** in each pair, and complete the following statements.

a. i. 5.2×10^{-1}, 2.5×10^{-2}
ii. 8.8×10^{-3}, 4.3×10^{-2}
iii. 1.4×10^{-2}, 7.1×10^{-2}

b. Each value in the above question has a _____ numeric value and a _____ exponent of 10.
(positive/negative) (positive/negative)

c. Each value in the above question represents a number between 0 and _____ .
(+1/ -1)

10. Arrange the values in order from largest to smallest, and then complete the statement.

-2.0×10^{-2}
-2.0×10^{-1}
-2.0×10^{-3}

largest
_____
_____
_____
smallest

As the exponent of 10 increases, the value of the number _____ . (increases/decreases)

11. Circle the **larger value** in each pair, and complete the statements.

a. i. -4.5×10^{-2}, -1.5×10^{-3}
ii. -5.0×10^{-1}, -4.7×10^{-2}
iii. -1.5×10^{-2}, -4.6×10^{-2}

b. Each value in the above question has a _____ numeric value and a (positive/negative)
_____ exponent of 10. (positive/negative)

c. Each value in the above question represents a number between 0 and _____ . (+1/-1)

12. Arrange each of the values in order from largest to smallest.

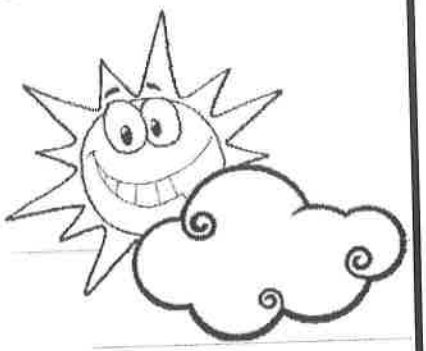
a. -2.3×10^{3}
5.6×10^{-1}
-1.7×10^{-3}

largest
_____
_____
_____
smallest

b. -4.3×10^{-2}
-1.5×10^{-3}
7.4×10^{-3}

largest
_____
_____
_____
smallest

Name _____



Adding & Subtracting Monomials Worksheet 1

Both terms have the same variable to same degree; Single digit numbers.

Find each sum or difference.

1) $3y^2 + 4y^2 =$ _____

2) $14x^3 + 4x^3 =$ _____

3) $-5p + (-7p) =$ _____

4) $16s + (-4s) =$ _____

5) $7n + 21n =$ _____

6) $-40q - 14q =$ _____

7) $15h - 21h =$ _____

8) $24d - 16 =$ _____

9) $56x^2 + 31x^2 =$ _____

10) $-20y - 20y =$ _____

11) $z^4 - (-6z^4) =$ _____

12) $25d^3 + 75d^3 =$ _____