Algebra I
9.3 Worksheet #1

NAME:_____

DATE:_____ HOUR:____

Product of a Power
Quotient of a Power
Zero and Negative Exponents

Multiply.

1. $a \cdot a^2$
2. $b^2 \cdot b^2$
3. $x^2 \cdot 3x^{-5}$
4. $x^4 \cdot x^0$
5. $n^3 \cdot n^4$
6. $a^6 \cdot a^0$
7. $(2x)(2x^2)$
8. $(3x)(-2x^4)$
9. $(c^2)(-5c^3)$
10. $(ab)(a^2b)$
11. $(3x^2)(-2x^5)$
12. $(-y^2)(4y^7)$
13. $(3x^2)(4x^4)$
14. $(-x^2)(-4x)$
15. $(5a)(-ab^2)$
16. $(xy)(-2x)$
17. $(cd)(-3d^3)$
18. $(2mn)(-8m^2)$
19. $(5x^2y)(4xy^2)$
20. $(-5xy)(2xy^2)$
21. $(-r^2s)(-10r^2s^2)$
22. $(-6a^2)(4ab^5)$
23. $(-x^4)(-3xyz^2)$
24. $(-6a^2b^5)(abc^3)$
25. $(a^2b)(-5a^2b^2)$
26. $(-x^3)(-5x^2y)$
27. $(xy^3)(-2x^3y^2)$
28. $(-a^4b^3)(a^2bc^5)$

Divide.

1. $\frac{a^5}{a^2}$
2. $\frac{x^9}{x^4}$
3. $\frac{x^3}{x^7}$
4. $\frac{5a^7}{a^3}$
5. $\frac{9x^6}{x^3}$
6. $\frac{12x^3}{3x^5}$
7. $\frac{-8n^2}{4n^5}$
8. $\frac{14b^{12}}{2b^{20}}$
9. $\frac{-3a^2b^2}{ab^2}$
10. $\frac{-18a^3b^{-2}}{-3a^2}$
11. $\frac{16x^4y^3}{-4xy^5}$
12. $\frac{25x^4y^2}{5xy^4}$
13. $\frac{-12x^5y^2}{-6x^2y^2}$
14. $\frac{14a^3b^2}{-7a^2b^5}$
15. $\frac{-42m^6n^3}{-7m^4n^4}$
16. $\frac{56x^5y^5}{7xy^4}$
17. $\frac{-20x^6y^7}{5xy^6}$
18. $\frac{-12a^3b^8}{-3a^2b^5}$
19. $\frac{9x^9y^4z^0}{3xy^6}$
20. $\frac{15a^2b^4c^3}{-3ac^2}$
21. $\frac{-7a^9bc^0}{a^5bc^3}$
22. $\frac{49c^2d^{10}x}{-7c^2d^5}$
23. $\frac{-3r^4st^6}{-rst^4}$
24. $\frac{36a^6b^2c^7}{-12abc^6}$
25. $\frac{12x^2y}{-2xy^4}$
26. $\frac{21a^2b^3c}{-3a^2b^4}$
27. $\frac{-40a^4b^2c^5}{-10a^3bc^3}$
28. $\frac{30x^2y^3z^0}{-5xy^2}$
29. $\frac{-42a^5b^2}{6a^3b^4}$
30. $\frac{36x^4y^2z^0}{-6x^4}$
31. $\frac{-81a^4b^2c^9}{-3ab^2c^5}$
32. $\frac{54r^2s^4t^{10}}{-9s^3t^4}$

Simplify

Properties of Exponents Practice

1. $x^2 \cdot x^4$	2. $2x^4 \cdot -x^3$	3. $3v^2 \cdot 4v^5$
4. $\frac{2x^2}{x}$	5. $\frac{7n^5}{n^2}$	6. $\frac{-6m^2n}{m^3n}$
7. $\frac{30a^3}{-6a}$	8. $-a^2t \cdot -at^3$	9. $\frac{n^5p^4}{n^3p}$
10. $2n^7 \cdot 3n \cdot -n^2$	11. $x^0 \cdot 14 \cdot y^{-3}$	12. $\frac{15x^5y^2}{10x^6y}$
13. $\frac{-9r^2s^4t^{10}}{-54s^4t^{11}}$	14. $3 \cdot a \cdot a \cdot 2 \cdot b \cdot b \cdot b$	15. xy^0z^{-5}
16. $\frac{y^{40}x^5}{y^5x^{15}}$	17. $4a \cdot 4a$	18. $(-5x^5y^3)^0$
19. $\frac{6xy}{36x^2y^{15}}$	20. $5^2 \cdot 5^3$	21. $a^3 \cdot b^{-4}$
22. $x^2 \cdot x^{-5}$	23. $(2a^2)(7ab^3)$	24. $\frac{-6n^2w}{-4nw}$

Algebra I

9.3 Worksheet #2

Negative and Zero Exponents

NAME:_____

DATE:_____ HOUR:____

1. Fill in the next three entries in each row of the table to continue the pattern.

Customary notation	81	27	9	3			
Exponential form	3^4	3^3	3^2	3^1	3^0	3^{-1}	3^{-2}

2. Which is largest? 4^{-2}, 10^{-2}, 12^{-2}? _____

Evaluate.

3. $(0.1)^{-1}$ _____ 4. $(0.01)^{-1}$ _____ 5. $(1)^{-1}$ _____ 6. $(2 \cdot 1)^{-1}$ _____

Write each of the following without negative or zero exponents.

7. 5^{-1} _____ 8. 7^0 _____ 9. 3^{-3} _____ 10. 2^{-2} _____

11. x^{-1} _____ 12. $(xy)^0$ _____ 13. a^{-3} _____ 14. a^{-2} _____

15. $\frac{5^{-1}}{x}$ _____ 16. $\frac{7^0}{(xy)^0}$ _____ 17. $\frac{3^{-3}}{a}$ _____ 18. $(2a)^0$ _____

Evaluate each of the following mentally.

19. $(3.73)^0$ _____ 20. $(3.94 \times 8.72)^0$ _____

21. $\frac{4.69^5}{4.69^4}$ _____ 22. $\frac{2^8}{2^9}$ _____

Simplify by using the properties of integer exponents. Your answers should contain no zero or negative exponents.

1. $2^4 \cdot 2^{-2}$

2. $(7a)^0$

3. $\frac{(-3)^4}{(-3)^7}$

4. $\frac{3^{-5}}{3^{-5}}$

5. $\frac{4^{-6}}{4^{-6}}$

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

7. $3^{-5} \cdot 3^8$

8. $(-3)^{-2}(-3)$

9. $(-4)(-4)^{-3}$

10. $\frac{4^2}{4^5}$

11. $\frac{3^5}{3^8}$

12. $\frac{5^9}{5^7}$

13. $\frac{14x^5y^3}{21x^2y^8}$

14. $\frac{8t^9w^6}{10t^3w^7}$

15. $\frac{15gh^3}{5g^2h^4}$

16. $(rs)^0$

17. $(wt)^0$

18. $5^{-3} \cdot 5^3$

Evaluate each expression as a whole number or a fraction (no decimals).

1. 2^{-4} _____ 2. $(-2)^4$ _____ 3. $-(2^4)$ _____ 4. $-(2^{-4})$ _____

5. $(-2)^{-4}$ _____ 6. 3^{-2} _____ 7. 10^{-4} _____ 8. $-(7^2)$ _____

9. $(-7)^2$ _____ 10. $(-10)^3$ _____ 11. $(-8)^{-2}$ _____ 12. $(-3)^{-3}$ _____

Write each of the following without negative or zero exponents:

13. x^{-1} _____ 14. y^0 _____

15. a^{-3} _____ 16. $2n^{-2}$ $\frac{2}{n^2}$

17. $(x^2y^3)^0$ _____ 18. $4x^{-2}x^{-3}$ _____

19. $a^{-1}b^{-2}c^3$ $\frac{c^3}{ab^2}$ 20. $4c^3d^{-4}$ _____

21. m^5m^{-2} _____ 22. $k^{-4}k^7$ _____

23. $r^{-2}s^{-2}t^4$ _____ 24. $4a^3a^{-6}a^{-5}$ $4a^{-8} = \frac{4}{a^8}$

25. $\frac{m^6t^3}{m^3t}$ _____ 26. $\frac{7^0}{(xy)^0}$ _____

27. $\frac{y^{-6}}{y^2}$ $y^{-8} = \frac{1}{y^8}$ 28. $\frac{rt^{-4}}{t^3}$ _____

29. $\frac{w^{-8}}{w^2}$ _____ 30. $\frac{3q^{-5}}{q}$ _____

31. $\frac{-2a^{-4}}{a^2b}$ _____ 32. $\frac{5q^{-4}}{q^2s}$ _____

33. $\frac{(2a^3)(3a^5)}{a}$ $\frac{6a^8}{a^1} = 6a^7$ 34. $\frac{(7d^{-6})(-4d^{-2})}{2d}$ _____

35. $\frac{x^{-4}x^3}{x^{-3}x^4}$ $\frac{x^{-1}}{x^1} = x^{-2} = \frac{1}{x^2}$ 36. $\frac{-z^3z^{-6}}{-3z^2}$ _____

Evaluate each of the following mentally.

1. 1^0 2. 2^0 3. 16^0 4. $(1{,}000{,}000)^0$ 5. $(-1)^0$ 6. $(-\frac{1}{2})^0$