7.2
Day 2

* Tips for Evaluating Exponential Expressions: 1) Simplify the expression 1st.
2) When substituting, use ( ).

* Review Problem 3, "Evaluating an Exponential Expression" on pg. 420

* Got it? #3

A) $\frac{n^{-4}w^0}{(-2)^{-4}(1)}$ $\frac{1}{(-2)^4}$ $\frac{1}{16}$

B) $\frac{n^{-1}}{w^2} = \frac{(-2)^{-1}}{5^2} = \frac{1}{(5^2)(-2)^1} = \frac{1}{(25)(-2)}$ $\frac{1}{-50}$

C) $\frac{n^0}{w^6} = \frac{1}{5^6} = \frac{1}{15625}$

D) $\frac{1}{nw^{-1}} = \frac{1}{(-2)(5)^{-1}} = \frac{5^1}{-2} = \frac{5}{-2}$

* Review Problem 4 "Using a Exponential Expression" on pg. 420

* Got it? #4)

$w=-2$	$w=0$	$w=1$
$5400 \cdot 3^w$	$5400 \cdot 3^w$	$5400 \cdot 3^w$
$5400 \cdot 3^{-2}$	$5400 \cdot 3^0$	$5400 \cdot 3^1$
$5400 \cdot \frac{1}{3^2}$	$5400 \cdot 1$	$5400 \cdot 3$
$\frac{5400}{1} \cdot \frac{1}{9}$	5400 insects when it was measured	16,200 insects 1 week after the population was measured
600		

600 insects (2 week before the pop was measured)

7-2 continues

* Scientific notation (SN) a way to write very small or very large numbers
  - a # is expressed in SN when it is written as a product of a factor & a power of 10
  - the 1st factor's MUST be greater than or equal to 1 & less than 10

Absolute value

Example 2.9×10^4

Not an example 37.5×10^2
rewrite in SN 3.75×10^3

* Review Problem 3, "Multiplying with SN" on pg. 427

* Got it #3? $200\,m^3 = 2 \times 10^2\,m^3$

$= (2 \times 10^2) \cdot (9.98 \times 10^5) \cdot (3.34 \times 10^{22})$

$= 66.7 \times 10^{29}$

$= 6.7 \times 10^{30}$ molecules of water

Name Day 2 - Key Class _____ Date _____

7-1 Practice (continued) Form G

Zero and Negative Exponents

Evaluate each expression for a = –4, b = 3, and c = 2.

21. $3a^{-1}$ $-\frac{3}{4}$

22. b^{-3} $\frac{1}{27}$

23. $4a^2 b^{-2} c^3$ $56\frac{8}{9}$ or $\frac{512}{9}$

24. $9a^0 c^4$ 144

25. $-a^{-2}$ $-\frac{1}{16}$

26. $(-c)^{-2}$ $\frac{1}{4}$

Write each number as a power of 10 using negative exponents.

27. $\frac{1}{1000}$ 10^{-3}

28. $\frac{1}{10}$ 10^{-1}

Write each expression as a decimal.

29. 10^{-3} 0.001

30. $8 \cdot 10^{-4}$ 0.0008

31. The number of people who vote early doubles every week leading up to an election. This week 1200 people voted early. The expression $1200 \cdot 2^w$ models the number of people who will vote early w weeks after this week. Evaluate the expression for $w = -3$. Describe what the value of the expression represents in the situation.

WORK = 7
$1200 \cdot 2^{(-3)}$
$\frac{1200}{2^3} = \frac{1200}{8}$

150 (The expression $1{,}200 \cdot 2^{-3}$ represents the # of people who voted 3 weeks ago.)

32. A pizza shop makes large pizzas with a target diameter of 16 inches. A pizza is acceptable if its diameter is within $3 \cdot 2^{-2}$ in. of the target diameter. Let d represent the diameter of a pizza. Write an inequality for the range of acceptable large pizza diameters in inches.

WORK:
$3(2^{-2}) = \frac{3}{2^2} = \frac{3}{4}$

$16 - \frac{3}{4} = 15\frac{1}{4}$

$16 + \frac{3}{4} = 16\frac{3}{4}$

$15\frac{1}{4} < d < 16\frac{3}{4}$

33. **Open-Ended** Choose a fraction to use as a value for the variable c. Find the values of c^{-1}, c^{-3}, and c^3.

Skip

Name Day 2 - Key Class _____ Date _____

7-2 Practice

Form G

Multiplying Powers With the Same Base

Rewrite each expression using each base only once.

1. $4^5 \cdot 4^3$
2. $2^4 \cdot 2^6 \cdot 2^2$
3. $5^6 \cdot 5^{-2} \cdot 5^{-1}$
4. $10^{-4} \cdot 10^4 \cdot 10^2$
5. $7^9 \cdot 7^3 \cdot 7^{-10}$
6. $9^2 \cdot 9^{-8} \cdot 9^6$

Simplify each expression.

7. $z^8 z^5$
8. $-4k^{-3} \cdot 6k^4$
9. $(-5b^3)(-3b^6)$
10. $(13x^{-8})(3x^{10})$
11. $(-2h^5)(4h^{-3})$
12. $-8n \cdot 11n^9$
13. $mn^2 \cdot m^2n^{-4} \cdot mn^{-1}$
14. $(6a^3b^{-2})(-4ab^{-8})$
15. $(12mn)(-m^3n^{-2}p^5)(2m)$

Write each answer in scientific notation.

16. The population of a country in 1950 was 6.2×10^7. The population in 2030 is projected to be 3×10^2 times the 1950 population. If the projection is correct, what will the population of the country be in 2030?

1.86×10^{10} people

17. The area of land that Rhode Island covers is approximately 1.5×10^3 square miles. The area of land that Alaska covers is a little more than 4.3×10^2 times the land area of Rhode Island. What is the approximate area of Alaska in square miles?

6.45×10^5 mi^2

Simplify each expression.

18. $16^{\frac{1}{4}}$
19. $125^{\frac{1}{3}}$
20. $243^{\frac{1}{5}}$
21. $8^{\frac{2}{3}}$
22. $64^{\frac{4}{3}}$
23. $25^{\frac{3}{2}}$
24. $\left(7q^{\frac{4}{3}} \cdot 6r^{\frac{3}{5}}\right) \cdot \left(7q^{\frac{1}{3}} \cdot 6r^{\frac{1}{5}}\right)$
25. $\left(3h^{\frac{5}{2}} \cdot 2k^{\frac{3}{4}}\right) \cdot \left(2k^{\frac{3}{2}} \cdot 3h^{\frac{5}{4}}\right)$
26. $\left(8p^{\frac{1}{6}} \cdot 5m^{\frac{1}{2}}\right) \cdot \left(8p^{\frac{1}{4}} \cdot 5m^{\frac{5}{6}}\right)$

Complete each equation.

27. $9^{-2} \cdot 9^4 = 9^{\square}$
28. $5^{\square} \cdot 5^3 = 5^2$
29. $2^8 \cdot 2^{\square} = 2^{-2}$
30. $z^{\square} \cdot z^{-5} = z^3$
31. $m^{\frac{1}{3}} \cdot m^{\frac{1}{6}} \cdot m^{\square} = m^2$
32. $d^7 \cdot d^{-13} \cdot d^{-9} = d^{\square}$

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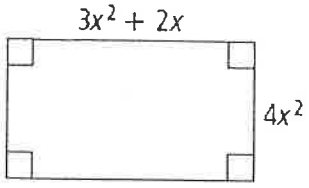
7-2 Practice

Form G

Multiplying Powers With the Same Base

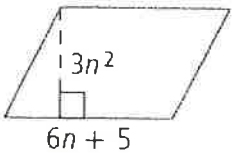
Find the area of each figure.

33.



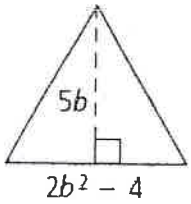
$12x^4 + 8x^3$ sq. units

34.



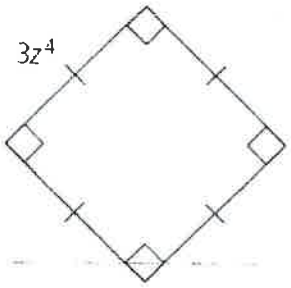
$18n^3 + 15n^2$ sq. units

35.



$5b^3 - 10b$ sq. units

36.



$9z^8$ sq. units

Simplify each expression. Write each answer in scientific notation.

37. $(7 \times 10^{17})(8 \times 10^{-28})$ — 5.6×10^{-10}

38. $(4 \times 10^{-11})(0.8 \times 10^{7})$ — 3.2×10^{-4}

39. $(0.9 \times 10^{15})(0.1 \times 10^{-6})$ — 9×10^{7}

40. $(0.8 \times 10^{5})(0.6 \times 10^{-17})$ — 4.8×10^{-13}

41. $(0.5 \times 10^{3})(0.6 \times 10^{0})$ — 3×10^{2}

42. $(0.2 \times 10^{11})(0.4 \times 10^{-14})$ — 8×10^{-5}

43. The diameter of the moon is approximately 3.5×10^3 kilometers.
   a. The diameter of Earth is approximately 3.7 times the diameter of the moon. Determine the diameter of Earth. Write your answer in scientific notation. 1.295×10^4 Km
   b. The distance from the center of Earth to the center of the moon is approximately 30 times the diameter of Earth. Determine the distance from the center of Earth to the center of the moon. Write your answer in scientific notation. 3.885×10^5 Km

Simplify each expression.

44. $\dfrac{1}{n^{-8} \cdot n^3}$

45. $\dfrac{1}{x^4 \cdot x^{-9}}$

46. $7k^4(-2k^6 - k)$

47. $-2x^2\left(-3x^{\frac{1}{2}} + 5\right)$

48. $4^x \cdot 4^{x+1} \cdot 4$

49. $(n + 2)^5(n + 2)^{-3}$

50. **Writing** Explain what moving the decimal point 4 places to the right or to the left does to the value of a number. In scientific notation, what power of 10 would you multiply by to move the decimal point 4 places to the right or to the left?