Chapter 2 Enrichment

Properties, Conversions and Exponents

This packet belongs to: _____

Name _____

Multiplication Riddles

Solve each set of exercises by using the choices in the right column. Then find the exercise number below the riddle and write the letter of that exercise above it.

For 1–9, choose the letter of the correct product.

1. $5 \times 5 \times 5$ **A.** 243

2. $8 \times 8 \times 8$ **E.** 64

3. $7 \times 7 \times 7 \times 7$ **H.** 1296

4. $10 \times 10 \times 10$ **O.** 512

5. $3 \times 3 \times 3 \times 3$ **R.** 1000

6. $4 \times 4 \times 4$ **S.** 128

7. $2 \times 2 \times 2 \times 2 \times 2 \times 2$ **T.** 81

8. 9×9 **U.** 2401

9. $6 \times 6 \times 6 \times 6$ **Y.** 125

What is the best thing to put into homemade pies?

$\overline{}$ $\overline{}$ $\overline{}$ $\overline{}$ $\overline{}$ $\overline{}$ $\overline{}$ $\overline{}$ $\overline{}$
  1   2   3   4   5   6   7   8   9

For 10–16, choose the letter of the property illustrated.

10. $18 \times 1 = 18$ **A.** Identity Property of Multiplication

11. $5 + 9 = 9 + 5$ **D.** Commutative Property of Multiplication

12. $100 \times 0 = 0$ **E.** Associative Property of Multiplication

13. $(6 + 16) + 26 = 6 + (16 + 26)$ **G.** Identity Property of Addition

14. $6 \times (16 + 26) = (6 \times 16) + (6 \times 26)$ **N.** Distributive Property

15. $28 + 0 = 28$ **O.** Associative Property of Addition

16. $4 \times (25 \times 17) = (4 \times 25) \times 17$ **P.** Property of Zero

                                                S. Commutative Property of Addition

What is full of holes but holds lots of water?

$\overline{}$ $\overline{}$ $\overline{}$ $\overline{}$ $\overline{}$ $\overline{}$ $\overline{}$
 10   11   12   13   14   15   16

3

Holt Pre-Algebra

8-5

Adding and Subtracting Polynomials

Add Polynomials To add polynomials, you can group like terms horizontally or write them in column form, aligning like terms vertically. **Like terms** are monomial terms that are either identical or differ only in their coefficients, such as $3p$ and $-5p$ or $2x^2y$ and $8x^2y$.

Example 1 Find $(2x^2 + x - 8) +$
$(3x - 4x^2 + 2)$.

Horizontal Method

Example 2 Find $(3x^2 + 5xy) +$
$(xy + 2x^2)$.

Vertical Method

Exercises

Find each sum.

1. $(4a - 5) + (3a + 6)$

2. $(6x + 9) + (4x^2 - 7)$

3. $(6xy + 2y + 6x) + (4xy - x)$

4. $(x^2 + y^2) + (-x^2 + y^2)$

5. $(3p^2 - 2p + 3) + (p^2 - 7p + 7)$

6. $(2x^2 + 5xy + 4y^2) + (-xy - 6x^2 + 2y^2)$

$8.$

8-5

Adding and Subtracting Polynomials

Subtract Polynomials You can subtract a polynomial by adding its additive inverse. To find the additive inverse of a polynomial, replace each term with its additive inverse or opposite.

Example Find $(3x^2 + 2x - 6) - (2x + x^2 + 3)$.

Horizontal Method

Use additive inverses to rewrite as addition. Then group like terms.

Vertical Method

Align like terms in columns and subtract by adding the additive inverse.

Exercises

Find each difference.

1. $(3a - 5) - (5a + 1)$

2. $(9x + 2) - (-3x^2 - 5)$

3. $(9xy + y - 2x) - (6xy - 2x)$

4. $(x^2 + y^2) - (-x^2 + y^2)$

5. $(6p^2 + 4p + 5) - (2p^2 - 5p + 1)$

6. $(6x^2 + 5xy - 2y^2) - (-xy - 2x^2 - 4y^2)$

9.

LESSON 2-8 **Challenge**
Stuff It!

$9^{\frac{1}{2}}$ means

In general, here's the way to rewrite a term with a fractional exponent:

$$x^{\frac{a}{b}} = \sqrt[b]{x^a}$$

Evaluate $8^{\frac{2}{3}}$.

Rewrite each term using radical form. Evaluate the root. Evaluate the power.

1. $64^{\frac{1}{2}}$ = _____

= _____

= _____

2. $100^{\frac{1}{2}}$ = _____

= _____

= _____

3. $400^{\frac{1}{2}}$ = _____

= _____

= _____

4. $64^{\frac{2}{3}}$ = _____

= _____

= _____

5. $216^{\frac{2}{3}}$ = _____

= _____

= _____

6. $1000^{\frac{2}{3}}$ = _____

= _____

= _____

7. $625^{\frac{3}{4}}$ = _____

= _____

= _____

8. $32^{\frac{2}{5}}$ = _____

= _____

= _____

9. $10,000^{\frac{5}{4}}$ = _____

= _____

= _____

Holt Pre-Algebra

	Required Enrichment You may use any means necessary to find these answers.	
1.	How many rods are in a furlong?	a=
2.	How many states in the USA begin with the letter M?	b=
3.	How many "blind mice" are there in the famous nursery rhyme?	c=
4.	How many states border Pennsylvania?	d=
5.	If a normal octopus got one leg cut off in an unfortunate accident, how may legs would she have left?	e=
6.	How many counties are in the state of Pennsylvania in the United States of America?	f=
7.	What is the atomic number of uranium?	g=
8.	What number is seven less than the number of years in a century?	h=
9.	What is ten squared, then doubled, plus one.	i=
10.	How many star points would 21 normal starfish have altogether?	j=
11.	What is the only even prime number?	k=
12.	How many items are in a gross?	l=
13.	In "Hickory Dickory Dock", at what hour did the mouse run down the clock?	m=
14.	How many bones are in an adult human skeleton?	n=
15.	How many keys are on a piano?	o=
16.	How many Fridays were in January 2003?	p=
17.	What is the total number of spots on a six-sided regular die?	q=
18.	What is the freezing point of water in degrees Celsius?	r=
19.	What is two times the number of letters in the English alphabet, plus two more?	s=
20.	What is the boiling point of water in degrees Fahrenheit?	t=
21.	What is the boiling point of water in degrees Celsius?	u=
22.	What is the freezing point of water in degrees Fahrenheit?	v=
23.	How many square feet are in a square yard?	w=
24.	How many meters are in a dekameter?	x=
25.	How old was Mickey Mouse on his birthday in **1988**?	y=
26.	How many dry quarts are in a peck?	z=

11.

In the space provided, SUBSTITUTE the numbers you have found into this expression, and simplify it down to one number. Be sure to show all of your work!

Hint: the answer is a whole number in the thousands.

$$yg + w - m + ri + \frac{[f - (s + q - x)](j) - [t - (o + a) + wb]}{d} + \frac{[az - (n + h)] \div [ec] + [(l + m) - p]}{u + v + (x - k) + m}$$

Solving Exponential Equations

Solve each equation by writing each side with the same base.

1) $2^x = 2^5$

2) $5^{3x} = 5^{3+x}$

3) $3^x = 3^{2x+2}$

4) $5^x = 25^3$

5) $4^{x+2} = 64$

6) $9^{2x-5} = 27$

7) $4^{3x+5} = 8^{4x-3}$

8) $5^{x-2} = 1$

9) $9^{2-x} = 81^{6x}$

10) $9^{4x-1} = 27^{5-x}$

11) $2^{x+3} - 1 = 1$

12) $4^{2x} + 1 = 65$

13.

13) $3^{x-2} + 5 = 32$

14) $-19 + 5^{2x} = 6$

15) $2^{2+x} \times 16^{x-3} = \dfrac{4^x}{16^{1+2x}}$

Solve each equation by writing each side with the same base. Use a separate sheet of paper to show your work.

1) $3^x = 9^5$

2) $4^{2x} = 4^{3+x}$

3) $4^x = 16^{2x+2}$

4) $3^{x-2} = 27^3$

5) $5^{x+3} = 125$

6) $4^{2x-5} = 64^{x+2}$

7) $64^{3x+5} = 2^{4x+3}$

8) $3^{x-2} = 1$

9) $6^{2x-5} = 216^{4x}$

10) $3^{x-1} + 4 = 13$

11) $4^{x+2} + 3 = 19$

12) $2^{2+x} - 8 = 24$

13) $3^{x+2} \times 9^{x-2} = 27^{2x+4}$

14) $\dfrac{2^{x+4}}{8^{2x-2}} = 4^{3x+4} \times 32^{x+2}$

14.

Bonus Opportunities for Chapter 2

1) Ten trillion is one followed by _____ zeros.

2) How many dimensions is a hypercube? Sketch a picture of one.

3) $x^3 = 2744$ find x

4) $\dfrac{(10 billion)^{10}}{googol} = ?$

5) $m^4 (((m^2)^3)^4)^2 = ?$

6) The speed of light is 3×10^8 meters per second. How many meters per day is that?

7) A jar contains 3 dozen cookies totaling 1.008 kilograms. How many grams does each cookie weigh?

8) Find all of the values of x that make both of the following inequalities true. $2x + 4 < 10$ & $5 - 3x \leq 17$

9) $0.01\overline{8}(55) = ?$

10) The term $\dfrac{a}{b}$ is a fraction. If 2 is added to the numerator, the value of the fraction is $\dfrac{1}{2}$. If 3 is added to the denominator, the fraction is $\dfrac{1}{3}$. The sum of a & b = ?

11) Simplify $10 + \left[5 + 2(3 - 4)^2\right] = ?$

12) Simplify $\left[\dfrac{a^{-6}(b^2)^{-4}}{b^3 a^0}\right]^{-2} = ?$ a & $b \neq 0$

13) Simplify $\left[\dfrac{2x^3 y^2 z}{3x^4 yz^{-2}}\right]^{-2} = ?$ x, y & $z \neq 0$

14) Simplify $\dfrac{(.5)^{-\frac{1}{2}}(1.5)^{\frac{1}{2}}(27)^5}{2^{-1}} = ?$

15) Simplify $\left[\dfrac{\left[(9) \times (.0\overline{8})\right]}{\left[2(5^{-1})\right]}\right]^3 = ?$

16) $\dfrac{-1.4a^c\left(99.3a^t b^3 - 7.96a^{19c}\right)}{a^b(c^a) - 9.779^3} = ?$ Round numerical terms to the nearest thousandth.

17) Solve the following equation for x... $6\left[(8 - 2x) - .5\right] = -\dfrac{3}{4}(40 - 4x) - 10x$