

Reteaching 4-2

Exponents

An *exponent* tells how many times a number is used as a factor.

$3 \times 3 \times 3 \times 3$ shows the number 3 is used as a factor 4 times.

$3 \times 3 \times 3 \times 3$ can be written 3^4 .

In 3^4 , 3 is the *base* and 4 is the exponent.

Read 3^4 as "three to the fourth power."

- To *simplify* a power, first write it as a product.

$$2^5 = 2 \times 2 \times 2 \times 2 \times 2 = 32$$

- When you simplify expressions with exponents, do all operations inside parentheses first. Then simplify the powers.

$$\begin{aligned} \text{Example: } 30 - (2 + 3)^2 &= 30 - 5^2 \\ &= 30 - 25 \\ &= 5 \end{aligned}$$

Name the base and the exponent.

1. 3^6

base _____
exponent _____

2. 6^2

base _____
exponent _____

3. 8^4

base _____
exponent _____

Write each expression using an exponent. Name the base and the exponent.

4. $9 \times 9 \times 9$

5. $6 \times 6 \times 6 \times 6$

6. $1 \times 1 \times 1 \times 1 \times 1$

Simplify each expression.

7. 6^2

8. 3^5

9. 10^4

10. $4^2 + 5^2$

11. $2 \times 6 - 2^3$

12. $6^2 + 4^2$

13. $5 + 5^2 - 2$

14. $24 \div 4 + 2^4$

15. $9 + (40 \div 2^3)$

16. $(4^2 + 4) \div 5$

17. $10 \times (30 - 5^2)$

18. $12 + 18 \div 3^2$



Exponents with whole number bases

Grade 6 Exponents Worksheet

Solve the following exponents.

1. $10^1 =$ _____

2. $1^8 =$ _____

3. $7^4 =$ _____

4. $10^9 =$ _____

5. $2^6 =$ _____

6. $7^1 =$ _____

7. $10^3 =$ _____

8. $10^8 =$ _____

9. $0^4 =$ _____

10. $7^6 =$ _____

11. $9^6 =$ _____

12. $3^1 =$ _____

Enrichment 3-1

Describing a Pattern

Patterns in Numbers

Number patterns are like secret codes. Once you understand what the pattern is, you have the ability to extend the pattern. Create some number patterns and then share them with others in your class. See if you can “unlock the codes” of your classmates’ number patterns.

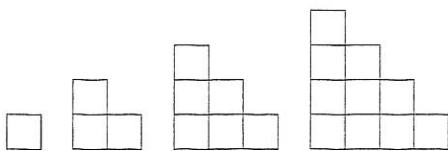
1. The number pattern 1, 4, 13, 16, 25 . . . is a two-addition pattern. The pattern is +3, +9, +3, +9 Create another pattern that is a two-addition pattern. Show at least ten terms in your pattern.

2. What is the number pattern in the sequence 50, 60, 55, 65, 60, 70 . . . ? Create another sequence of numbers using the same operations. Show at least ten terms in your pattern.

3. You can also use multiplication and division to create patterns. Create a pattern in which all numbers will be even numbers. Use at least two operations. Show at least ten terms in your pattern.

4. Create at least three patterns that could start with the terms 2, 4 Then write the next five terms in each pattern.

5. a. How many squares will be in the next shape below? _____
 b. Draw the next shape.



Practice 4-2

Exponents

Write each expression using an exponent. Name the base and the exponent.

1. $3 \times 3 \times 3 \times 3$

2. $7 \times 7 \times 7 \times 7 \times 7 \times 7$

3. $9 \times 9 \times 9$

Write each number in expanded form using powers of 10.

4. 98,364

5. 20,351,401

6. 875,020

Simplify each expression.

7. 9^2

8. 6^4

9. 5^3

10. $156 + (256 \div 8^2)$

11. $32 + 64 + 2^3$

12. $53 + 64 \div 2^3$

13. $(3 \times 4)^2$

14. $60 \div (8 + 7) + 11$

15. $2^2 \times 5^2 + 106$

16. $4 + 7 \times 2^3$

17. $60 + (5 \times 4^3) + 2^2 \times 55$

18. $7^2 + 4$

19. $7^2 - 7 \times 2$

20. $48 \div 4 \times 5 - 2 \times 5$

21. $(4^2 - 4) \times 10$

22. $(4 + 3) \times (2 + 1)$

23. $2^4 \times 2^5$

24. $12 \times (30 + 37)$

25. $(3 + 2) \times (6^2 - 7)$

26. $5 \times (9 + 4) + 362 \div 2$

27. $3^4 + 405 \div 81$

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Prime Factors (A)

Use a tree diagram to find the prime factors of each number.

91

100

220

205

201

124

194

231

118

Subtracting 2-Digit Numbers (H)

Name: _____

Date: _____

Calculate each difference.

$$\begin{array}{r} 83 \\ - 63 \\ \hline \end{array}$$

$$\begin{array}{r} 17 \\ - 11 \\ \hline \end{array}$$

$$\begin{array}{r} 88 \\ - 79 \\ \hline \end{array}$$

$$\begin{array}{r} 86 \\ - 18 \\ \hline \end{array}$$

$$\begin{array}{r} 86 \\ - 72 \\ \hline \end{array}$$

$$\begin{array}{r} 77 \\ - 55 \\ \hline \end{array}$$

$$\begin{array}{r} 33 \\ - 33 \\ \hline \end{array}$$

$$\begin{array}{r} 52 \\ - 36 \\ \hline \end{array}$$

$$\begin{array}{r} 46 \\ - 34 \\ \hline \end{array}$$

$$\begin{array}{r} 75 \\ - 17 \\ \hline \end{array}$$

$$\begin{array}{r} 67 \\ - 55 \\ \hline \end{array}$$

$$\begin{array}{r} 33 \\ - 27 \\ \hline \end{array}$$

$$\begin{array}{r} 35 \\ - 19 \\ \hline \end{array}$$

$$\begin{array}{r} 58 \\ - 36 \\ \hline \end{array}$$

$$\begin{array}{r} 96 \\ - 37 \\ \hline \end{array}$$

$$\begin{array}{r} 33 \\ - 31 \\ \hline \end{array}$$

$$\begin{array}{r} 57 \\ - 42 \\ \hline \end{array}$$

$$\begin{array}{r} 76 \\ - 21 \\ \hline \end{array}$$

$$\begin{array}{r} 92 \\ - 13 \\ \hline \end{array}$$

$$\begin{array}{r} 65 \\ - 16 \\ \hline \end{array}$$

$$\begin{array}{r} 78 \\ - 17 \\ \hline \end{array}$$

$$\begin{array}{r} 83 \\ - 82 \\ \hline \end{array}$$

$$\begin{array}{r} 94 \\ - 30 \\ \hline \end{array}$$

$$\begin{array}{r} 83 \\ - 70 \\ \hline \end{array}$$

$$\begin{array}{r} 41 \\ - 32 \\ \hline \end{array}$$

Adding 2-Digit Numbers (H)

Name: _____

Date: _____

Calculate each sum.

$$\begin{array}{r} 806 \\ + 73 \\ \hline \end{array}$$

$$\begin{array}{r} 484 \\ + 73 \\ \hline \end{array}$$

$$\begin{array}{r} 131 \\ + 51 \\ \hline \end{array}$$

$$\begin{array}{r} 213 \\ + 82 \\ \hline \end{array}$$

$$\begin{array}{r} 144 \\ + 50 \\ \hline \end{array}$$

$$\begin{array}{r} 316 \\ + 21 \\ \hline \end{array}$$

$$\begin{array}{r} 504 \\ + 50 \\ \hline \end{array}$$

$$\begin{array}{r} 214 \\ + 47 \\ \hline \end{array}$$

$$\begin{array}{r} 608 \\ + 30 \\ \hline \end{array}$$

$$\begin{array}{r} 641 \\ + 31 \\ \hline \end{array}$$

$$\begin{array}{r} 691 \\ + 96 \\ \hline \end{array}$$

$$\begin{array}{r} 234 \\ + 57 \\ \hline \end{array}$$

$$\begin{array}{r} 491 \\ + 90 \\ \hline \end{array}$$

$$\begin{array}{r} 849 \\ + 36 \\ \hline \end{array}$$

$$\begin{array}{r} 726 \\ + 48 \\ \hline \end{array}$$

$$\begin{array}{r} 907 \\ + 96 \\ \hline \end{array}$$

$$\begin{array}{r} 286 \\ + 59 \\ \hline \end{array}$$

$$\begin{array}{r} 916 \\ + 14 \\ \hline \end{array}$$

$$\begin{array}{r} 799 \\ + 70 \\ \hline \end{array}$$

$$\begin{array}{r} 442 \\ + 44 \\ \hline \end{array}$$

$$\begin{array}{r} 317 \\ + 34 \\ \hline \end{array}$$

$$\begin{array}{r} 987 \\ + 63 \\ \hline \end{array}$$

$$\begin{array}{r} 557 \\ + 33 \\ \hline \end{array}$$

$$\begin{array}{r} 788 \\ + 91 \\ \hline \end{array}$$

$$\begin{array}{r} 497 \\ + 88 \\ \hline \end{array}$$

Division Facts (H)

Find each quotient.

$4 \div 4 =$

$12 \div 3 =$

$25 \div 5 =$

$3 \div 3 =$

$12 \div 4 =$

$6 \div 2 =$

$8 \div 2 =$

$4 \div 4 =$

$2 \div 1 =$

$3 \div 1 =$

$15 \div 3 =$

$3 \div 3 =$

$10 \div 5 =$

$25 \div 5 =$

$16 \div 4 =$

$8 \div 4 =$

$12 \div 3 =$

$6 \div 3 =$

$3 \div 1 =$

$2 \div 1 =$

$16 \div 4 =$

$12 \div 4 =$

$4 \div 1 =$

$20 \div 5 =$

$6 \div 3 =$

$15 \div 5 =$

$20 \div 5 =$

$10 \div 2 =$

$9 \div 3 =$

$1 \div 1 =$

$3 \div 1 =$

$5 \div 5 =$

$10 \div 2 =$

$4 \div 2 =$

$5 \div 1 =$

$8 \div 2 =$

$12 \div 3 =$

$15 \div 5 =$

$12 \div 4 =$

$8 \div 2 =$

$4 \div 2 =$

$5 \div 1 =$

$15 \div 5 =$

$1 \div 1 =$

$5 \div 5 =$

$9 \div 3 =$

$4 \div 2 =$

$15 \div 5 =$

$25 \div 5 =$

$8 \div 2 =$

$15 \div 3 =$

$10 \div 5 =$

$5 \div 1 =$

$6 \div 3 =$

$4 \div 1 =$

$8 \div 4 =$

$6 \div 3 =$

$4 \div 1 =$

$20 \div 4 =$

$2 \div 2 =$

$12 \div 4 =$

$16 \div 4 =$

$15 \div 3 =$

$9 \div 3 =$

$6 \div 2 =$

$4 \div 4 =$

$20 \div 5 =$

$2 \div 1 =$

$5 \div 5 =$

$10 \div 2 =$

$1 \div 1 =$

$8 \div 4 =$

$3 \div 1 =$

$12 \div 3 =$

$15 \div 3 =$

$5 \div 5 =$

$2 \div 1 =$

$16 \div 4 =$

$20 \div 4 =$

$4 \div 2 =$

$2 \div 2 =$

$20 \div 5 =$

$8 \div 4 =$

$6 \div 2 =$

$1 \div 1 =$

$9 \div 3 =$

$25 \div 5 =$

$2 \div 2 =$

$4 \div 1 =$

$10 \div 2 =$

$20 \div 4 =$

$10 \div 5 =$

$3 \div 3 =$

$20 \div 4 =$

$4 \div 4 =$

$6 \div 2 =$

$3 \div 3 =$

$5 \div 1 =$

$10 \div 5 =$

$2 \div 2 =$

Five Minute Multiplying Frenzy (A)

Write the product of the column and row numbers in each space.

(Range 0 to 9)

8	2	9	0	5	4	1	6	7	3	×
										3
										4
										1
										8
										6
										9
										7
										0
										2
										5

Time: _____

/100

Skills Worksheet

Directed Reading A

Section: What Is Matter?

MATTER

1. What characteristic do a human, hot soup, the metal wires in a toaster, and the glowing gases in a neon sign have in common?

2. What is matter?

MATTER AND VOLUME

_____ 3. What unit would you use to measure the amount of water in a lake?

a. grams (g)

c. meters (m)

b. liters (L)

d. milliliters (mL)

_____ 4. What unit would you use to measure the volume of soda in a can?

a. centimeters (cm)

c. liters (L)

b. grams (g)

d. milliliters (mL)

5. What is volume?

6. Things with _____ cannot share the same space at the same time.

7. To measure a volume of water in a graduated cylinder, you should look at the bottom of the curve at the surface of the water called

the _____.

8. The volume of solid objects is commonly expressed

in _____ units.

9. What three dimensions are needed to find the volume of a rectangular solid?

10. How could the volume of a 12-sided object be found using water and a graduated cylinder?

Name _____ Class _____ Date _____

Directed Reading A *continued*

INERTIA

- _____ 24. The tendency of an object to resist a change in motion is known as
- a. mass.
 - b. gravitation.
 - c. inertia.
 - d. weight.

25. What is needed in order to cause an object at rest to move, or an object in motion to change its direction or speed?

26. How does mass affect the inertia of an object?

27. Why is it harder to get a cart full of potatoes moving than one that is empty?

Skills Worksheet

Directed Reading A

Section: Physical Properties

PHYSICAL PROPERTIES

- _____ 1. A characteristic of matter that can be observed or measured without changing the identity of the matter is a
- a. matter property.
 - b. physical property.
 - c. chemical property.
 - d. volume property.
- _____ 2. Some examples of physical properties are
- a. color, odor, and age.
 - b. color, odor, and speed.
 - c. color, odor, and magnetism.
 - d. color, odor, and anger.

Match the correct example with the correct physical property. Write the letter in the space provided.

- | | |
|--|-------------------------|
| _____ 3. Aluminum can be flattened into sheets of foil. | a. state |
| _____ 4. An ice cube floats in a glass of water. | b. solubility |
| _____ 5. Copper can be pulled into thin wires. | c. thermal conductivity |
| _____ 6. Plastic foam protects you from hot liquid. | d. malleability |
| _____ 7. Flavored drink mix dissolves in water. | e. odor |
| _____ 8. An onion gives off a very distinctive smell. | f. ductility |
| _____ 9. A golf ball has more mass than a table tennis ball. | g. density |

10. Density is the _____ that describes the relationship between mass and volume.
11. Objects such as a cotton ball and a small tomato can occupy similar volumes but vary greatly in _____.
12. If you pour different liquids into a graduated cylinder, the liquids will form layers based upon differences in the _____ of each liquid.
13. Which layer of liquid would settle on the bottom of a graduated cylinder?

Directed Reading A *continued*

14. Where will the least dense liquid be found?

15. Why would 1 kg of lead be less awkward to carry around than 1 kg of feathers?

16. What will happen to a solid object made from matter with a greater density than water when it is dropped into water?

17. How will knowing the density of a substance help you determine whether an object made from that material will float in water?

18. What is the equation for density?

19. What do D , V , and m stand for in the equation for density?

20. The units for density take the form of a mass unit divided by a(n)

_____ unit.

21. What are two reasons why density is a useful property for identifying substances?

Name _____ Class _____ Date _____

Directed Reading A *continued*

PHYSICAL CHANGES DO NOT FORM NEW SUBSTANCES

22. A change that affects only the physical properties of a substance is known as a(n) _____.

23. What kind of changes are melting and freezing?

Identify which of the following activities represent physical changes by writing PC in the space provided if they cause only physical changes. Put an X beside any that do not.

_____ 24. sanding a piece of wood

_____ 25. baking bread

_____ 26. crushing an aluminum can

_____ 27. melting an ice cube

_____ 28. dissolving sugar in water

_____ 29. molding a piece of silver

30. When a substance undergoes a physical change, its _____ does not change.

31. What is changed when matter undergoes a physical change? Give an example to explain your answer.

