

Name _____

Period _____

Chapter 1A Notes

Algebra 8

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Vocabulary

variable	constant	numerical expression
algebraic expression	evaluate	Simplify
power	base	exponent
Perfect Square	Square Root	Cubed Root

Real Numbers	Rational	Irrational
Natural	Whole	Integers
Terminating	Repeating	Fraction

Calculator Notes

Translating Expressions

Words used to describe mathematical operations				
Addition +	Subtraction -	Multiplication ×	Division ÷	Equal =

Write each algebraic expression in words two different ways.

$8 + k$

$\frac{c}{4}$

$10 - x$

$m - 6$

$4k$

$3(x+1)$

Model each situation with an algebraic expression.

Jared can type 35 words per minute. Write an expression for the number of words he can type in m minutes.

Mr. O'Brien's commute to work is 0.5 hour less than Miss Santos's commute. Write an expression for the length of Mr. O'Brien's commute if Miss Santos's commute is h hours.

Mrs. Knighten bought a box of c cookies and split them evenly between the 25 students in her classroom. Write an expression for the number of cookies each student received.

Samantha baked b brownies and split them between her and 5 of her friends. Write an expression for the number of brownies each person received.

Enrique collected 152 recyclable bottles, and Latasha collected b recyclable bottles. Write an expression for the number of bottles they collected altogether.

Tammy's current rent is r dollars. Next month it will be reduced by \$50. Write an expression for next month's rent in dollars.

One third of a number m .

A number w tripled plus a number t quadrupled.

The quotient of 5 plus d and 12 minus w .

Evaluating Algebraic Expressions

Evaluate each expression for $a = 2$ and $b = 6$.

$$a + b$$

$$ab$$

Evaluate each expression for $c = 12$ and $d = 4$.

$$c \div d$$

$$c + d$$

Evaluate each expression for $x = 3$, $y = 18$ and $z = 9$.

$$x(z)$$

$$y - x$$

$$y \div z$$

$$\frac{y}{z}$$

$$xy$$

$$zx$$

Tina is 4 years younger than her brother Jeff. Write an expression for Tina's age when Jeff is j years old.

Expression: _____

Find Tina's age when Jeff is 15, 20 and 58 years old.

Craig types 20 words per minute. Write an expression for the number of words Craig types in m minutes.

Expression: _____

Calculate the number of words Craig can type in 5, 17 and 50 minutes.

Approximately fourteen 20-ounce plastic bottles must be recycled to produce one square foot of carpet. Write an expression for the number of bottles needed to make c square feet of carpet.

Expression: _____

Find the number of bottles needed to make 40, 120 and 224 square feet of carpet.

Integer Operations

Rules for Multiplying and Dividing Integers

_____ \times or \div _____ = Positive

_____ \times or \div _____ = Positive

_____ \times or \div _____ = Negative

_____ \times or \div _____ = Negative

$$-6(4) \quad \frac{-15}{-3} \quad 24 \div -8 \quad -14 \times -2 \quad \frac{110}{10} \quad 8(7)$$

Write a multiplication problem that would result in a positive product.

Write a multiplication problem that would result in a negative product.

Write a division problem that would result in a positive quotient.

Write a division problem that would result in a negative quotient.

Rules for Adding and Subtracting Integers

- Think of all _____ and _____ problems as _____.
- Separate each number; paying attention to whether it is _____ or _____.
- If you have more _____ your answer will be _____.
- If you have more _____ your answer will be _____.

$$-8 + 4 - 3$$

$$5 + (-4) - 3$$

$$-9 - (-5)$$

$$5 + 8$$

$$-3 - 6$$

$$11 - (-7)$$

$$-7 - 4 - 3 - 2$$

$$3 + 8 + (-2)$$

$$-3 - 6 + 10$$

Put it Together: Evaluating and Integers

Evaluate each algebraic expression using $x = 7$, $y = -2$ and $z = -6$.

xyz

$x - y - z$

$\frac{z}{y} + x$

$xy - z$

$x - yz$

$x + y + z$

Write your own algebraic expression.

- You must use x , y and z as variables.
- You must use each one at least one time.
- When it is evaluated for $x = 7$, $y = -2$ and $z = -6$ the result must be negative.

Exponents

Power	Base	Exponent	Calculations	Answer
3^3				
4^2				
1^4				
9^5				

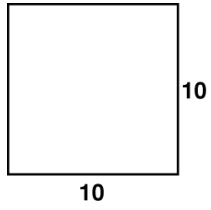
Memorize your Perfect Squares

$1^2 =$	$5^2 =$	$9^2 =$	$13^2 =$	$17^2 =$
$2^2 =$	$6^2 =$	$10^2 =$	$14^2 =$	$18^2 =$
$3^2 =$	$7^2 =$	$11^2 =$	$15^2 =$	$19^2 =$
$4^2 =$	$8^2 =$	$12^2 =$	$16^2 =$	$20^2 =$

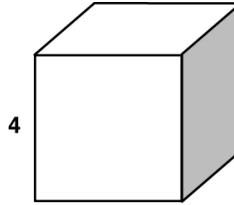
Quiz Yourself!

5^2	10^2	6^2	2^2	13^2
16^2	11^2	18^2	9^2	3^2
7^2	19^2	1^2	15^2	17^2
20^2	8^2	12^2	4^2	14^2

Find the area of the square below.

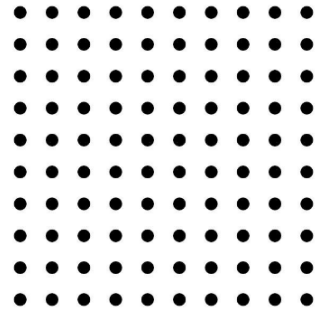
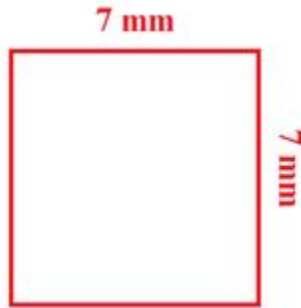
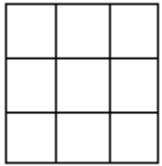


Find the volume of the cube below.

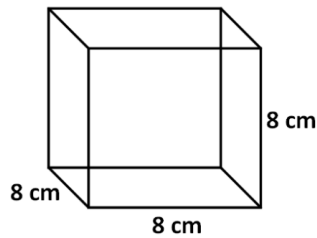
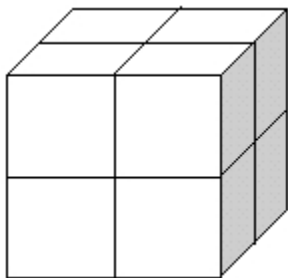


Formulas	
Area of a Square	Volume of a Cube

_____ of _____ can be modeled by a power.



_____ of _____ can be modeled by a power.



Simplifying Powers with Negatives

$$-9^2 \qquad (-9)^2$$

$$-5^3 \qquad (-5)^3$$

$$-3^4 \qquad (-2)^5$$

$$-1^9 \qquad (-1)^3$$

$$-8^1 \qquad (-6)^4$$

$$-.7^3 \qquad (-.25)^2$$

What conjectures can you make?

Write 16 as a power of 2.

Write 125 as a power of 5.

Write -27 as a power of -3.

Write 361 as a power of 19.

Write 289 as a power of -17.

Write 169 as a power of -13.

Put it Together: Evaluating and Exponents

Evaluate each expression for $a = 4$ and $b = -2$.

$$a^2 + b^2$$

$$a^3 - b$$

$$a + b^2 + b$$

Evaluate each expression for $x = -1$ and $y = -7$.

$$x^3 + y^2$$

$$y^3 - x$$

$$x + y^4 + y^3$$

Evaluate each expression for $m = -6$ and $n = 5$.

$$m^2n$$

$$-m + n^3 - m^3$$

$$(mn)^2$$

Radicals

Fill in each equation to make it true

$$\underline{\quad}^2 = 64$$

$$\underline{\quad}^2 = -81$$

$$\underline{\quad}^2 = 14$$

$$\underline{\quad}^3 = 27$$

$$\underline{\quad}^3 = -125$$

$$\underline{\quad}^3 = 117$$

What conjectures can you make?

Simplify each radical

$$\sqrt{100}$$

$$\sqrt{157}$$

$$\sqrt{196}$$

$$-\sqrt{1}$$

$$\sqrt{-49}$$

$$\sqrt{169}$$

$$\sqrt[3]{-64}$$

$$\sqrt{4}$$

$$\sqrt[3]{729}$$

$$\sqrt[3]{-216}$$

$$-\sqrt{324}$$

$$\sqrt{296}$$

Memorize the Rational Square Roots

$\sqrt{1} =$

$\sqrt{25} =$

$\sqrt{81} =$

$\sqrt{169} =$

$\sqrt{289} =$

$\sqrt{4} =$

$\sqrt{36} =$

$\sqrt{100} =$

$\sqrt{196} =$

$\sqrt{324} =$

$\sqrt{9} =$

$\sqrt{49} =$

$\sqrt{121} =$

$\sqrt{225} =$

$\sqrt{361} =$

$\sqrt{16} =$

$\sqrt{64} =$

$\sqrt{144} =$

$\sqrt{256} =$

$\sqrt{400} =$

Give the best integer estimate for each square root below.

$\sqrt{19}$

$-\sqrt{188}$

$\sqrt{290}$

$-\sqrt{7}$

$\sqrt{58}$

$\sqrt{97}$

Place each number on the number line.

$a. \sqrt{88}$

$b. -\sqrt{47}$

$c. -\sqrt{77}$

$d. \sqrt{1}$

$e. \sqrt{3}$



Using radicals to solve the problems below.

- Draw a picture.
- Write down a formula.
- Work backwards.

Max needs to paint a wall that is shaped like a square. He knows that the area of the wall is $75ft^2$. He needs to find the height of the wall. Find the height of the wall to the nearest tenth of a foot.

Peter is making a shed in the shape of a cube. He wants the volume of the shed to be $1728ft^3$. What should the dimensions of the shed be?

Paula has some bricks to make a square patio. She knows she has enough bricks to cover 50 square feet. She needs to find how long to make the patio. How long should Paula make the patio? Round your answer to the nearest tenth of a foot.

Allison is going to buy a new fish tank in the shape of a cube. She remembers that the volume of the tank is $3500in^3$ but cannot remember how wide the tank is. Allison needs to be able to fit the tank on her 15x15 inch table. Will she be able to?

Put it Together: Radicals and Exponents with Fractions

- Look at each fraction as 2 separate math calculations.
- Reduce fractions if possible.

Simplify each numerical expression.

$$\left(\frac{4}{5}\right)^2$$

$$\left(\frac{9}{4}\right)^3$$

$$\left(\frac{1}{6}\right)^1$$

$$\left(\frac{2}{7}\right)^5$$

$$\left(\frac{10}{12}\right)^2$$

$$\left(\frac{2}{1}\right)^2$$

$$-\left(\frac{1}{3}\right)^3$$

$$\left(\frac{-4}{5}\right)^2$$

$$\left(-\frac{2}{5}\right)^3$$

$$\sqrt{\frac{9}{81}}$$

$$\sqrt{\frac{121}{256}}$$

$$\sqrt[3]{\frac{-27}{64}}$$

$$\sqrt[3]{\frac{1}{125}}$$

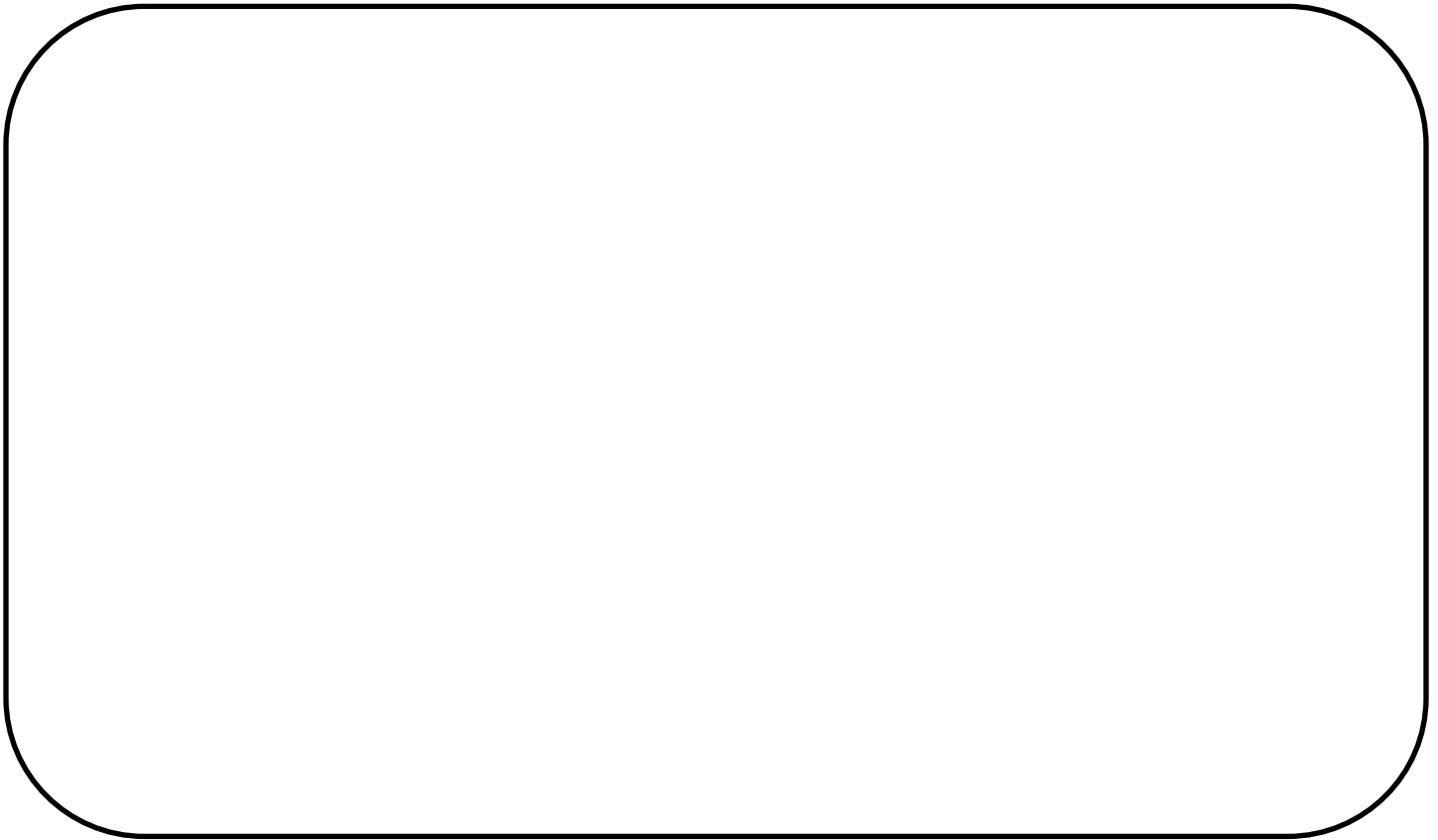
$$\sqrt{\frac{144}{196}}$$

$$\sqrt{\frac{36}{64}}$$

$$\sqrt{\frac{16}{400}}$$

$$\sqrt{\frac{25}{100}}$$

Classifying Numbers



Classify each number as rational or irrational. Justify your answer.

$$-\frac{1}{2}$$

$$12$$

$$0$$

$$\sqrt{\frac{9}{144}}$$

$$\sqrt{57}$$

$$\sqrt{169}$$

$$\frac{2}{3}$$

$$.75$$

$$-80$$

$$\sqrt{\frac{7}{100}}$$

$$\sqrt[3]{182}$$

$$\sqrt{197}$$

What types of numbers are always rational? Answer in a complete sentence.

What types of numbers can be rational or irrational? Answer in a complete sentence.

How can you tell if a square root is rational or irrational? Answer in a complete sentence.

How can you tell if a fraction inside of a square root is rational or irrational? Answer in a complete sentence.

Circle the math problems that you think would have rational answers. Explain your thinking.

$$2.7 + \sqrt{27}$$

$$\sqrt{36} - 9$$

$$\sqrt{\frac{4}{7}} + 12$$