

Name _____

KEY

INTEGRATED ALGEBRA REVIEW

This packet provides a review of the topics we learned this year.

- Go over each of the units by answering the practice problems to the best of your ability.
- If you answer most of the questions correctly, you are in pretty good shape for that specific unit.
- If you find yourself struggling to answer the questions in a unit that is perhaps a unit for which you need some review.

For more review of a Unit:

- Go back in your notes and review the material.
- Write down some of the questions in the unit. Close your notes and try to answer the questions. When you've given it your best try, look back at the notes and see if you were correct.
- Check the section in your book that corresponds and try a few questions. Odd numbered answers are in the back of the book.
- Use regentsprep.org website to review concepts that you struggle with.

Repeat this process until you are confident that you can answer any question from any unit with ease!

Unit 1 Topics:

- Definitions of number system.
- Identify and apply commutative and associative properties
- Identify and apply distributive, identity, inverse properties
- Identify and apply closure property
- Identify properties of binary operations
- Understand and use mathematical set notation and find unions and intersection of sets.

Sample Problems:

1. Operation \odot is defined on the set $\{a, b, c, d\}$ as shown in the table below:

- a. Is this operation commutative? *Yes (order doesn't matter)*
- b. Name the identity element, or explain why none exists. *NONE*
- c. For each element having an inverse, name the element and its inverse. *there is no element such that*
- d. True or false: *FALSE*
- d. $(c \odot b) = (d \odot c) \odot b$ *since there is no identity element, there is no inverse $X \odot _ = X$*

\odot	a	b	c	d
a	d	c	a	b
b	c	a	b	d
c	a	b	d	c
d	b	d	c	a

2. Express the following set of numbers using set builder notation:
 $\{2, 3, 4, 5, \dots\}$

$$\{x \mid x \geq 2, x \in \mathbb{Z}\}$$

3. Express the following set of numbers using interval notation:
 "The set of numbers greater than or equal to 2 and less than 20"

$$[2, 20)$$

4. If set $A = \{\text{red, orange, yellow}\}$ and set $B = \{\text{red, orange, yellow, green, blue, purple}\}$
 A is a subset of B . What is the complement of A ? *$\{\text{green, blue, purple}\}$*

5. If set $A = \{x \mid 0 \leq x \leq 10\}$ and set $B = \{x \mid 5 \leq x \leq 15\}$
 What is $A \cup B$? *$\{x \mid 0 \leq x \leq 15\}$*
 What is $A \cap B$? *$\{x \mid 5 \leq x \leq 10\}$*

6. Determine if each of the following sets is closed under division. Justify your answer.

$\{1\} \rightarrow$ *Yes $1/1 = 1$*

natural numbers

integers \rightarrow *No $\frac{2}{2} = 1 \notin \mathbb{Z}$*

rational numbers

Yes $\frac{Q}{Q} = Q$

No $\frac{\mathbb{N}}{\mathbb{N}} \neq \mathbb{N}$

Unit 2

Unit 2 Topics:

- Solving two-step and multi-step equations. (Section 2-3)
- Solving equations with variables on both sides A.A.22 (Section 2-4)
- Analyze and solve verbal problems whose solution requires solving a linear equation in one variable A.A.6 (Sections 2-3 through 2-5)
- Solving for a variable A.A.22 (Section 2-5)
- Solve problems involving commission, tax, tip, gratuity, and sale price A.N.5 (Section 2-8 and 2-9)
- Solve problems involving interest rate ($I=prt$) A.N.5 (Section 2-8 and 2-9)
- Solve problems involving percent of increase and decrease A.N.5 (Section 2-10)
- Write and use rates, ratios, unit rates, and measurement conversions A.M.1 and write and solve proportions A.M.2. (Section 2-6)
- Use proportions to solve similar figure problems A.N.5 (Section 2-7)

7. Solve for x. Check.

$$5 - x - 2 = 3 + 4x + 5$$

$$3 - x = 4x + 8$$

$$\begin{aligned} 3 - x &= 4x + 8 \\ -3 &= 5x + 8 \\ \frac{-5}{5} &= \frac{5x + 8}{5} \\ -1 &= x \end{aligned}$$

ck

$$\begin{aligned} 5 - (-1) - 2 &= 3 + 4(-1) + 5 \\ 5 + 1 - 2 &= 3 - 4 + 5 \\ 6 - 2 &= -1 + 5 \\ 4 &= 4 \checkmark \end{aligned}$$

8. Solve for a.

$$\frac{a+2}{6} = \frac{a-3}{5}$$

$$\begin{aligned} 5(a+2) &= 6(a-3) \\ 5a+10 &= 6a-18 \\ -5a & \quad -5a \\ -10 &= a-18 \\ +18 & \quad +18 \\ 8 &= a \end{aligned}$$

9. The length of a rectangle is 2 more than twice its width. If the perimeter is 58, find the length and the width of the rectangle.

$$P = 2l + 2w$$

let $x = \text{width}$

$$58 = 2(2x+2) + 2(x)$$

then $2x+2 = \text{length}$

$$58 = 4x + 4 + 2x$$

$$\begin{aligned} 58 &= 6x + 4 \\ -4 & \quad -4 \\ 54 &= 6x \\ \frac{54}{6} &= \frac{6x}{6} \\ 9 &= x \end{aligned}$$

$$\begin{aligned} \text{length} &= 2x + 2 \\ &= 2(9) + 2 \\ &= 18 + 2 \\ &= 20 \end{aligned}$$

10. Find the value of y in the equation below:

$$2y + yz = 1 + z$$

$$\frac{y(2+z)}{(2+z)} = \frac{1+z}{2+z}$$

$$y = \frac{1+z}{2+z}$$

11. Solve this equation for x. $a + 2xy = z$

$$a + 2xy = z$$

$$2xy = z - a$$

$$x = \frac{z-a}{2y}$$

length = 20
width = 9

12. Cassidy wants to buy a new sweater. The original cost is \$45.49. She has a coupon for 30% off and the sales tax is 8%. Find the total cost of the sweater, including tax.

$$45.49(.30) = \$13.65 \text{ off}$$

$$31.84(.08) = 2.55 \text{ tax}$$

$$45.49 - 13.65 = 31.84 \text{ reduced price}$$

$$31.84 + 2.55 = \$34.39 \text{ total cost}$$

13. The cost of a new car increased from \$12,500 in 2001 to \$17,000 in 2008. What is the percent increase in cost?

$$\frac{\text{amt. of inc}}{\text{original}} = \frac{4500}{12500} = .36 = 36\% \text{ increase.}$$

14. Mitchell invested \$11,000. Is he earns 6% interest and leaves the money in the account, how much will his account be worth in 5 years?

$$I = prt$$

$$I = 11000(.06)(5)$$

$$I = 3300$$

$$\$14,300$$

15. If Pete drove 300 miles at a rate of 50 miles per hour, find the number of hours Pete traveled.

$$\frac{\text{miles}}{\text{hr}} = \frac{300}{x} = \frac{50}{1}$$

$$x = 6 \text{ hrs}$$

$$\text{Total} = \frac{11000}{+ 3300} = 14300$$

16. Joey is 5 ft tall. He is standing next to a tree and he wants to calculate the height of the tree. His shadow is 8 ft long. The shadow of the tree is 22 ft. How tall is the tree? Round your answer to the nearest tenth.

$$\frac{5}{8} = \frac{x}{22}$$

$$x = 13.8 \text{ ft}$$



