

## Algebra II Summer Packet

**Directions:** You are responsible for knowing how to complete all topics included in this packet by the first day of school. If you have any questions, please see your teacher during the first week of school. Answer keys will be provided on the school website before the end of summer break.

### **A. Order of Operations**

**\*Supplemental Video:** [https://www.khanacademy.org/math/pre-algebra/order-of-operations/order\\_of\\_operations/v/more-complicated-order-of-operations-example](https://www.khanacademy.org/math/pre-algebra/order-of-operations/order_of_operations/v/more-complicated-order-of-operations-example)

**\*Online Resources and Practice Problems:**

<https://www.ixl.com/math/algebra-1/order-of-operations-with-rational-numbers>  
and <http://www.regentsprep.org/regents/math/algebra/aop2/indexAOP2.htm>

**Directions:** Use PEMDAS to evaluate the following problems.

1.  $a^3 \cdot (b + c)$  where  $a = -2, b = 4, c = -8$

2.  $-s^2 - t(-2) - r$  where  $r = 12, s = 2, t = 3$

3.  $\frac{f-g(-1 \cdot f^2)+6}{f+4 \cdot -f}$  where  $f = 3, g = 2$

4.  $z(x - 2) - 9 + y^2$  where  $x = 8, y = -1, z = -2$

5. Find and cross out the two errors in the work below:

$$(1 - 3^4) - 2 + -1 * 3$$

$$(-2)^4 - 2 + -1 * 3$$

$$16 - 2 + - 3$$

$$16 - \frac{2}{3}$$

$$15\frac{1}{3}$$

## **B. Simplifying Algebraic Expressions**

### ***\*Supplemental Video:***

[https://www.khanacademy.org/math/algebra-basics/core-algebra-expressions/core-algebra-manipulating-expressions/e/combining\\_like\\_terms\\_2](https://www.khanacademy.org/math/algebra-basics/core-algebra-expressions/core-algebra-manipulating-expressions/e/combining_like_terms_2)

### ***\*Online Resources and Practice Problems:***

<https://www.ixl.com/math/algebra-1/simplify-variable-expressions-involving-like-terms-and-the-distributive-property>,

<http://www.regentsprep.org/regents/math/algebra/AV1/indexAV1.htm>,

<http://www.regentsprep.org/regents/math/algebra/av2/indexAV2.htm>,

and <http://www.regentsprep.org/regents/math/algebra/an1/tdistrib.htm>

**Directions: Simplify each expression.**

6.  $3x - 9(2x - 1)$

7.  $(4w + 5)(3w - 12)$

8.  $(8x + 3)^2$

9.  $23b - 28c + 4b(2 + c) - bc$

## **C. Solving Basic Equations**

***\*Supplemental Video:*** <https://www.khanacademy.org/math/algebra-basics/core-algebra-linear-equations-inequalities/core-algebra-solving-basic-equations/v/solving-equations-1>

### ***\*Online Resources and Practice Problems:***

<https://www.ixl.com/math/algebra-2/solve-linear-equations>

<http://www.regentsprep.org/regents/math/algebra/ae2/indexAE2.htm>

**Directions: Solve for x. Simplify answers, if fractions, reduce to lowest terms.**

10.  $2x - 9 = 51$

11.  $3x + 2 = -2x - 13$

12.  $-2(x + 9) = 8x - 4$

13.  $-13 + 7(3x - 1) = -4(-3 + 3x) - 2x$

14.  $-5n - 3n = -5(n + 3) - 4(n - 1)$

15.  $3(2x - 4) = -2(8x + 5)$

16.  $\frac{(x-2)}{5} = \frac{3x}{9}$

17.  $\frac{-(x+9)}{4} = \frac{8x+1}{3}$

**D. Fraction Operations*****\*Supplemental Videos:***<https://www.khanacademy.org/math/arithmetic/fractions>***\*Online Resources and Practice Problems:***<https://www.ixl.com/math/fractions><http://www.regentsprep.org/regents/math/algebra/av5/indexAV5.htm>**Directions: Simplify each expression.**

18.  $\frac{2}{5} + \frac{3}{10} - \frac{1}{2}$

19.  $\frac{1}{2} \cdot \frac{2}{5} + \frac{3}{4} \cdot \frac{2}{3}$

20.  $b = 2\frac{2}{7}$ ,  $c = \frac{1}{2}$

Find:  $b - c$ 

21.  $d = \frac{-2}{3}$ ,  $f = \frac{5}{11}$

Find  $d + f$ 

22.  $\frac{1}{2} \bullet \frac{2}{7} \bullet \frac{-1}{5}$

23.  $\frac{3}{4} \div \frac{1}{7}$

## E. Exponent Properties

### \*Supplemental Videos:

<https://www.khanacademy.org/math/in-seventh-grade-math/exponents-powers/laws-exponents-examples/v/exponent-properties-1>

### \*Online Resources and Practice Problems:

<https://www.mathplanet.com/education/algebra-1/exponents-and-exponential-functions/properties-of-exponents>

**Directions: Simplify using the properties of exponents.**

24.  $2xy * 4x^4y^3$

25.  $(4mn^2)^4$

26.  $\frac{4a^3b^3}{3b^2}$

27.  $(3m^3n^0)^4$

## F. Functions

### \*Supplemental Videos:

<https://www.khanacademy.org/math/algebra/algebra-functions>

### \*Online Resources and Practice Problems:

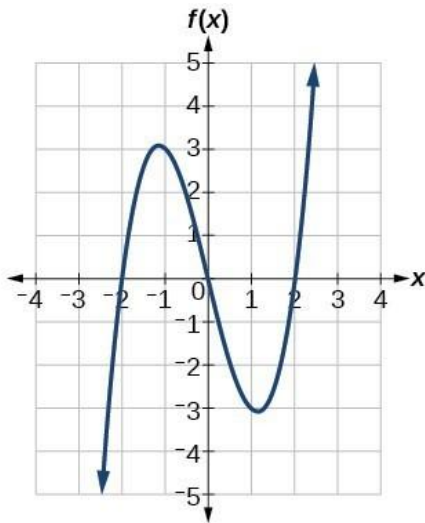
<https://www.mathplanet.com/education/algebra-1/discovering-expressions,-equations-and-functions/representing-functions-as-rules-and-graphs>

**Directions: Complete all questions.**

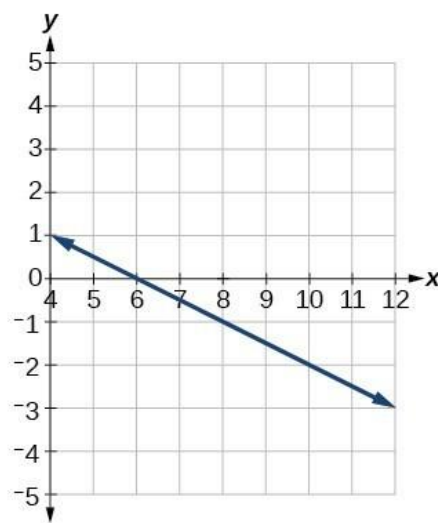
28. Fill in the blanks with input or output:

For a relation to be a function, each \_\_\_\_\_ must produce exactly one \_\_\_\_\_.

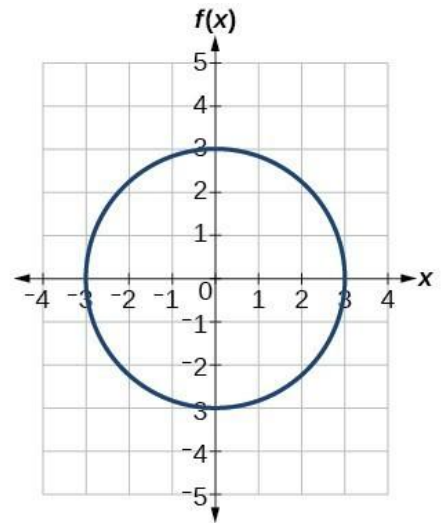
29. State whether or not each relation is a function: (Hint: remember the vertical line test!)



(a)



(b)



(c)

30. Does “domain” correspond to input or output? Does “domain” mean x or y values?

31. Does “range” correspond to input or output? Does “range” mean x or y values?

32.  $f(x) = 3x^3 - 2x^2 + x - 4$

$g(x) = 4x^2 + 3x$

$h(x) = -8$

$k(x) = 3x - 2$

a. Determine:  $f(x) + g(x)$

b. Determine:  $f(x) - k(x)$

c. Determine:  $h(x) \cdot g(x)$

d. Determine:  $k(x) \cdot g(x)$