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**PUBLIC SCHOOLS**

# Summer Packet for students entering Algebra 2

Welcome to Algebra 2. Algebra 2 is an extension of the skills you learned in Algebra 1 and Geometry. You are expected to have a strong background in the skills reviewed in this packet. Resource links are listed within each section throughout the packet. This packet will be checked for completion and entered as formative Infinite Campus grade.

**DUE:** 1<sup>st</sup> week of school.

Have a great summer and see you in the fall! 😊

## Section 1: Linear Equation

### Linear Equations Links:

[Solving Linear Equations](#)

1. Solve each of the following equations for  $x$

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

b.  $\frac{2}{3}x + 5 = \frac{1}{2}x + 2$

c.  $3(x - 5) + 1 = 2(x + 4) - 3$

## Section 2: Linear Functions

### Linear Functions Links:

[Linear Functions](#)

[Slope](#)

[Linear Systems](#)

2. Graph the equation and identify each of the following:

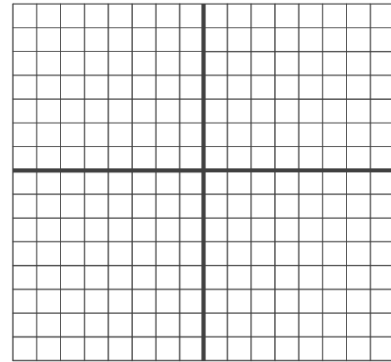
$$y = \frac{2}{3}x - 1$$

a. Slope = \_\_\_\_\_

b. Y-intercept = \_\_\_\_\_

c. When  $x = -3$ ,  $y =$  \_\_\_\_\_

d. When  $y = 4$ ,  $x =$  \_\_\_\_\_



3. Solve the given system of equations using the given method

a. By Graphing:

$$y = -2x + 4$$

$$y = 3x - 1$$

b. By Substitution

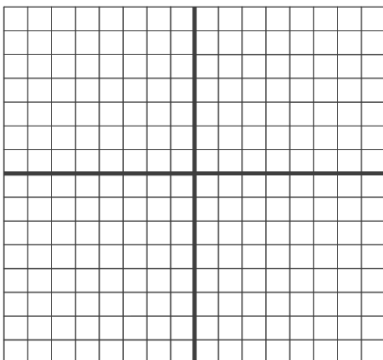
$$y = 3x - 5$$

$$x + y = 3$$

c. By Elimination

$$x + y = 7$$

$$-3x + 2y = -6$$



### Section 3: Operations with polynomials

#### **Operation Links:**

[Multiplying Polynomials Using an Area Model](#)

[Adding and Subtracting Polynomials](#)

Perform the indicated operation:

4.  $(x^2 - 2x + 3) + (3x^2 - 4x - 7)$

5.  $(3x^2 - 1) - (4x^2 - 2x)$

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

7.  $(x + 4)^2$

### Section 4: Quadratics

#### **Factoring Links:**

[Factoring leading coefficient of 1](#)

[Factoring with Leading Coefficient Not 1](#)

[Factoring with GCF](#)

[Factoring difference of two squares](#)

[Factoring Using an Area Model](#)

**Factor** each of the following completely:

8.  $f(x) = x^2 + 5x + 6$

9.  $f(x) = x^2 - 5x + 6$

10.  $g(x) = x^2 - 7x - 18$

11.  $g(x) = x^3 - 16x^2 + 63x$

12.  $h(x) = 2x^2 + 5x + 2$

13.  $r(x) = x^2 - 9$

14.  $k(x) = 4x^2 + 24x - 64$

15.  $t(x) = 6x^2 - 17x + 5$

**Solving Quadratics Links:**[Solve by square rooting](#)[Solving by Factoring](#)[Solving Using the Quadratic Formula](#)

16. Find the solution(s) by taking the square root:

a.  $x^2 = 9$

b.  $2x^2 = 72$

c.  $(x - 5)^2 = 36$

d.  $2(x - 3)^2 - 32 = 0$

17. Find the zeros from factored form.

a.  $(x + 3)(x - 5) = 0$

b.  $(2x - 1)(x + 10) = 0$

c.  $x(3x + 6)\left(x - \frac{1}{2}\right) = 0$

18. Find the zeros using the zero-product property (factoring):

a.  $x^2 + 3x - 40 = 0$

b.  $2x^2 + 5x - 12 = 0$

c.  $x^3 + 4x^2 + 3x = 0$

19. Solve using the quadratic formula.

a.  $2x^2 + 3x - 8 = 0$

b.  $3x^2 + 2x = 10$

c.  $(x + 1)(x + 2) = 8$

**Section 5: Radicals****Radicals Links:**[Simplifying Square Roots](#)[Rationalizing the denominator](#)

20. Simplify the radical.

a.  $\sqrt{75}$

b.  $\sqrt{45}$

c.  $\sqrt{32}$

d.  $\sqrt{54}$

21. Rationalize the denominator.

a.  $\frac{1}{\sqrt{3}}$

b.  $\frac{2}{\sqrt{7}}$

c.  $\frac{6}{\sqrt{5}}$

## Section 6: Functions

### Function Links:

[Domain, Range, and Interval Notation](#)

[Functions and Function Notation](#)

22. Write the inequality in interval notation.

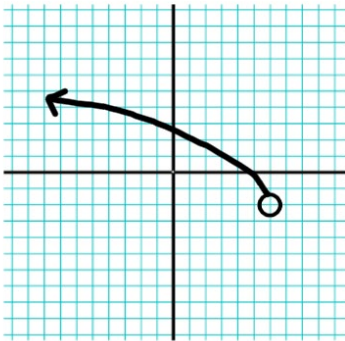
a.  $x > 7$

b.  $x \leq -5$

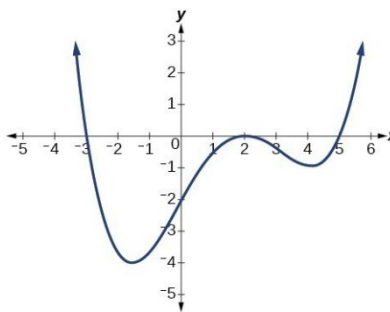
c.  $2 < x \leq 8$

23. Identify the domain and range in interval notation, as well as, x-intercept(s) and y-intercept(s).

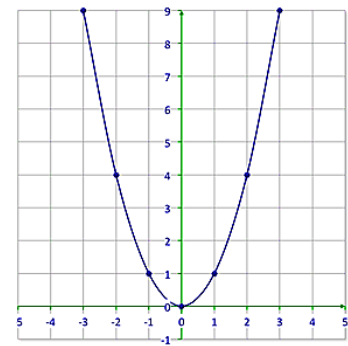
a.



b.



c.



Domain: \_\_\_\_\_

Domain: \_\_\_\_\_

Domain: \_\_\_\_\_

Range: \_\_\_\_\_

Range: \_\_\_\_\_

Range: \_\_\_\_\_

x-intercept \_\_\_\_\_

x-intercept \_\_\_\_\_

x-intercept \_\_\_\_\_

y-intercept \_\_\_\_\_

y-intercept \_\_\_\_\_

y-intercept \_\_\_\_\_

24. Evaluate the following expressions given the functions below:

$$g(x) = 2x + 1$$

$$f(x) = x^2 + 9$$

$$h(x) = -3x + 5$$

a.  $g(10)$

b.  $g(x) = 19$

c.  $f(-3)$

d.  $h(4)$

25. Evaluate each using the given graph:

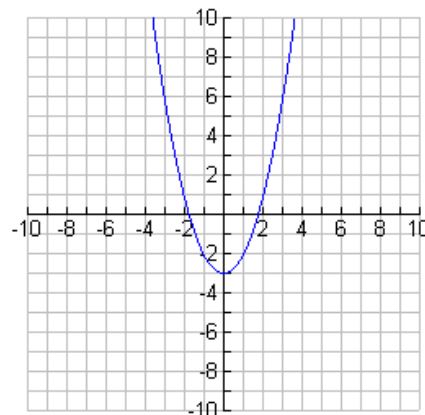
Find:

$f(1) = \underline{\hspace{2cm}}$

$f(-2) = \underline{\hspace{2cm}}$

$f(0) = \underline{\hspace{2cm}}$

$f(x) = 6, x = \underline{\hspace{2cm}}$



## Section 7: Properties of Exponents

Exponent Links: [Properties of Exponents](#)

26. Simplify each of the following:

a)  $x^2 \cdot x^3$

b)  $\frac{x^8}{x^5}$

c)  $3x^6 \cdot 5x^7$

d)  $\frac{x^4}{x^{10}}$

e)  $(4x)^2$

f)  $y^0$

g)  $t^{-1}$

h)  $2x^{-3}$

## Algebra 2 Summer Packet Answer Key

1a.  $x = -3$

1b.  $x = -18$

1c.  $x = 19$

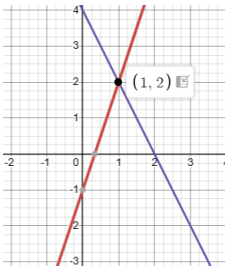
2a. Slope =  $\frac{2}{3}$

2b. y-intercept:  $(0, -1)$

2c.  $y = -3$

2d.  $x = \frac{15}{2}$

3a. *Solution:*  $(1, 2)$



3b. *Solution:*  $(2, 1)$

3c. *Solution:*  $(4, 3)$

4.  $4x^2 - 6x - 4$

5.  $-x^2 + 2x - 1$

6.  $2x^2 + 5x - 12$

7.  $x^2 + 8x + 16$

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

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

10.  $(x - 9)(x + 2)$

11.  $x(x - 9)(x - 7)$

12.  $(2x + 1)(x + 2)$

13.  $(x + 3)(x - 3)$

14.  $4(x + 8)(x - 2)$

15.  $(3x - 1)(2x - 5)$

16a.  $x = \pm 3$

16b.  $x = \pm 6$

16c.  $x = -1$  and  $x = 11$

16d.  $x = -1$  and  $x = 7$

17a.  $x = -3$  and  $x = 5$

17b.  $x = -10$  and  $x = \frac{1}{2}$

17c.  $x = -2, x = 0$  and  $x = \frac{1}{2}$

18a.  $x = -8$  and  $x = 5$

18b.  $x = -4$  and  $x = \frac{3}{2}$

18c.  $x = -3, x = -1,$  and  $x = 0$

19a.  $x = \frac{-3 \pm \sqrt{73}}{4}$

19b.  $x = \frac{-2 \pm \sqrt{124}}{6} = \frac{-1 \pm \sqrt{31}}{3}$

19c.  $x = \frac{-3 \pm \sqrt{33}}{2}$

20a.  $5\sqrt{3}$

20b.  $3\sqrt{5}$

20c.  $4\sqrt{2}$

20d.  $3\sqrt{6}$

21a.  $\frac{\sqrt{3}}{3}$

21b.  $\frac{2\sqrt{7}}{7}$

21c.  $\frac{6\sqrt{5}}{5}$

22a.  $(7, \infty)$

22b.  $(-\infty, -5]$

22c.  $(7, 8]$

23a. Domain:  $(-\infty, 6)$

Range:  $(-2, \infty)$

x-intercept:  $(5, 0)$

y-intercept:  $(0, \sim 2.7)$

23b. Domain:  $(-\infty, \infty)$

Range:  $[-4, \infty)$

x-intercept:  $(-3, 0), (2, 0), (5, 0)$

y-intercept:  $(0, -2)$

23c. Domain:  $(-\infty, \infty)$

Range:  $[0, \infty)$

x-intercept:  $(0, 0)$

y-intercept:  $(0, 0)$

24a.  $g(10) = 21$

24b.  $x = 9$

24c.  $f(-3) = 18$

24d.  $h(4) = -7$

25.  $f(1) = -2$

$f(-2) = 0$

$f(0) = -3$

$f(x) = 6, x = -3, 3$

26a.  $x^5$

26b.  $x^3$

26c.  $15x^{13}$

26d.  $\frac{1}{x^6}$

26e.  $16x^2$

26f. 1

26g.  $\frac{1}{t}$

26h.  $\frac{2}{x^3}$