

## 2021 Algebra 1 Summer Practice

Students entering Algebra 1 are expected to recall basic middle school mathematics skills that pertain to arithmetic and pre-algebra. Below are practice problems that students may choose to complete throughout the summer in preparation for taking an Algebra 1 class in the 2021-2022 school year. If they so choose, students may work on these problems to reinforce the skills learned this past school year.

If you have any questions, you may refer to the following websites for assistance:

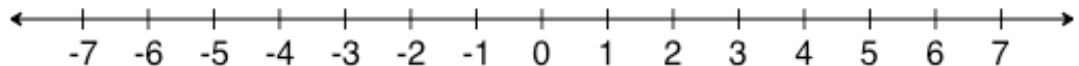
- <https://www.khanacademy.org/math/algebra/one-variable-linear-inequalities/alg1-inequalities/v/plotting-inequalities-on-a-number-line>
- <https://www.khanacademy.org/math/pre-algebra/pre-algebra-arith-prop/pre-algebra-order-of-operations/v/introduction-to-order-of-operations>
- <https://www.khanacademy.org/math/algebra/introduction-to-algebra/alg1-manipulating-expressions/v/combining-like-terms-and-the-distributive-property>
- <https://www.khanacademy.org/math/algebra-home/alg-basic-eq-ineq/alg-old-school-equations/v/algebra-linear-equations-1>
- <https://www.khanacademy.org/math/algebra/two-var-linear-equations/slope/v/introduction-to-slope>
- <https://www.khanacademy.org/math/algebra/two-var-linear-equations/slope-intercept-form/v/slope-intercept-form>

### I. Graphing Inequalities

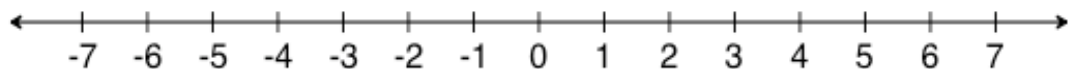
1. Graph each of the following inequalities on a number line.

RECALL: Use an open OR closed circle and then shade correctly.

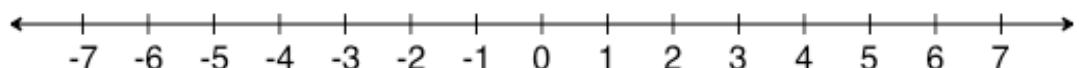
a.  $x \leq 3$



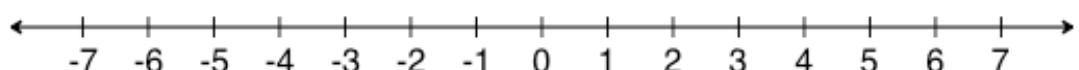
b.  $x > -1$



c.  $3x \geq 12$



d.  $5x > 10$



## II. Order of Operations (PEMDAS)

**Evaluate** means to find the value of an expression. To evaluate expressions, replace the variable with the given number and simplify using order of operations. Show all work.

1.) Evaluate  $x^2 - 4x + 9$ , when  $x = -3$

2.) Evaluate  $q^2 - (h^3 - 4j)$ , when  $q = 7$ ,  $h = 3$  and  $j = -5$

3.) Evaluate  $\frac{20 - c}{b}$ , when  $b = 4$ , and  $c = -8$

4.) Evaluate  $\frac{2(5ab)}{c}$ , when  $a = 3$ ,  $b = 2$ , and  $c = -12$

## III. Simplifying Variable Expressions

Simplify each expression by distributing and combining like terms.

1. $-13 - 4y - 5z + 15 - (-4z) + 11y$	2. $20xy + 3x^2y - 10x^2y - 30xy$
3. $-3(2x - 5y)$	4. $9(2x + 4) - 2(3x - 1)$

$$5. 9(6 + 2y) - 5 + 2y$$

#### IV. Solving Equations

Solve and check each equation.

$$1. x - 4 = 2$$

$$2. w + \frac{2}{3} = \frac{5}{6}$$

$$3. 7a = -49$$

$$4. \frac{m}{6} = 3$$

$$5. \frac{4}{5}y = 12$$

$$6. 5x + 2 = 2$$

$$7. 7 = 6m - 47$$

$$8. 2(3x - 6) = 12$$

$$9. -3(2x + 5) + 3 = 12$$

$$10. 3(x - 2) = 5(2x - 7)$$

$$11. -4(2x + 9) = -8x + 2$$

$$12. 5y + 3 = -6y + 9 + 2$$

$$13. 12 + 3n = 3(n + 4)$$

$$14. 5 = \frac{1}{3}y$$

### V. Lines and Slope

Calculate the slope between two points using the slope formula.

1. (3, -2) and (5, 9)

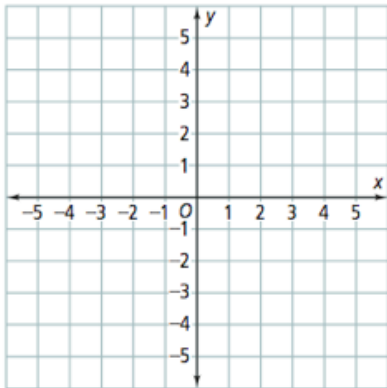
2. (1, 4) and (8, 5)

3. (-8, 7) and (-8, 3)

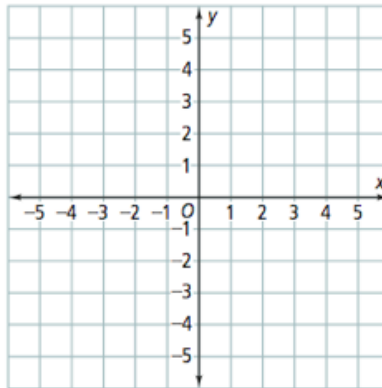
4. (2, 6) and (7, 6)

Identify the slope and y-intercept of each equation. Then, graph the line on the graph provided.

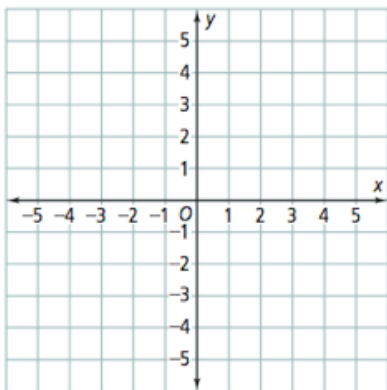
1.  $y = 4x - 3$



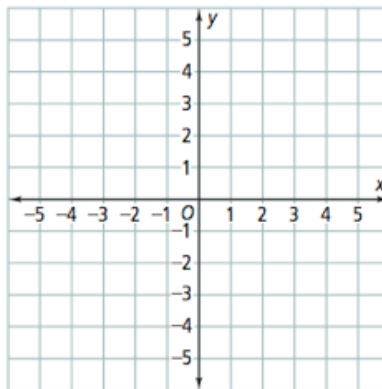
2.  $y = -2x + 7$



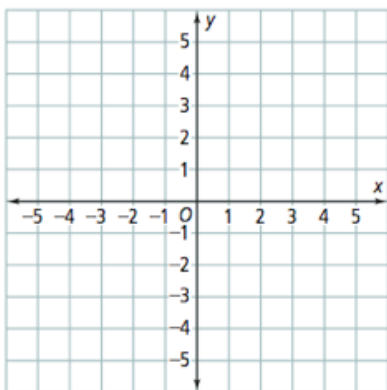
3.  $y = \frac{1}{2}x$



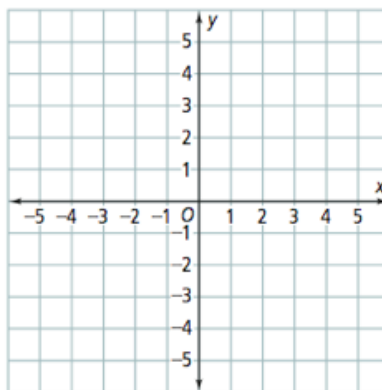
4.  $y = 4$



5.  $x = -3$



6.  $y = -\frac{3}{2}x$



## VI. Open Ended Questions

1. Which equation(s) define  $y$  as a nonlinear function of  $x$ ? Select ALL that apply.

A.  $y = 7.4x$

B.  $y = 2x + 5^2$

C.  $y = 10x^2$

D.  $y = 5x - 3$

E.  $y = \frac{x}{2}$

F.  $y = 2x^3 + 1$

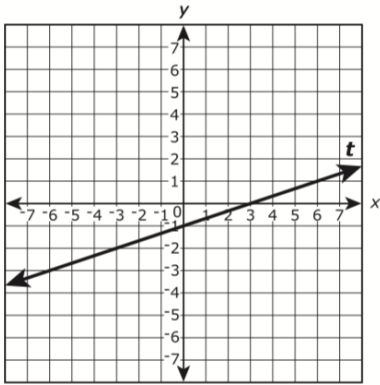
2. Suppose you need to have your car repaired. Dumont's Car Shop charges customers a flat fee of \$44 plus an additional hourly rate of \$17 to repair a car. New Milford's Car Shop charges customers a flat fee of \$60, plus an additional hourly rate of \$13 to repair a car.

a) Write an equation to model the cost to repair a car at Dumont's Car Shop.

b) Write an equation to model the cost to repair a car at New Milford's Car Shop.

c) After how many hours would the cost to repair the car be the same?

3. Line  $t$  is shown in the coordinate plane.



- What is the slope of line  $t$ ?
- What is the y-intercept of line  $t$ ?
- Write the linear equation that models the graph.

4. Best Buy is offering a discount on a computer sold in the store.

**Computer Sale!**

Original Price: \$598.00  
25% off original price

*8% tax applied after discount*

The owner offers a payment plan where the total cost of the computer is paid in 6 equal monthly payments.

a) Determine the amount of each monthly payment. Show your work and explain your answer.

A different computer is advertised as 40% off the original price. After the discount, the tax is \$44.64.

b) Determine the total price of this computer after the discount and tax are applied. Show your work and explain your answer.

c) Determine the original price of this computer. Show your work and explain your answer.