

# **Brushing up on Essential Algebra Skills to get you ready for Geometry Summer Packet**

*(For students entering Geometry 21/22)*

Students entering Geometry 21 and 22 should complete the problems in this packet before returning to school. **Students will be held responsible for reviewing these concepts by their Geometry teacher.** The first full day of school questions will be answered on the packet. The second class period an assessment on the packet will be administered.

Answers to all problems are included on the last page of this packet.

**Need help on some of the topics?** For each section a link to an instructional video has been provided!

*Pre-Requisite Expectations from Algebra-1*

- Solve linear equations in one variable with coefficients represented by real numbers and variables (A-REI.3)
- Calculate and interpret the average rate of change (slope) of a linear function (F-IF.6)
- Graph linear functions in different forms (e.g., slope-intercept, point-slope, and standard form) and show intercepts (F-IF.9)
- Solve systems of equations consisting of two linear equations in two variables algebraically and graphically (A-REI.7)
- Solve quadratic equations in one variable using factoring and quadratic formula (A-REI.4)

**Linear Equations and Inequalities**

Solving equations tutorials

- [Solutions-to-linear-equations](#)
- [Solving-for-a-variable](#)
- [Solving-more-complicated-equations](#)

Solve each of the following equations for x.

1)  $3 - 2(x - 1) = 2 + 4x$

2)  $16x - 3(4x + 7) = 6x - (2x + 21)$

3)  $\frac{2}{3} = \frac{x+7}{3x}$

4)  $16x + 24 = 7(x + 6)$

Solve each equation for the indicated variable.

5)  $ax + r = 7$  , for  $x$

6)  $y = mx + 6$  , for  $m$

Solve each of the following inequalities for x.

7)  $4x + 7 - x \leq 31$

8)  $2(x - 3) + 8x \leq 11$

Solve each of the following compound inequalities for x.

9)  $-7 \leq 3x + 2 \leq 8$

10)  $8 < 3x - 1 \leq 11$

## Linear Functions

Linear Functions tutorials

- [Slope](#)
- [Slope-intercept-form](#)
- [Point-slope-form](#)
- [Standard-form](#)

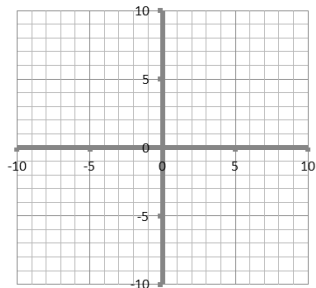
Given two points M & N on the coordinate plane, find the slope of  $\overline{MN}$ , and state the slope of the line perpendicular to  $\overline{MN}$ .

11) M(9, 6), N(1, 4)

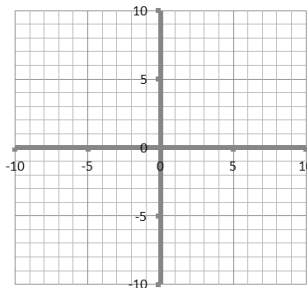
12) M(-2, 2), N(4, -4)

Find the x-intercept and y-intercept of the given line. Using the intercepts, graph the line.

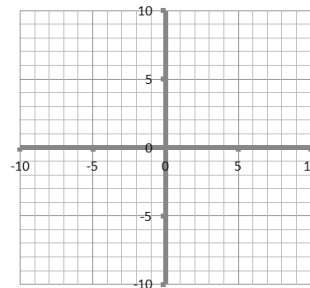
13)  $y = x - 5$



14)  $6x + 2y = -12$

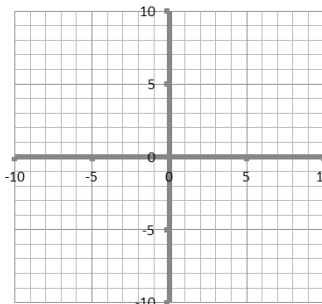


15)  $3y = 9x + 15$

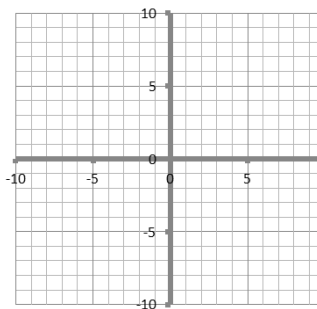


Find the slope and y-intercept of the graph of the equation. Using slope-intercept form, graph the line.

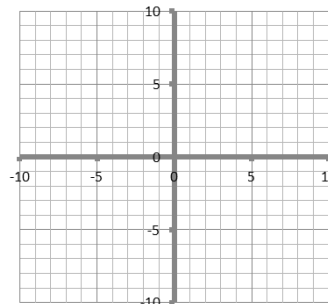
16)  $y - 2x = 7$



17)  $y = -\frac{2}{3}x + 3$



18)  $3x + 6y = 12$



## Systems of Equations

System of Equations Tutorials

[Solving-linear-systems-by-graphing](#)

[Special-types-of-systems-of-equations](#)

[Solving-systems-by-substitution](#)

[Solving-systems-by-elimination/combination](#)

Solve the following equations for x & y. Use any method.

$$\begin{aligned} 19) y &= 3x - 4 \\ x - 4y &= -28 \end{aligned}$$

$$\begin{aligned} 20) 2x - 3y &= 13 \\ -3x - 2y &= 0 \end{aligned}$$

$$\begin{aligned} 21) y &= 4x - 1 \\ y &= -2x - 7 \end{aligned}$$

## Quadratic Functions

Quadratic Equations tutorials

- [Solving-quadratic-equations-by-square-roots](#)
- [Factoring-quadratic-expressions](#)
- [Using-the-quadratic-formula](#)

Factor each expression completely.

$$22) x^2 - 25$$

$$23) x^2 + 2x - 8$$

$$24) x^2 - 2x - 24$$

$$25) 9x^2 - 81$$

$$26) 4x^2 + 8x - 21$$

$$27) 2x^3 + 4x^2 - 6x$$

Using the Zero Product Property, solve the following quadratic equations for x.

$$28) x^2 = 25$$

$$29) 3x^2 = 48$$

$$30) x^2 - 9x - 36 = 0$$

$$31) x^2 - 3x + 2 = 0$$

$$32) 2x^2 - 15x - 8 = 0$$

$$33) 5x^2 - 17x + 6 = 0$$

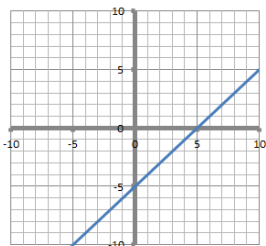
Using the Quadratic Formula, solve the following quadratic equations.

$$34) 4x^2 - 5x - 4 = 0$$

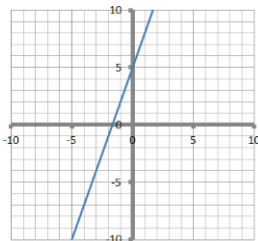
$$35) 6x^2 - 7x - 3 = 0$$

Answer Key:

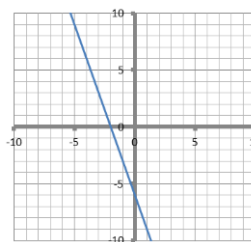
- 1)  $x = \frac{1}{2}$
- 2) All real numbers/infinite number of solutions
- 3)  $x = 7$
- 4)  $x = 2$
- 5)  $x = \frac{7-r}{a}$
- 6)  $m = \frac{y-6}{x}$
- 7)  $x \leq 8$
- 8)  $x \leq \frac{7}{5}$
- 9)  $-3 \leq x \leq 2$
- 10)  $3 \leq x \leq 4$
- 11) Slope of  $\overline{MN} = \frac{1}{4}$   
Slope of  $\overline{MN}_\perp = -4$
- 12) Slope of  $\overline{MN} = -1$   
Slope of  $\overline{MN}_\perp = 1$
- 13) x-int = 5  
y-int = -5



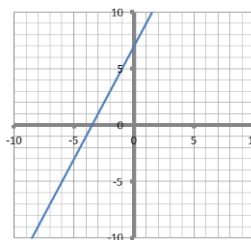
- 15) x-int =  $-\frac{5}{3}$   
y-int = 5



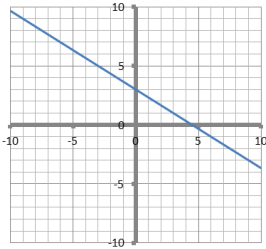
- 14) x-int = -2  
y-int = -6



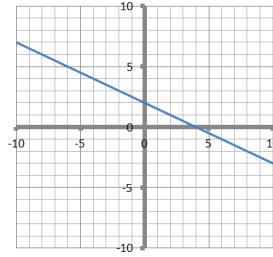
- 16) Slope = 2  
y-int = 7



17) Slope =  $-\frac{2}{3}$   
 $y$ -int = 3



18) Slope =  $\frac{1}{2}$   
 $y$ -int = 2



19)  $x = 4$  and  $y = 8$

20)  $x = 2$  and  $y = -3$

21)  $x = -1$  and  $y = -5$

22)  $(x - 5)(x + 5)$

23)  $(x + 4)(x - 2)$

24)  $(x - 6)(x + 4)$

25)  $(x - 3)(x + 3)$

26)  $(2x - 3)(2x + 7)$

27)  $2x(x + 3)(x - 1)$

28)  $x = \pm 5$

29)  $x = \pm 4$

30)  $x = 12$  and  $-3$

31)  $x = 2$  and  $1$

32)  $x = -\frac{1}{2}$  and  $8$

33)  $x = -\frac{2}{5}$  and  $-3$

34)  $x = \frac{5 \pm \sqrt{89}}{8}$

35)  $x = -\frac{1}{3}$  and  $\frac{3}{2}$