Essential Skills for Algebra II

(For students entering Algebra II in 2020-2021)

Students entering Algebra II should make sure they are proficient with these topics before school begins on August 24th, 2020. **Students will be held responsible for reviewing these concepts by their Algebra 2 teacher.** There will likely be an assessment on these topics the first week of school or even the first day.

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

Be sure to come to class with these basic supplies on the first day of school:

- paper
- graph paper
- 5 pencils (at least)
- eraser
- 2 pens
- pencil sharpener
- scientific calculator and/or graphing calculator (*A graphing calculator is not required but if you choose to purchase one, please speak to your teacher first about which one to purchase. You are encouraged to learn to use it since it will be allowed on the SAT.*

Note: Your teacher may request additional supplies and you will be able to check for that on the teacher's website once you are assigned to a certain teacher.

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Pre-Requisite Expectations from Algebra-1

- Solve linear equations in one variable with coefficients represented by real numbers and variables
- Calculate and interpret the average rate of change (slope) of a linear function
- Graph linear functions in different forms (e.g., slope-intercept, point-slope, and standard form) and show intercepts
- Solve systems of equations consisting of two linear equations in two variables algebraically and graphically
- Solve quadratic equations in one variable using factoring and quadratic formula
- Work with radicals (simplify with and without a calculator)
- Work with various operations of fractions with and without a calculator.

Linear Equations and Inequalities

Solving equations tutorials

- Solutions-to-linear-equations
- Solving-for-a-variable
- Solving-more-complicated-equations

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

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

Linear Functions

Linear Functions tutorials

- Slope-intercept-form
- Slope
- Point-slope-form
- Standard-form

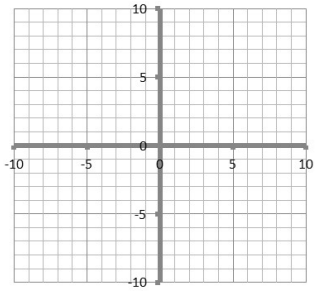
Given two points M & N on the coordinate plane, find the slope of $\overleftrightarrow{MN}$, and state the slope of the line perpendicular to $\overleftrightarrow{MN}$.

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

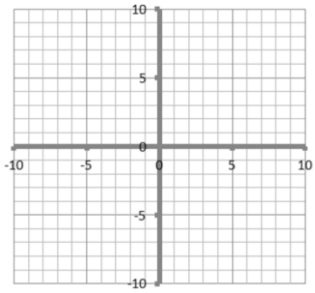
12) M(-2, 2), N(4, -4)

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

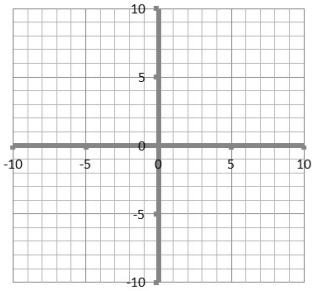
13) $y = x - 5$



14) $6x+2y=12$

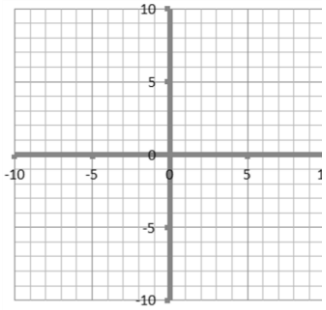


15) $3y=9x+15$

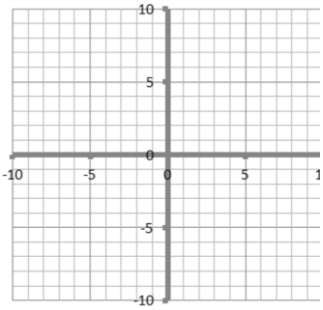


Find the slope and y-intercept of the graph of the equation. Using slope-intercept form, graph the line.

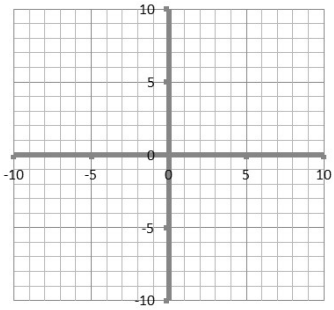
16) $y=2x+7$



17) $y=(-2/3)x+3$



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.

19) $y = 3x - 4$
$x - 4y = -28$

20) $2x - 3y = 13$ $x - 4y$
$-3x - 2y = 0$

21) $y = 4x - 1$
$y = -2x - 7$

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

Simplify radicals (without a calculator)

Working with square roots

Rationalize denominator

Simplify:

G1. $\sqrt{49}$ G2. $\sqrt{\frac{1}{4}}$ G3. $\sqrt{\frac{36}{49}}$

G4. $2\sqrt{144}$ G5. $\sqrt{196}$ G6. $\sqrt{289}$

G7. $\frac{2}{\sqrt{3}}$ G8. $\frac{3}{2+\sqrt{7}}$ G9. $\frac{2-\sqrt{3}}{3-\sqrt{2}}$

Operations with fractions (without a calculator)

Adding fractions with unlike denominators

Evaluate each expression.

1) $\frac{3}{4} + \frac{2}{5}$ 2) $1 + \frac{9}{5}$

3) $\frac{13}{7} + \frac{3}{2}$ 4) $\frac{5}{8} - \frac{1}{7}$

5) $1 + \frac{3}{7}$ 6) $\frac{1}{7} + \frac{3}{2}$