

All students going into Algebra 3 in the fall are expected to have an understanding of the basic topics covered in Algebra 1, Geometry and Algebra 2. It is highly suggested that students spend some time completing these problems over the summer to ensure they enter Algebra 3 with a review of these concepts.

Students may use online resources such as Khan Academy Videos (www.khanacademy.com) to assist in learning the topics that they are finding difficult. Video links have been placed throughout the packet for additional help with each topic.

Section I: Simplifying Radicals

Simplifying and Rationalizing of Radicals:

Part #1: Simplifying Radicals

In math, when we ask for an “**exact answer**,” this means that your answer MAY include a radical sign.

Example: $\sqrt{7}$ is an **exact** answer

2.645751311 (which the calculator gives you when you enter is **NOT EXACT**). It is rounded to whatever fits on your calculator screen

- When we simplify radicals we try to factor out the LARGEST perfect square factor possible.

Perfect Squares: 0, 1, 4, 9, 16, 25, 36, 49, 64, 81, 100, 121, 144, 169, 196, 225, 256, 289, 324, 361, 400

Examples:

$$\sqrt{40} = \sqrt{4} * \sqrt{10} = 2\sqrt{10}$$

$$\sqrt{60} = \sqrt{16} * \sqrt{10} = 4\sqrt{10}$$

Part #2: Simplifying Radicals

No radicals in the denominator of a fraction.

- You can **NOT** have a radical in the denominator of a fraction that cannot be simplified because it is an irrational number. So you have to “**RATIONALIZE**” it to make it “normal” or RATIONAL.

Examples:

$$\frac{2}{\sqrt{5}} * \frac{\sqrt{5}}{\sqrt{5}} = \frac{2\sqrt{5}}{5}$$

$$\frac{3}{2\sqrt{7}} * \frac{\sqrt{7}}{\sqrt{7}} = \frac{3\sqrt{7}}{2(7)} = \frac{3\sqrt{7}}{14}$$

Use these videos as a resource if you need to review these topics:

Simplifying radicals: <https://www.youtube.com/watch?v=6QJtWfIiyZo>

Rationalizing the denominator: <https://www.youtube.com/watch?v=gY5TvlHg4Vk>

Part 1: Simplify each radical below:

1. $\sqrt{24}$

2. $\sqrt{200}$

3. $\sqrt{50x^2}$

4. $\sqrt{16x^3y}$

Part 2: Simplify completely by rationalizing the denominator.

5. $\frac{16}{\sqrt{2}} =$

6. $\frac{9}{2\sqrt{3}} =$

7. $\frac{70}{\sqrt{7}} =$

Section II: Trigonometry

1. Find the third side of the right triangle and then list all six trigonometric ratios of angle A. Write all ratios (fractions) in simplest radical form.

sin A =

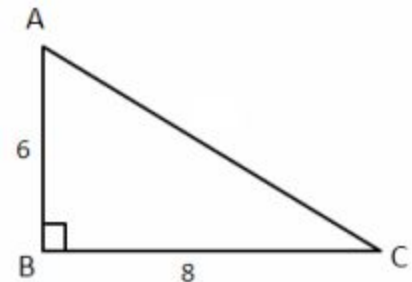
csc A =

cos A =

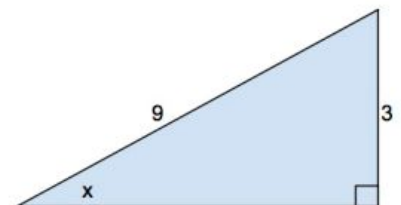
sec A =

tan A =

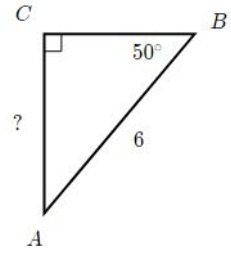
cot A =



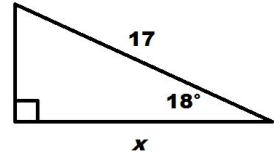
2. Solve for the missing angle x. Round your answer to the nearest tenth of a degree.



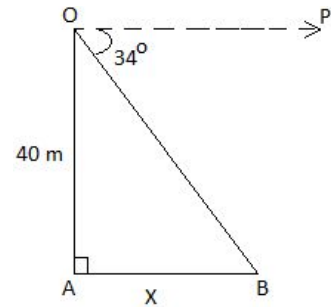
3. Find the length of side AC marked with a ? in the diagram shown below. Round your answer to the nearest tenths.



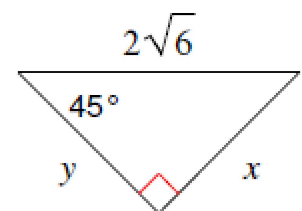
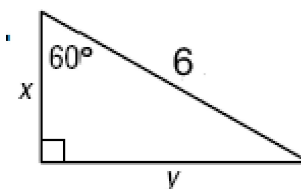
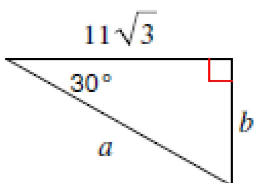
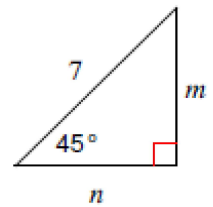
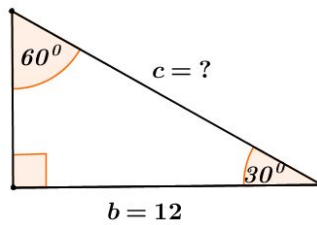
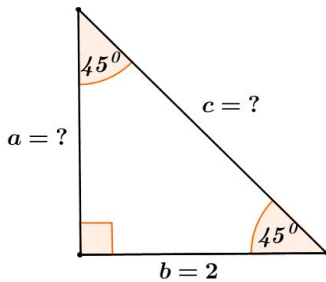
4. Find the length of x in the diagram. Round your answer to the nearest tenths.



5. Find the length of x in the diagram. Round your answer to the nearest tenth of a meter.



6. Find each missing side of the special right triangles given below:



Section III: Factoring

The following websites may be helpful for factoring:

https://www.khanacademy.org/math/algebra/multiplying-factoring-expression/factoring-special-products/e/factoring_difference_of_squares_1

<https://www.youtube.com/watch?v=AMEau9OE6Bs>

1. Factor: $x^2 - 3x - 10$

2. Factor: $x^2 - 100$

3. Factor: $3x^2 - 18x$

4. Factor: $3x^2 + 10x - 8$

5. Factor: $9x^2 - 121$

6. Factor: $-5x^2 - 85$

Section IV: Equations of Lines

Three Forms of a Linear Equation:	Slope:
Standard Form: $ax + by = c$	Given two points: $\frac{y_2 - y_1}{x_2 - x_1}$
Slope-Intercept Form: $y = mx + b$	Graphically: $slope = \frac{rise}{run}$
Point-Slope Form: $(y - y_1) = m(x - x_1)$	
Need additional help? Check out videos here: https://www.khanacademy.org/math/algebra/two-var-linear-equations	

1. Give the equation of a horizontal line that contains the point (-3, 5).

2. Give the equation of a vertical line that contains the point (-3, 5).

3. Find the slope of each line below with the following equations:

a) $4x - 5y = 12$

b) $y = 7$

c) $x = 0$

4. Find the equation of a line that contains the points (5, -1) and (7, -2) in slope intercept form.

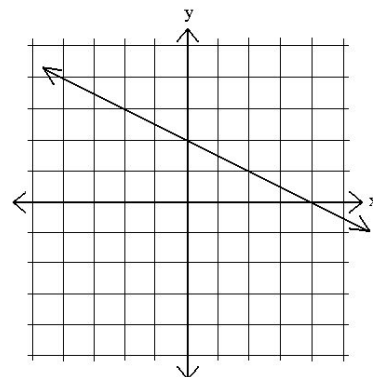
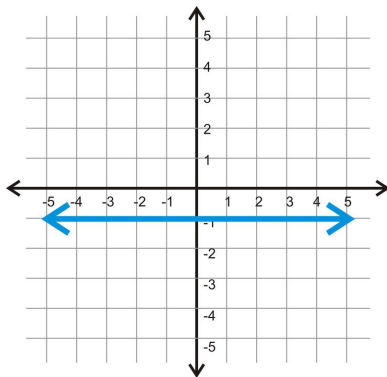
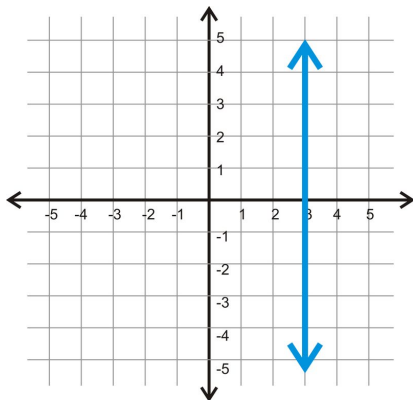
5. Transform $y = \frac{1}{2}x - 4$ to standard form.

6. Given slope = $\frac{1}{4}$ and point (8, -2), write the equation in point-slope form. Then rewrite the equation in slope-intercept form.

7. Find the equation of a line in slope-intercept form, that is parallel to $2x - 5y = 11$ and contains the point (7, 9).

8. Find the equation of a line in slope-intercept form, that is perpendicular to $y = \frac{5}{4}x + 4$ that contains the point (-6, 5).

9. What are the equations of the lines graphed?



Section V: Solving Equations

Steps for solving multi-step equations:

1. Simplify each side of the equation first. To do this, you may want to eliminate fractions or decimals, combine like terms, or use the distributive property to eliminate parenthesis.
2. Get all variables on one side and all numbers on the other side.
3. Isolate the variable using an inverse operation.

Use these videos as a resource if you need to review these topics:

Solving a Multi-step Equation Example Problem:

<https://www.khanacademy.org/math/cc-eighth-grade-math/cc-8th-solving-equations/cc-8th-equations-distribution/v/equation-special-cases>

Eliminating Fractions:

<https://www.khanacademy.org/math/cc-eighth-grade-math/cc-8th-solving-equations/cc-8th-equations-distribution/v/solving-equations-with-the-distributive-property-2>

Directions: Solve the following equations. Check your solutions.

1. $4(a + 2) = 14 - 2(3 - 2a)$

2. $2(g - 2) - 4 = 2(g - 3)$

3. $-\frac{3}{2}(d - 2) = 21$

4. $-4x + 18 + 8 = 16 - 2x$