

Westlake High School
Algebra 2 and Trigonometry Honors



Welcome to Algebra II Trig Honors! To be successful in this course you will need to be proficient in skills from Algebra and Geometry. As these are prerequisite skills, this information will not be retaught during class. This summer assignment will serve as practice to review and strengthen your algebraic skills. If you do not remember how to complete any of the sections, you may look up the topics using the links provided or finding your own worked out examples. You should be confident in your ability to answer these types of questions by September.

All work should be written neatly, accurately, and organized. Writing your work will be beneficial to show understanding of the content. If you use a calculator on a problem, show your work by writing what you entered into the calculator. Answers are included on the last page, so you can check answers and correct any mistakes.

These skills will be reviewed on the first day of class, so bring the completed assignment with you and be prepared to ask questions. Be prepared for an assessment on these topics within the first week of school.

Enjoy your summer! We look forward to seeing you in September!

What Students Should Know Entering Algebra 2 & Trig Honors

Algebra Topics:

- Order of Operations (PEMDAS)
- Operations with Fractions
- Simplifying Expressions
- Solving Equations
- Inequalities and Absolute Value
- Basic factoring – DOTS, GCF, and trinomials where $a = 1$ and $a > 1$
- How to add, subtract, and multiply algebraic expressions (for multiplication, at least as big as binomial $\times$ binomial)
- Basic understanding of linear, quadratic, exponential and absolute value functions
 - What they look like algebraically/graphically
 - Forms of equations (ie- slope intercept form, standard form...)
 - How they are similar/different
 - X and Y Intercepts
 - Domain/Range
 - Writing equations from tables
- Basic Exponent Rules
- How to solve quadratic equations by
 - Factoring (both $a=1$)
 - Quadratic formula
 - Complete the square
- Simplifying Radicals
 - Using perfect squares
 - Operations with Radicals
 - Rationalizing Denominator

Geometry Topics:

- Transformation vocabulary and notation (the symbol that looks like the open multiplication sign, I can't find it right now)
 - Compositions
- Basic triangle vocab and how to set them up
 - Difference between sides and angles, where they go, notation used to describe how to draw them, etc.)
 - Classifying Triangles by sides and angles
- Special right triangle ratios and how to apply them to various sized triangles
- How to apply SOH CAH TOA – finding basic ratios, using to solve for a side/angle
- If possible, basic circle stuff – how to write in center-radius form (or whatever the proper name for that is), how to graph them on the xy-plane, etc.

Helpful Links:

<https://www.khanacademy.org/>

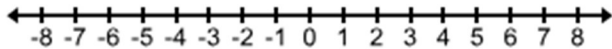
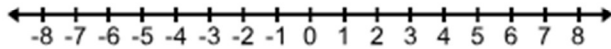
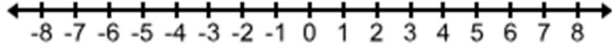
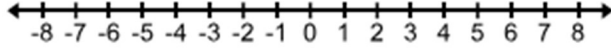
<https://www.purplemath.com/>

<https://www.youtube.com/watch?v=TbJ5gqLRpeM>

SOLVE EACH OF THE FOLLOWING. SHOW ALL WORK. IF YOU DO NOT SHOW THE WORK YOU WILL NOT RECEIVE THE CREDIT.

1). $x - 48 = 110$	2). $\frac{1}{3}z - 8 = -4$
3). $32 = 12 + 4(z - 1)$	4). $5(x + 2) - 7 = 5x + 3$

SOLVE EACH OF THE FOLLOWING. GRAPH THE SOLUTIONS ON THE NUMBER LINE PROVIDED. SHOW ALL WORK.

5). $-3(x - 1) > -3x - 2$ 	6). $2 + \frac{1}{3}y > \frac{2}{3}$ 
7). $-8 \leq c - 3 < -1$ 	9). $a - 6 < -4$ or $a - 1 > 5$ 

- 10). GIVE THE DOMAIN AND RANGE FOR EACH RELATION. TELL WHETHER THE RELATION IS A FUNCTION OR NOT.

$$\{(3,4), (-1,2), (2, -3), (5,0)\}$$

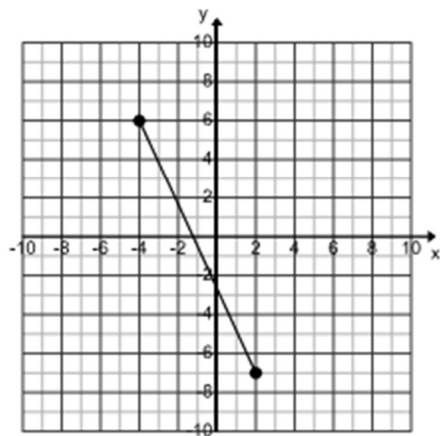
Domain _____

Range _____

Function ? (Yes or No) _____

- 11). USING THE GRAPH BELOW, DETERMINE BOTH THE DOMAIN AND THE RANGE:

DOMAIN _____ RANGE _____



- 12). DETERMINE A RELATIONSHIP BETWEEN THE X AND Y VARIABLES. WRITE AN EQUATION.

x	0	1	2	3	4
y	0	5	10	15	20

Equation: _____

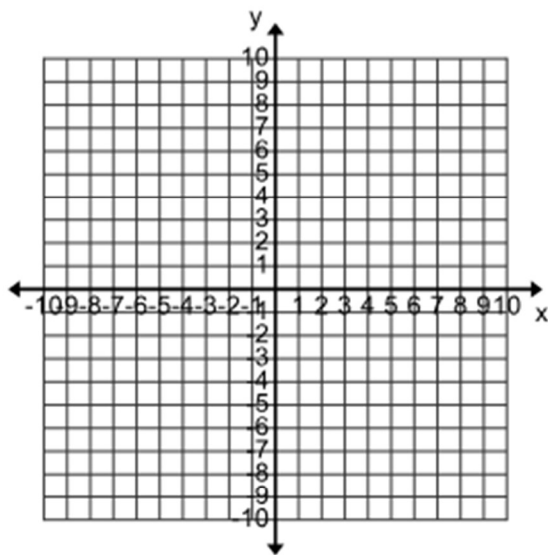
- 13). $\{(3,0), (2, -1), (1, -2), (0, -3)\}$ EQUATION _____

14). EVALUATE THE FUNCTION $F(x) = 6x - 1$ WHEN $x = 0$ AND WHEN $x = 5$.

$$f(0) =$$

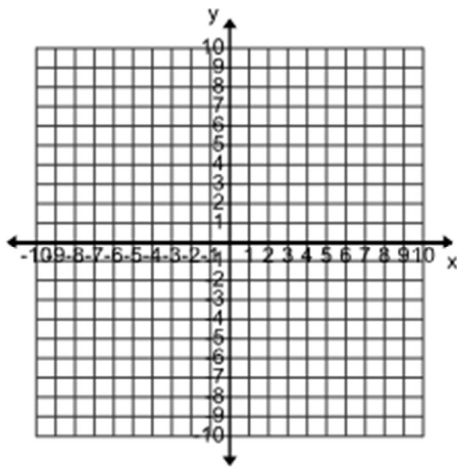
$$f(5) =$$

15). GRAPH THE FUNCTION: $y = 2|x|$ D: $\{-2, -1, 0, 1, 2\}$



16). GRAPH THE LINE $-3x + 2y = -4$ BY COMPLETING THE CHART AND GRAPHING THE POINTS:

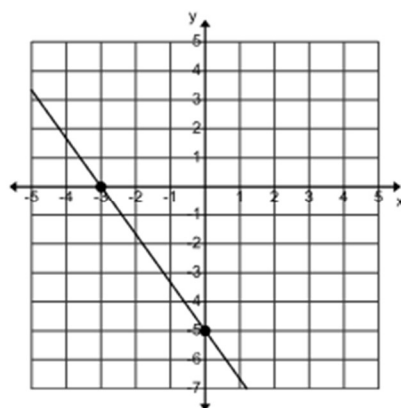
x	y
0	
-2	
2	



17). FROM THE GRAPH DETERMINE THE X AND Y INTERCEPTS

x-intercept = _____

y-intercept = _____

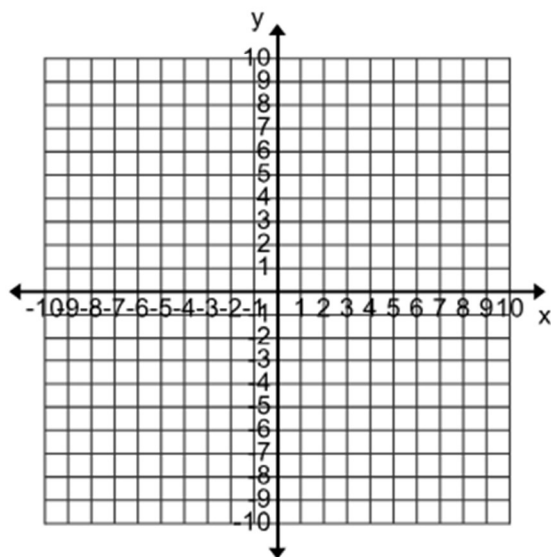


18). FOR THE EQUATION BELOW, DETERMINE THE X-INTERCEPT AND THE Y-INTERCEPT
AND THEN GRAPH THE LINE

$$-5x + 3y = 15$$

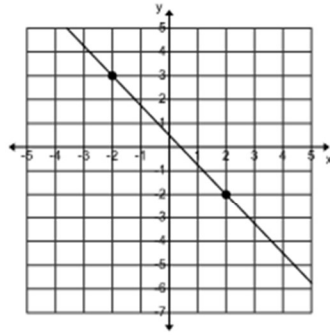
x-intercept = _____

y-intercept = _____



19). FROM THE GRAPH DETERMINE THE SLOPE OF THE LINE

$m =$ _____

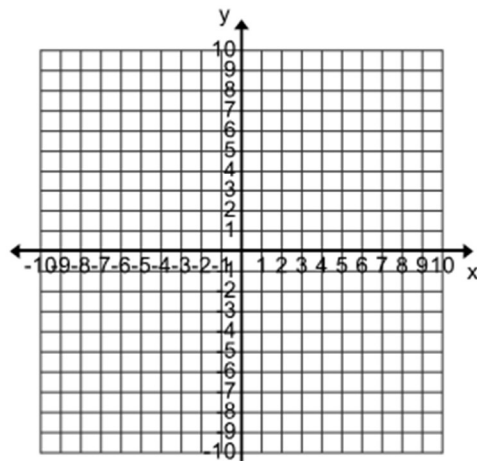


20). FROM THE EQUATION, DETERMINE THE SLOPE OF THE LINE:

$$6x + 2y = -4$$

slope = _____

21). GRAPH THE LINE WHOSE SLOPE IS 2 AND THE Y-INTERCEPT IS - 4.

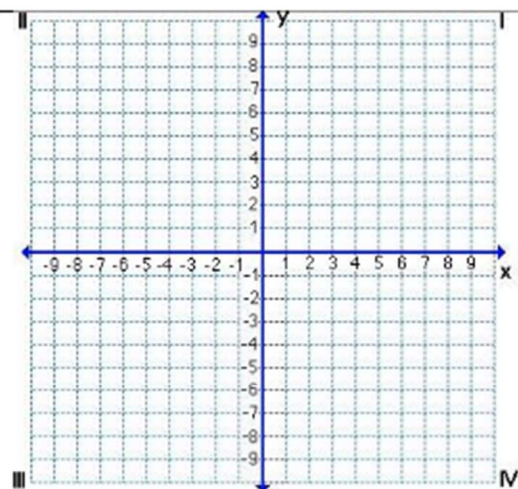


- 22). PUT THE EQUATION $2x - 3y = -3$ IN SLOPE INTERCEPT FORM. THEN STATE THE SLOPE AND Y-INTERCEPT AND GRAPH THE LINE.

Slope-intercept form _____

Slope _____

y-intercept = _____



- 23). WRITE AN EQUATION OF A LINE IN BOTH POINT-SLOPE FORM AND SLOPE-INTERCEPT FORM FOR THE LINE WHOSE SLOPE IS $-\frac{2}{3}$ AND GOES THROUGH THE POINT $(-6, 2)$

Point-slope form _____

Slope-intercept form _____

DETERMINE IF THE GIVEN POINT IS A SOLUTION TO THE SYSTEM OR INEQUALITY. SHOW ALL WORK

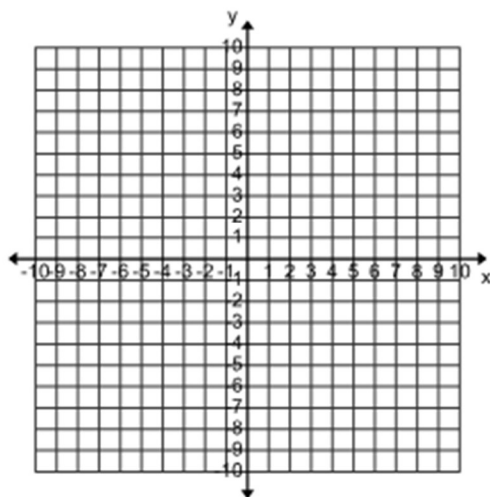
24). $(2,0)$ $3x + y = 6$
 $x - y = 2$

25). $(6, -2)$ $x + y > 4$
 $x - y < 10$

26). $(-2,3)$ $3x + 4y > 18$

SOLVE THE FOLLOWING SYSTEM BY GRAPHING:

27). $\begin{cases} y = -x + 2 \\ y = x - 6 \end{cases}$



SOLVE EACH OF THE FOLLOWING BY SUBSTITUTION. SHOW ALL WORK.

28). $\begin{cases} x = y + 4 \\ x + 7y = 20 \end{cases}$

29). $\begin{cases} 3x - 4y = 3 \\ y = -2x + 2 \end{cases}$

SOLVE EACH OF THE FOLLOWING BY THE ELIMINATION METHOD:

30). $\begin{cases} 2x - 4y = -4 \\ 2x + 4y = 20 \end{cases}$

31). $\begin{cases} x + y = 2 \\ 2x - y = 1 \end{cases}$

WITHOUT GRAPHING DETERMINE THE FOLLOWING:

- A) THE TYPES OF LINES THAT MAKE UP THE SYSTEM (INTERSECTING, PARALLEL OR SAME LINE)
- B) THE NUMBER OF SOLUTIONS
- C) THE SLOPE OF EACH LINE

32). $x + y = 0$
 $y = 3x - 12$

A) _____

B) _____

C) _____

33). $y = 2x + 5$
 $y - 2x = 1$

A) _____

B) _____

C) _____

34). $y = \frac{3}{2}x - 4$
 $-6x + 4y = 1$

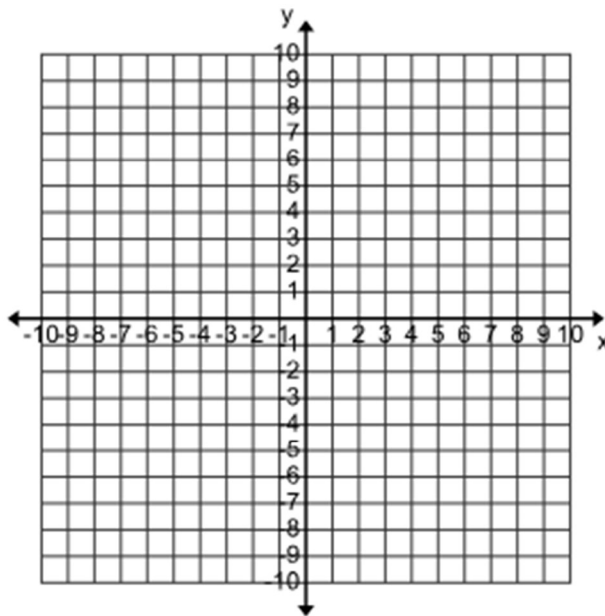
A) _____

B) _____

C) _____

GRAPH THE SOLUTIONS TO THE FOLLOWING:

35). $y < x - 3$

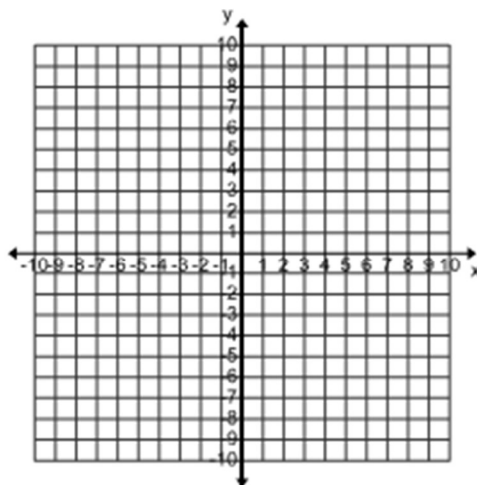


GRAPH THE SOLUTIONS TO THE FOLLOWING SYSTEMS OF INEQUALITIES. THEN DETERMINE TWO POINTS THAT ARE SOLUTIONS, AND TWO POINTS THAT ARE NOT SOLUTIONS.

36).. $\begin{cases} y < -3x + 2 \\ y \geq 4x - 1 \end{cases}$

Two points that are solutions: _____

Two points that are not solutions: _____



SIMPLIFY EACH OF THE FOLLOWING:

37). $(5x^2 + 2x - 7) + (x^2 - 8x + 12) =$ _____

38). $(x^2 - 3x + 8) - (2x^2 - 3x + 7) =$ _____

39). $-2a^2(3a^2 - 2a + 3) =$ _____

40). $(7x - 3y)(2x - 9y) =$ _____

41). $(x + 5)(x^3 - 3x + 4) =$ _____

42). $(3x - 2)(3x + 2) =$ _____

43). $(4x - 5y)^2 =$ _____

FACTOR BY REMOVING A GREATEST COMMON FACTOR:

44). $16x^3 - 64x^2 =$

FACTOR AS A DIFFERENCE OF TWO SQUARES:

45). $9t^2 - 1 =$

FACTOR EACH OF THE FOLLOWING TRINOMIALS INTO A PRODUCT OF TWO BINOMIALS:

46). $z^2 - 11z + 18 =$

47). $s^2 - 20s + 36 =$

SOLVE THE FOLLOWING QUADRATIC EQUATIONS BY EITHER THE SQUARE ROOT METHOD, FACTORING OR THE QUADRATIC FORMULA.

48). $x^2 - 3x - 4 =$

USE THE PROPERTY OF EXPONENTS TO SIMPLIFY THE FOLLOWING:

49). $(4xy^2)(3x^{-4}y^5) =$

50). $(2x)^3(3x)^3 =$

51). $\frac{12x^2y^3z^{-2}}{21xy^2z^3} =$

52). -4^0

WRITE THE FOLLOWING IN SIMPLEST RADICAL FORM. REMEMBER TO RATIONALIZE THE DENOMINATOR WHEN NECESSARY.

53) $\sqrt{144}$

54) $\sqrt{180}$

55) $\frac{\sqrt{24}}{2}$

56) $\frac{4}{\sqrt{21}}$

57) $\sqrt{6} + 2\sqrt{6}$

58) $4\sqrt{7} + 8\sqrt{63}$

59) $-3\sqrt{45} - \sqrt{20}$

60) $(6 - \sqrt{11})(6 + \sqrt{11})$

61) $(1 + 2\sqrt{5})(5 + \sqrt{5})$

SOLVING QUADRATIC EQUATIONS REVIEW

SOLVE THE FOLLOWING QUADRATIC EQUATIONS BY TAKING THE SQUARE ROOT.

1. $x^2 - 8 = 10$	2. $-x^2 + 25 = 25$
3. $(x + 2)^2 = 9$	4. $2x^2 + 10 = 0$

SOLVE THE FOLLOWING QUADRATIC EQUATIONS BY COMPLETING THE SQUARE.

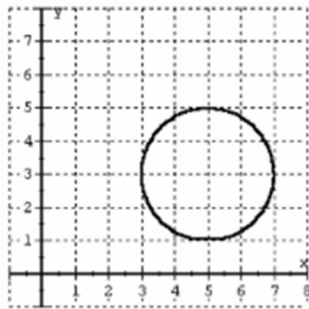
1. $x^2 - 6x + 18 = 0$	2. $x^2 + 2x - 15 = 0$
3. $-4x^2 - 16x + 19 = -17$	4. $2x^2 - 16x + 20 = 0$
5. $x^2 - 3x = 7$	6. $x^2 + 15x = 12$

SOLVE THE FOLLOWING QUADRATICS EQUATIONS BY USING THE QUADRATIC FORMULA OR FACTORING.

1. $x^2 + 5x + 14 = 0$	2. $3x^2 - 2x - 1 = 0$
3. $-5x^2 + 9x = -3$	4. $3x^2 - 2x = -6$
5. $-7x^2 = 21x$	6. $5x^2 = 4x + 10$

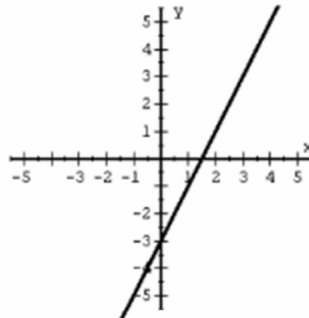
TYPES OF FUNCTIONS REVIEW

STATE WHETHER THE FOLLOWING ARE FUNCTIONS. IF THEY ARE FUNCTIONS, STATE THE DOMAIN AND RANGE.



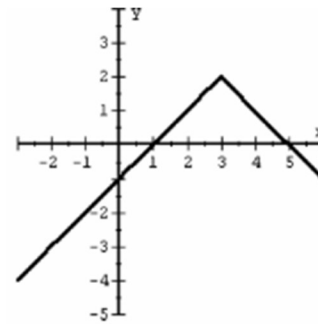
$$(x - 5)^2 + (y - 3)^2 = 4$$

Function?



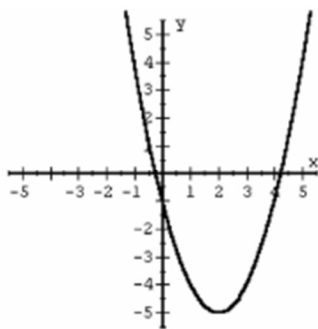
$$y = 2x - 3$$

Function?



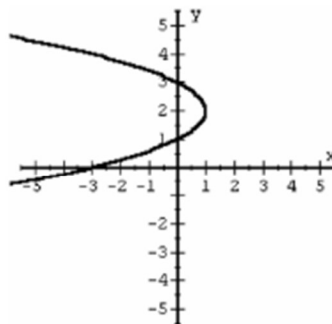
$$y = -|x - 3| + 2$$

Function?



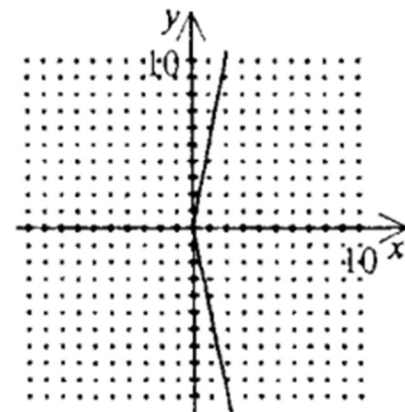
$$y = (x - 2)^2 - 5$$

Function?



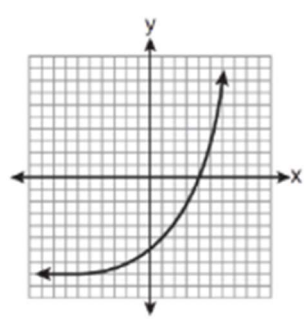
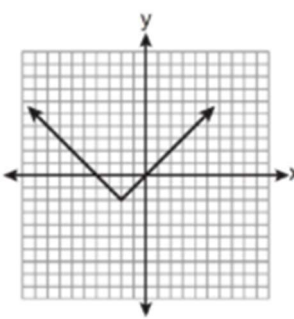
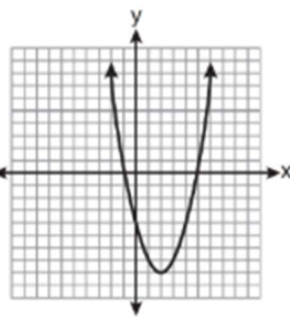
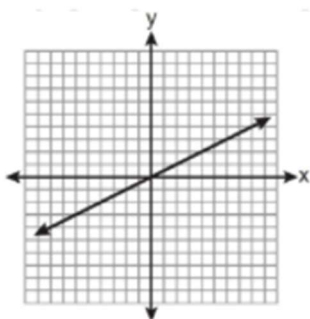
$$x = -(y - 2)^2 + 1$$

Function?



Function?

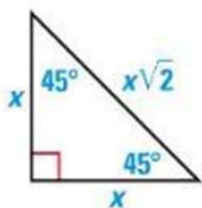
IDENTIFY EACH TYPE OF FUNCTION AS LINEAR, QUADRATIC, EXPONENTIAL OR ABSOLUTE VALUE.



RIGHT TRIANGLE AND TRIGONOMETRY REVIEW

45°-45°-90° Triangle Theorem

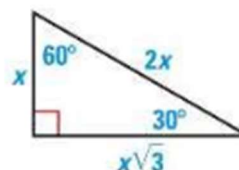
$$\text{hypotenuse} = \text{leg} \cdot \sqrt{2}$$



30°-60°-90° Triangle Theorem

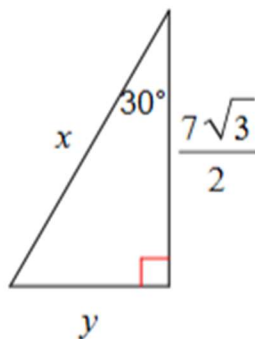
$$\text{hypotenuse} = 2 \cdot \text{shorter leg}$$

$$\text{longer leg} = \text{shorter leg} \cdot \sqrt{3}$$

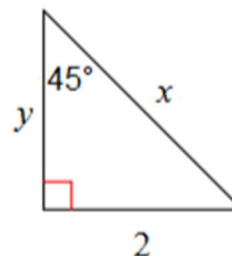


FIND THE MISSING SIDES OF THE SPECIAL RIGHT TRIANGLES BELOW USING WITHOUT THE USE OF A CALCULATOR. ALL ANSWERS MUST BE COMPLETELY SIMPLIFIED AND RATIONALIZED (NO RADICALS IN THE DENOMINATOR). THE ANSWERS MUST ALSO BE EXACT (NO DECIMALS).

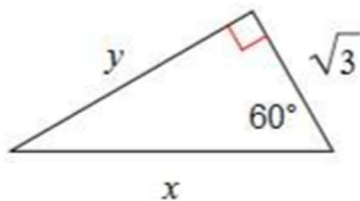
1)



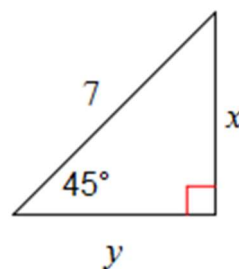
2)



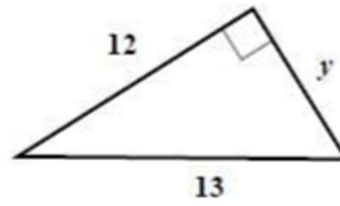
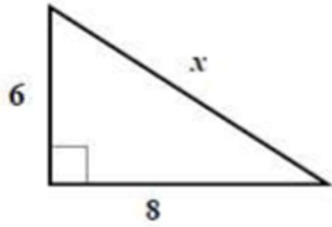
3)



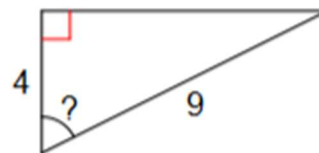
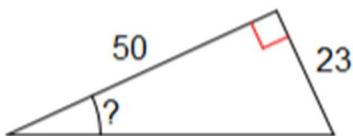
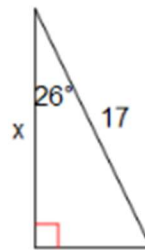
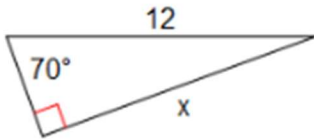
4)



FIND THE MISSING SIDES OF THE RIGHT TRIANGLES BELOW USING THE PYTHAGOREAN THEOREM.



FIND THE MISSING SIDES OR ANGLES OF THE FOLLOWING RIGHT TRIANGLES TO THE NEAREST TENTH. MAKE SURE YOUR CALCULATOR IS IN DEGREE MODE.



Reference Sheet for Algebra I (NGLS)

Conversions

1 mile = 5280 feet
 1 mile = 1760 yards
 1 pound = 16 ounces
 1 ton = 2000 pounds

Conversions Across Measurement Systems

1 inch = 2.54 centimeters
 1 meter = 39.37 inches
 1 mile = 1.609 kilometers
 1 kilometer = 0.6214 mile
 1 pound = 0.454 kilogram
 1 kilogram = 2.2 pounds

Quadratic Equation	$y = ax^2 + bx + c$
Quadratic Formula	$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$
Equation of the Axis of Symmetry	$x = -\frac{b}{2a}$
Slope	$m = \frac{y_2 - y_1}{x_2 - x_1}$
Linear Equation Slope Intercept	$y = mx + b$
Linear Equation Point Slope	$y - y_1 = m(x - x_1)$

Exponential Equation	$y = ab^x$
Annual Compound Interest	$A = P(1 + r)^n$
Arithmetic Sequence	$a_n = a_1 + d(n - 1)$
Geometric Sequence	$a_n = a_1 r^{n-1}$
Interquartile Range (IQR)	$IQR = Q_3 - Q_1$
Outlier	Lower Outlier Boundary = $Q_1 - 1.5(IQR)$
	Upper Outlier Boundary = $Q_3 + 1.5(IQR)$