Pre-Calculus Pre-AP Summer Packet

2015-2016
School Year

Winston Churchill HS

Welcome to Pre-AP Pre-Calculus. The following packet is a good review to be sure you are prepared for Pre-AP Precal. Please use this packet to make sure you that you understand the information. It is not "busy work" that just needs to get done. This will ensure that you are ready for the course. Please use any resource that you would like.

Some helpful resources might be:

Math book from the public or college library
Other Students
Internet
YouTube
Notes from Algebra II

We look forward to having you in Pre-Calculus Pre-AP. You will be challenged mathematically and will gain the knowledge necessary to be successful in Calculus.

Have a great summer,
The 2015-2016 Pre-Calculus Pre-AP Teachers

Define the following.

1. Integer

2. Rational Numbers

3. Irrational Numbers

4. Domain

5. Range

6. Linear

7. Function

8. Independent

9. Dependent

10. Vertex

11. Roots, Zeros, X-Intercepts, Solutions

12. Axis of Symmetry

Everything you need to know about Linear Functions

7. What is the Standard Form of a Linear Equation?_____

8. What is Slope-Intercept Form of a Linear Equation?_____

9. What is Point-Slope Form of a Linear Equation?_____

Graphing Linear Equations

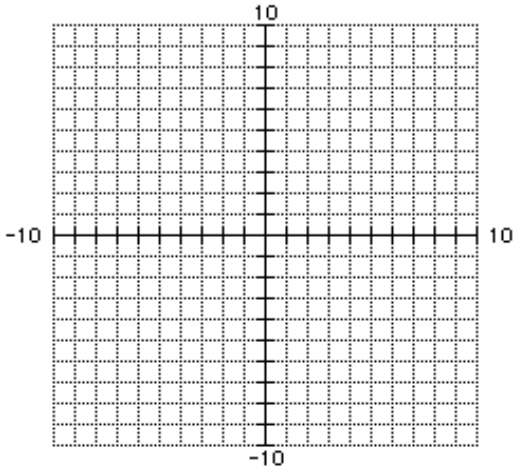
10. Graph the Linear Parent Function:_____ in red and the function y = $\frac{2}{3}$ x – 6 in pencil.

11. Identify the domain & range of both functions.

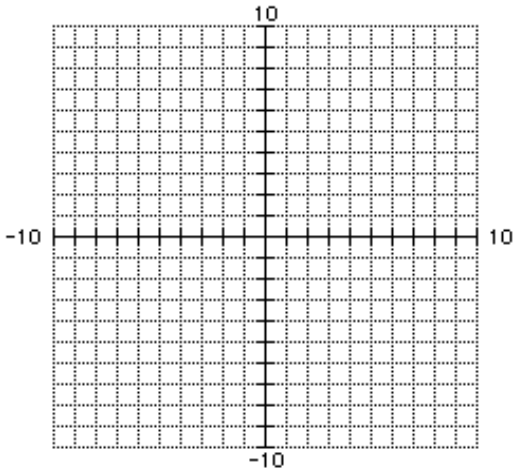
Parent: _____ y = $\frac{2}{3}$ x – 6

Domain_____ Domain_____

Range_____ Range_____



12. Graph $5x+2y=10$

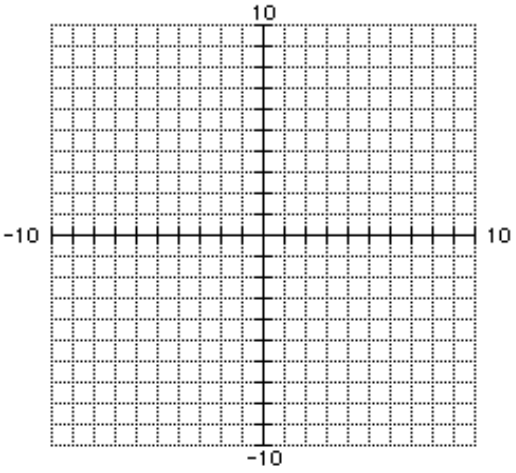


x-intercept? _____

y-intercept?_____

Slope?_____

13. Graph $2x-y=5$



x-intercept?_____

y-intercept?_____

Slope?_____

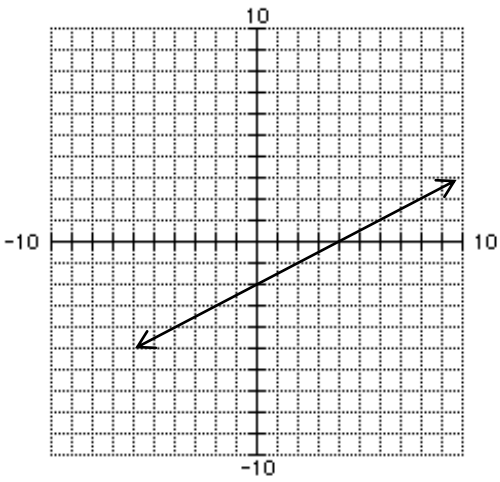
Writing Linear Equations

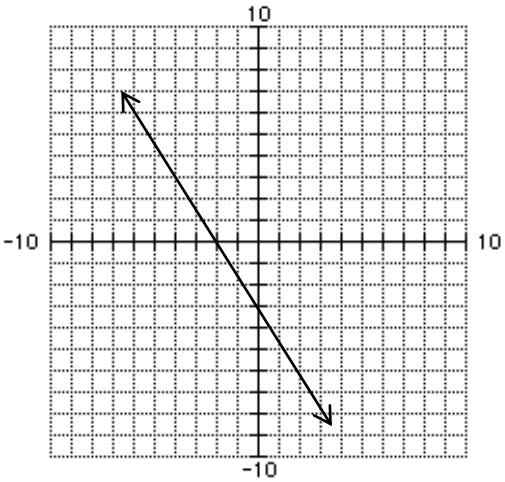
14. Parallel Lines have _____ slope.

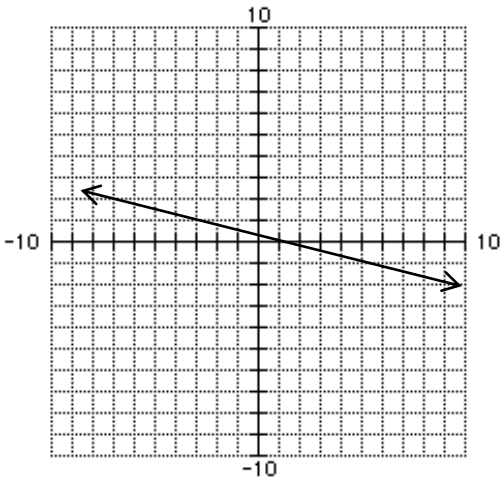
15. Perpendicular Lines have _____ slope.

16. Write the equation of each line in Slope -Intercept Form.

a)_____ b)_____ c)_____







17. Find the slope-intercept form of the line that passes through (2, 3) and (1, 5).

18. Write the standard form of the equation of the line that passes through (3, 2) and is parallel to the line whose equation is $y = 2x + 5$.

19 Write the standard form of the equation of the line that passes through (3, 2) and is perpendicular to the line whose equation is $y = 2x + 5$.

Everything you need to know about Quadratic Functions

20. What is the Standard Form of a Quadratic Equation?_____

21. What is General (Vertex) Form of a Quadratic Equation?_____

Graphing Quadratic Equations

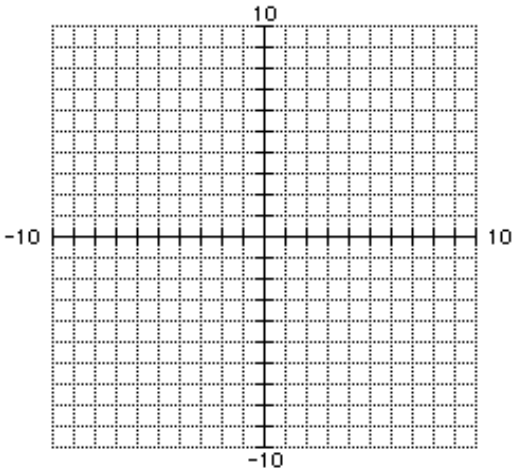
22. Graph the Quadratic Parent Function:_____ in red and $y = -(x + 2)^2 + 3$ in pencil.

23. Identify the domain & range of both functions.

Parent: _____ $y = -(x + 2)^2 + 3$

Domain_____ Domain_____

Range_____ Range_____



24. Graph the equation $y = 4(x+1)^2 - 3$

Identify the following parts of the parabola:

Vertex:_____

Axis of Symmetry:_____

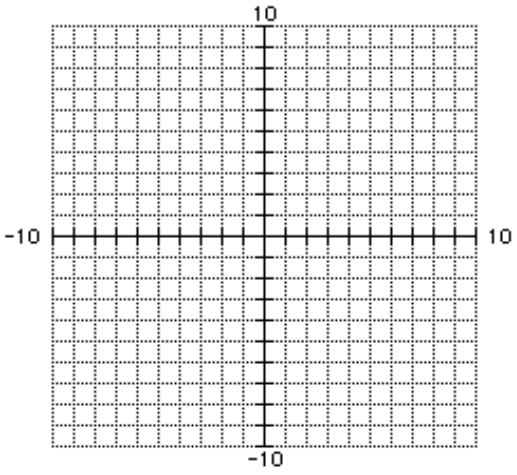
Direction:_____

x-intercepts:_____

y-intercept:_____

Domain:_____

Range:_____



25. Graph the equation $y = \frac{1}{4}(x-2)^2 + 4$

Identify the following parts of the parabola:

Vertex:_____

Axis of Symmetry:_____

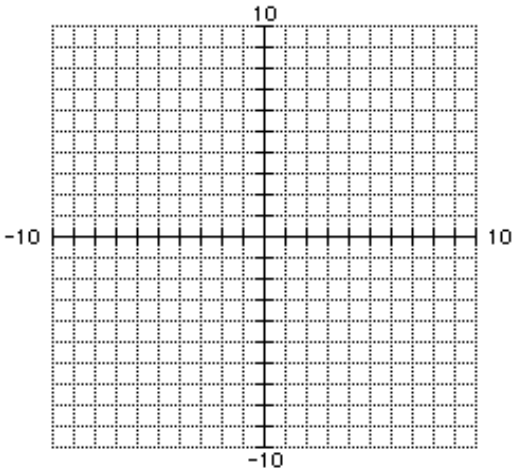
Direction:_____

x-intercepts:_____

y-intercept:_____

Domain:_____

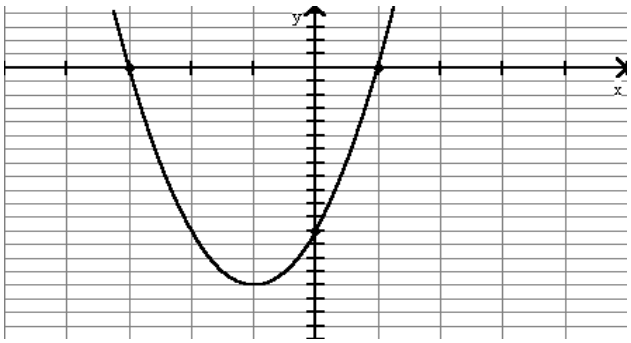
Range:_____



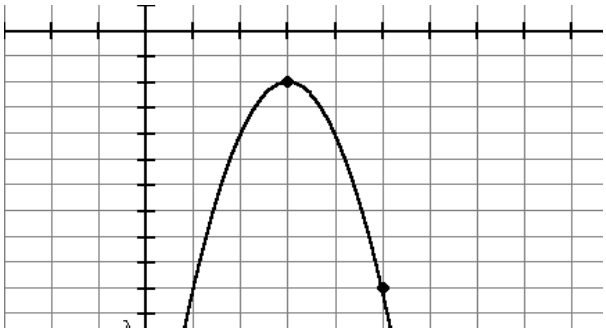
Writing Quadratic Equations

Write the equation for the following graphs.

26. _____



27. _____



28. Write the equation for the quadratic function with a vertex at (-2, 3) and passes through the point (4, 12).

Solve the following equations.

1. $4x - 7 = -35$

2. $3(x - 5) - 5x = 30$

2. $\frac{2}{5}x - 1 = 4$

4. $\frac{3}{4}(8x - 12) - 5x = 8$

5. $2 + 3(x - 5) = 4x - 5$

6. $\frac{2}{x+5} = \frac{x+8}{9}$

7. $\frac{t}{12} = \frac{3}{t}$

8. $\frac{2}{3}(x - 6) = 8$

9. $\frac{5}{2x+1} = \frac{x+7}{5x-1}$

10. $\frac{2x-10}{x-3} = \frac{x+3}{x}$

Solve for the specified letter:

11. $A = \frac{1}{2}h(b_1 + b_2)$; solve for h

12. $A = \frac{1}{2}bh$; solve for b

13. $A = \frac{d_1 + d_2}{2}$; solve for d_2

14. $\frac{3x}{yz} = 7$; solve for y

15. $100x^2y^2 = 25$; solve for y

GENERAL TRINOMIALS. Some teachers use the FOIL method; some teachers use the box method.

1. $(x+3)(x+4)$ 2. $(2z-1)(z-2)$ 3. $(2r+3s)(2r-s)$

Multiply. These are special polynomials. The answers are called "PERFECT SQUARE TRINOMIALS" or "DIFFERENCE OF TWO SQUARES." (Hint: $(2x+5)^2$ = (2x + 5)(2x + 5)

4. $(3c-2)^2$ 5. $(x+2)^2$ 6. $(3x-2)^2$

7. $(x-9)(x+9)$ 8. (2x + 1)(2x – 1) 9. $(5x+2)(5x-2)$

Multiply these polynomials.

10. $(5x^2-7)(2x^2-3)$ 11. $(r+3)(r^2-2r-1)$ 12. $(2x-3)(x^2-x+4)$

Solve the following quadratic equations by factoring (if possible).

1. $x^2 - 20x + 96 = 0$

2. $x^3 + 12x^2 + 35x = 0$

3. $5x^2 + 6 = -17x$

4. $3x^2 - 5x + 1 = 0$

5. $9x^2 + 30x = -25$

6. $3x^2 + 2x = 4x$

Solve the following quadratic equations by the quadratic formula. (Check using a graphing calculator)

1. $x^2 - 20x + 96 = 0$

2. $x^3 + 12x^2 + 35x = 0$

3. $5x^2 + 6 = -17x$

4. $3x^2 - 5x + 1 = 0$

5. $9x^2 + 30x = -25$

6. $3x^2 + 2x = 4x$

Add, subtract, multiply, or divide the fractions below **without a calculator**. Write your answer in lowest terms.

1. $\frac{4}{5}+\frac{7}{3}=$	2. $\frac{5}{8}-\frac{5}{6}=$	3. $\frac{8}{5}\bullet\frac{10}{12}\bullet\frac{3}{4}=$
4. $\frac{\frac{5}{8}}{\frac{3}{4}}=$	5. $\frac{\frac{4}{9}+\frac{1}{4}}{\frac{1}{3}-\frac{5}{6}}=$	6. $\frac{1}{8}+\frac{3}{20}=$
7. $7\frac{2}{3}-4\frac{5}{8}$	8. $\frac{1}{2}+\frac{15}{2}\left(\frac{3}{5}\right)=$	9. $\frac{5\sqrt{3}}{3}+\frac{2}{\sqrt{3}}=$ (please don't cancel the $\sqrt{3}$'s)
10. $\frac{2}{5}\div\frac{-7}{10}=$	11. $\frac{3\pi}{4}+\frac{2\pi}{3}=$ (Leave your answer in terms of π)	12. $\frac{12}{8}-\frac{12}{24}=$
14. $\left(\frac{3}{4}\right)\left(\frac{4}{3}\right)-\left(\frac{5}{19}\right)\div\left(\frac{5}{19}\right)=$	15. $\left(\frac{2}{3}\right)^2+\sqrt{\frac{25}{81}}=$	16. $\frac{3}{5}\left(\frac{5}{6}x+\frac{1}{3}\right)=$

Simplify each radical, if possible.

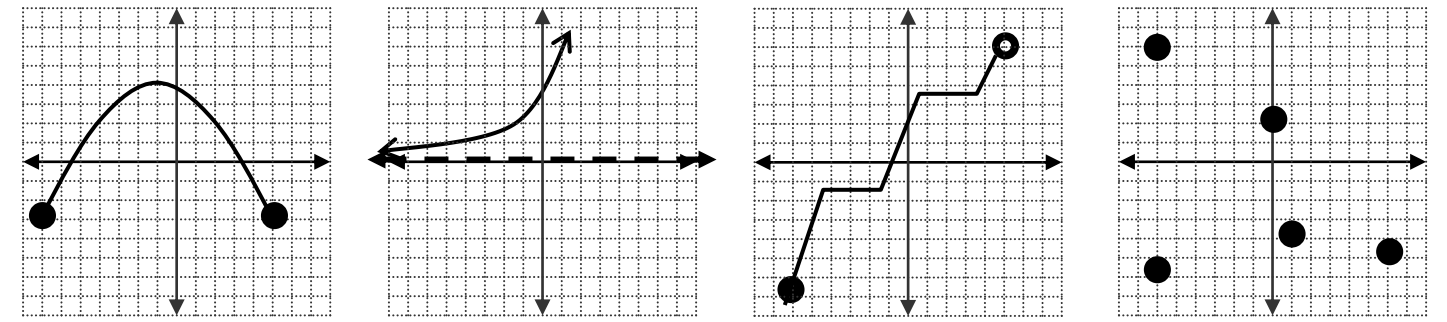
Example 1. $\sqrt{8} = 2\sqrt{2}$	5. $\sqrt{275}$
2. $\sqrt{90}$	6. $4\sqrt{24}$
3. $\sqrt{72}$	7. $2\sqrt{18}$
4. $\sqrt{200}$	8. $5\sqrt{90}$

Example 9. $\sqrt{98b^4} = 7b^2\sqrt{2}$	10. $\sqrt{484b^3}$
11. $3\sqrt{99x^5y}$	12. $\sqrt{525a^7b^6c^{17}}$
13. $\sqrt{108x^{11}}$	14. $\sqrt{661w^4x^{13}}$

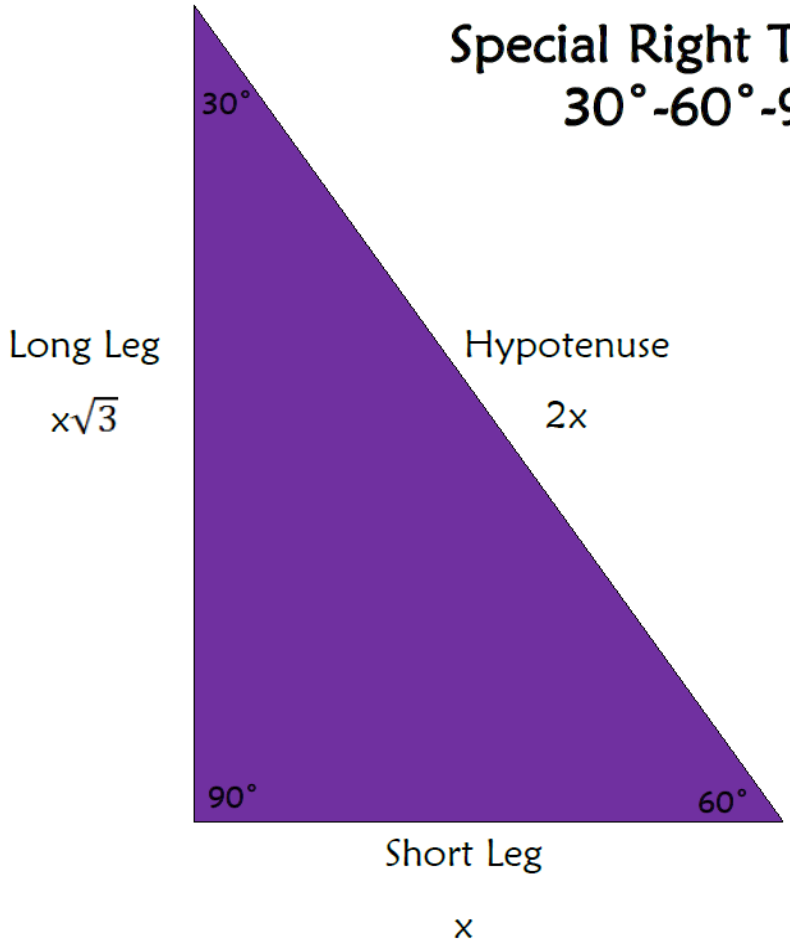
Find the domain and range from the graph. Indicate if the graph is a function or not a function.

1. Domain: _____ 2. Domain: _____ 3. Domain: _____ 4. Domain: _____

Range: _____ Range: _____ Range: _____ Range: _____



Special Right Triangles
30°-60°-90°



In a **30°-60°-90°** triangle, the sides of the triangle will always have the ratio

$1:\sqrt{3}:2$

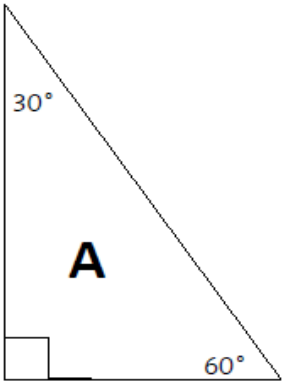
Example:

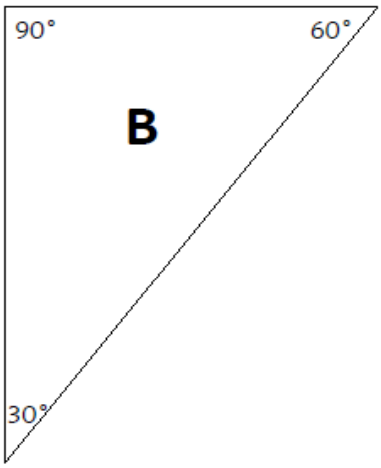
If the short leg is 2, then the long leg is $2\sqrt{3}$ and the hypotenuse is 2(2) or 4.

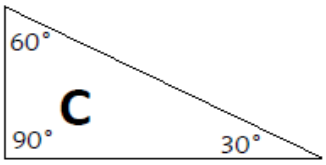
Let's Practice

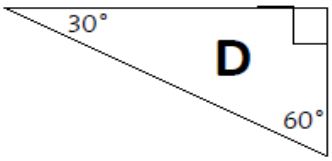
Use the 30°-60°-90° triangle conjecture to solve the following triangles:

(Hint: it might be easier to label the triangles with x, $x\sqrt{3}$, 2x before solving for the missing information)

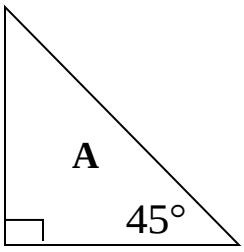


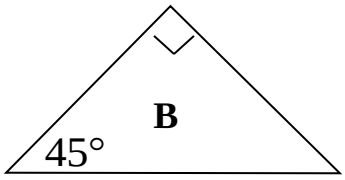


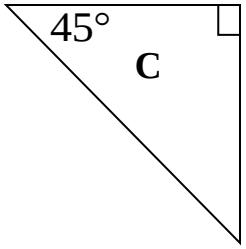




Triangle	Short Leg	Long Leg	Hypotenuse
A	8		
B		12	
C			$6\sqrt{3}$
D		$2\sqrt{3}$	







Triangle	Leg	Leg	Hypotenuse
A	6		
B		13	
C			$4\sqrt{5}$