

# Pre-Calculus Pre-AP Summer Packet

2011-2012  
School Year

## Winston Churchill HS

Welcome to Pre-AP Pre-Calculus. The following packet needs to be finished and ready to be turned the first week of the 2011/2012 school year. 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

Agilemind <http://neisd.agilemind.com> (Remember your username and password is your student ID without the leading zero)

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 2011-2012 Pre-Calculus Pre-AP Teachers

\*\*\*\*\*There will be a quiz over this packet on the third day of school!!

Define the following.

1. Integer

2. Rational Numbers

3. Irrational Numbers

4. Domain

5. Range

6. Interval

7. Linear

8. Absolute Value

9. Conjugate

10. Function

11. Independent

12. Dependent

13. Polynomial

14. Parabola

15. Vertex

16. Vertical Asymptote

17. Horizontal Asymptote

18. Maximum and Minimum Points

19. Roots, Zeros, X-Intercepts, Solutions

20. Axis of Symmetry

21. Continuous Function

22. Inverse

23. Transformations

## Everything you need to know about Linear Functions

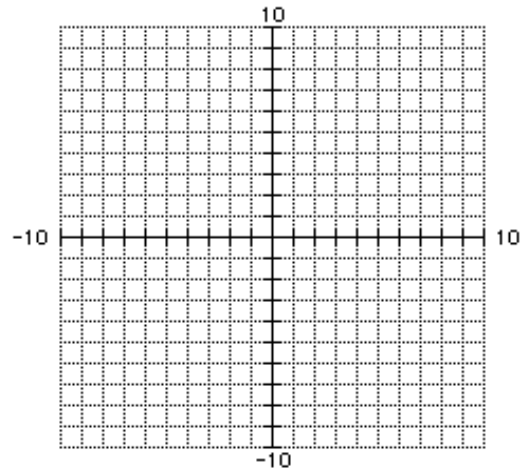
7. What is the Standard Form of a Linear Equation? \_\_\_\_\_
8. What is Slope-Intercept Form of a Linear Equation? \_\_\_\_\_
9. What is Point-Slope Form of a Linear Equation? \_\_\_\_\_

### Graphing Linear Equations

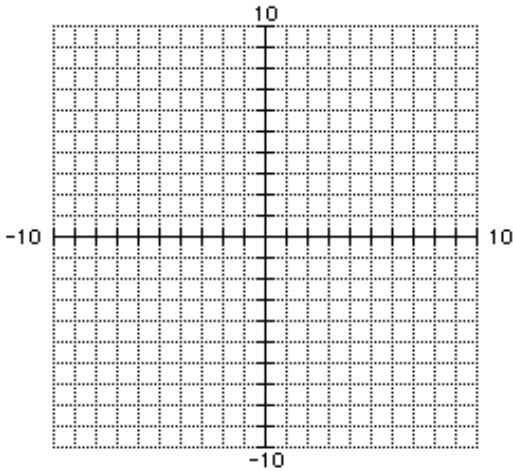
10. Graph the Linear Parent Function: \_\_\_\_\_ in red and the function  $y = \frac{2}{3}x - 6$  in pencil.

11. Identify the domain & range of both functions.

Parent: \_\_\_\_\_  $y = \frac{2}{3}x - 6$   
 Domain \_\_\_\_\_ Domain \_\_\_\_\_  
 Range \_\_\_\_\_ Range \_\_\_\_\_

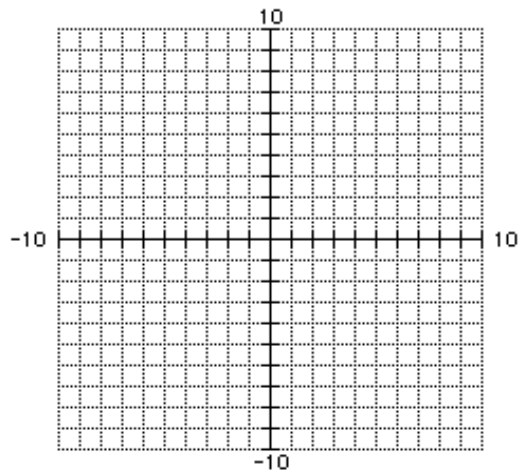


12. Graph  $5x + 2y = 10$



x-intercept? \_\_\_\_\_  
 y-intercept? \_\_\_\_\_  
 Slope? \_\_\_\_\_

13. Graph  $2x - y = 5$



x-intercept? \_\_\_\_\_  
 y-intercept? \_\_\_\_\_  
 Slope? \_\_\_\_\_

Writing Linear Equations

14. Parallel Lines have \_\_\_\_\_ slope.

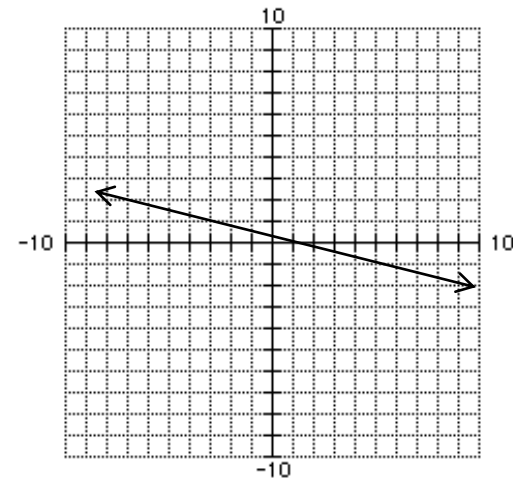
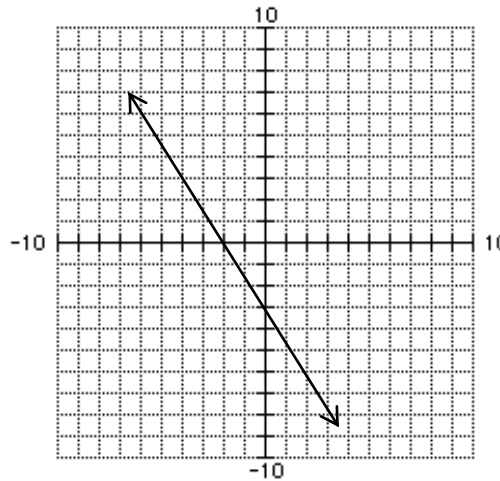
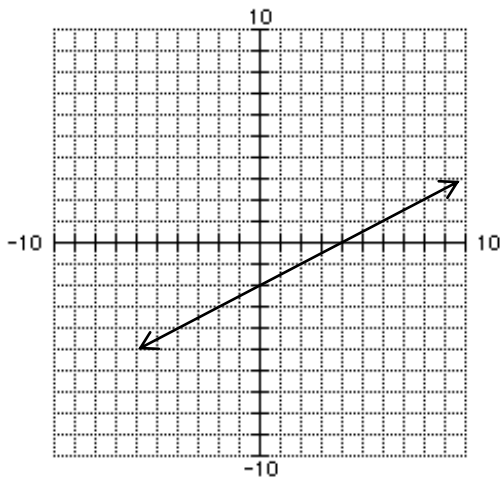
15. Perpendicular Lines have \_\_\_\_\_ slope.

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: \_\_\_\_\_

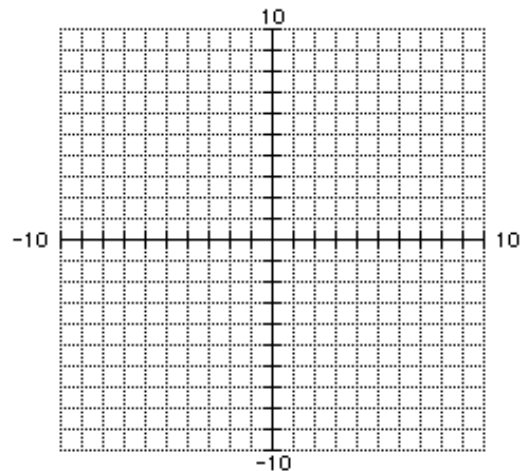
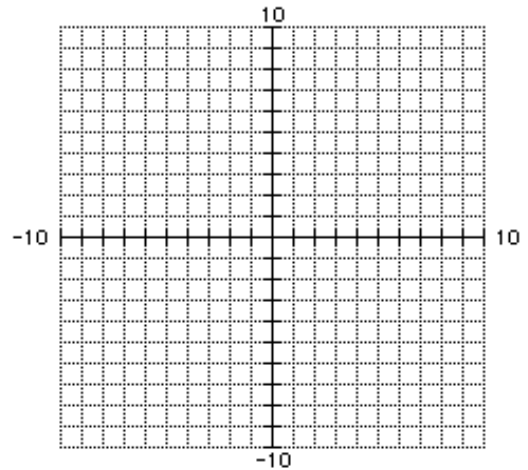
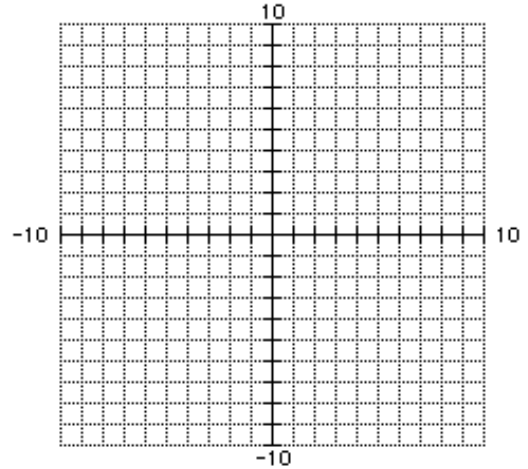
Direction: \_\_\_\_\_

x-intercepts: \_\_\_\_\_

y-intercept: \_\_\_\_\_

Domain: \_\_\_\_\_

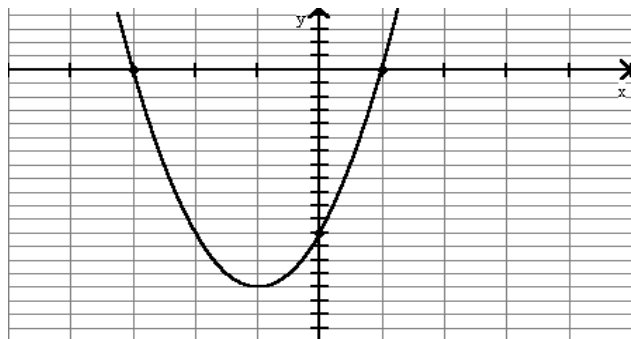
Range: \_\_\_\_\_



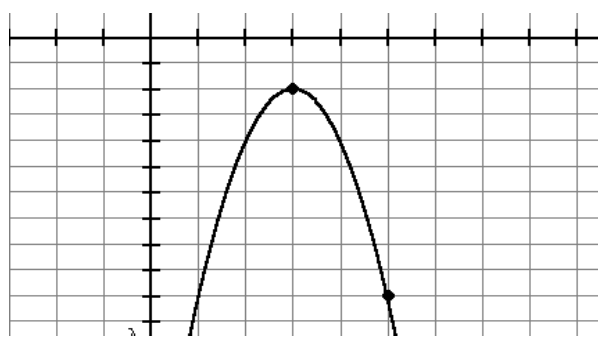
## Writing Quadratic Equations

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:

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

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

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

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

10.  $100x^2y^2 = 25$ ; 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.  $9x^2 + 30x = -25$

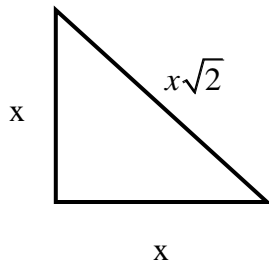
6.  $3x^2 + 2x = 4x$

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

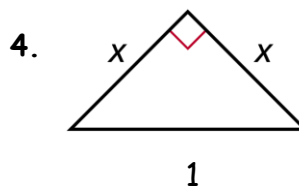
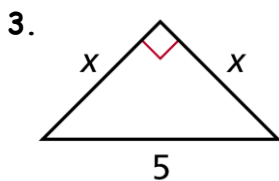
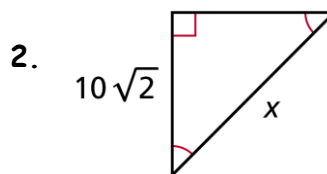
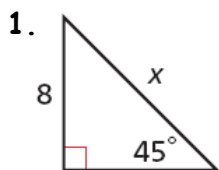
1. $\frac{4}{5} + \frac{7}{3} =$	2. $\frac{5}{8} - \frac{5}{6} =$	3. $\frac{8}{5} \cdot \frac{10}{12} \cdot \frac{3}{4} =$
4. $\frac{\frac{5}{8}}{\frac{3}{4}} =$	5. $\frac{\frac{4}{9} + \frac{1}{4}}{\frac{1}{3} - \frac{5}{6}} =$	6. $\frac{1}{8} + \frac{3}{20} =$
7. $7\frac{2}{3} - 4\frac{5}{8}$	8. $\frac{1}{2} + \frac{15}{2} \left( \frac{3}{5} \right) =$	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 $\pi$ )	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. $\frac{3}{5} \left( \frac{5}{6}x + \frac{1}{3} \right) =$

- In a  $45^\circ, 45^\circ, 90^\circ$  triangle, the hypotenuse is  $x\sqrt{2}$  times as long as each leg.

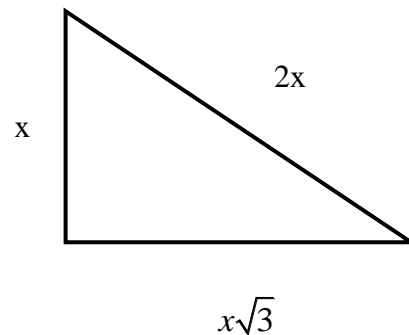
$45^\circ$	$45^\circ$	$90^\circ$
$x$	$x$	$x\sqrt{2}$



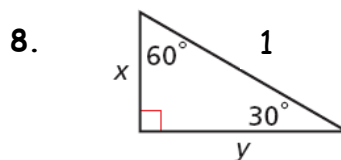
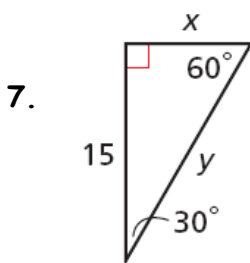
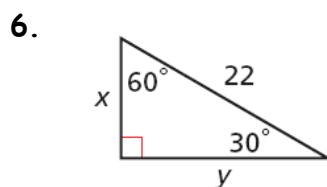
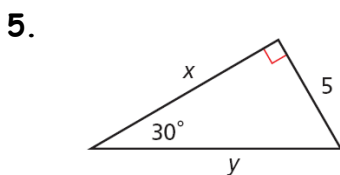
Solve for the missing sides:



- In a  $30^\circ, 60^\circ, 90^\circ$  triangle,
  - the hypotenuse is \_\_\_\_\_ as long as the shorter leg, and
  - the longer leg is \_\_\_\_\_ times as long as the shorter leg.



Solve for the missing sides:



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. $\sqrt{661w^4x^{13}}$