Honors Geometry Summer Review Packet

(Pre-requisite test will be given the first all student school day)

Part I: Factoring Review

Simplify.

1.) $(5x^2 + 3x - 4) + (8x^2 - 4x + 3)$

2.) $(2d^3 - 4d + 1) - (3d^2 + 6d - 8)$

3.) $3v^2 (4v - 9)$

4.) $(3x + 4) (2x - 7)$

5.) $(x - 7)^2$

6.) $(6m - 1) (3m^2 - 5m + 3)$

Factoring out the GCF

Example: $3x^2 + 6x = 3x (x + 2)$

1.) $2x^2 + 4x$

2.) $x^2 + 5x$

3.) $3x^8 + 48x^5 + 27x^3$

4.) $3x^2 - 18x + 27$

5.) $a^2b + 6ab^2 + 9b^3$

Factoring: Difference of Two Squares

Example: $25x^2 - 81 = (5x - 9) (5x + 9)$

1.) $x^2 - 16$

2.) $9 - 4x^2$

3.) $64x^2 - 121$

4.) $49a^2 - 9b^4$

Factoring: Perfect Square Trinomials
Example: $9x^2 + 12x + 4 = (3x + 2)^2$

1.) $4x^2 - 12x + 9$

2.) $9x^2 + 6x + 1$

3.) $4x^2 + 12x + 9$

4.) $9x^2 + 60x + 100$

Factoring: Quadratic Trinomials – Table Method
Example: $x^2 - 5x + 6 = (x - 3)(x - 2)$

1.) $x^2 - x - 12$

2.) $x^2 + 3x - 4$

Factoring: Grouping

1.) $4x^2 + 8x^3y + 10x^2y^2 + 20x^3y^3$

2.) $4x^3 - 7x^2 - 16x + 28$

3.) $x^3 + x^2 + 4x + 4$

4.) $x^3 - 11x^2 - 9x + 99$

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

6.) $a(2a + 5) + 2(2a + 5)$

Factoring: Quadratic Trinomials - *AC* Method

Example: $3x^2 - 5x - 2 = (3x + 1)(x - 2)$

1.) $3x^2 + 8x + 5$

2.) $2x^2 - x - 21$

Factoring: Mixed Review

Chart

-Factor out *GCF*

-Look at the number of terms:

-If leading coefficient is a = 1 then use the table method

-Check for difference of two squares or perfect square trinomial or grouping.

-If leading coefficient is a not equal to 1 then use the *AC* Method.

1.) $4x^2 - 49$

2.) $x^2 - 2x + 1$

3.) $7x^2 + 42x + 63$

4.) $3x^2 - 12$

5.) $4x^2 - 4x$

6.) $2x^2 - x - 6$

7.) $6x^2 + 8x$

8.) $x^2 - 5x + 6$

9.) $2x^2 - 32$

10.) $9x^2 - 30x + 25$

11.) $x^2 + 3x - 4$

12.) $6x^2 + 7x - 5$

13.) $r^2 - 6r + 8$

14.) $x^2 - 10x + 16$

15.) $x^2 - 20x + 64$

16.) $x^2 - 4x - 12$

17.) $x^2 + x - 56$

18.) $2x^2 + 5x + 3$

19.) $3x^2 - 2x - 5$

20.) $2x^2 + 7x - 9$

Factor the following Polynomials completely.

21.) $y^4 + 6y^3 + 9y^2$

22.) $x^4 - 1$

23.) $9m^3 - 63m^2 + 108m$

24.) $16x^2 - 8x + 1$

25.) $x^2 - 35x + 300$

26.) $12x^2 - 6x - 12$

27.) $x^2 + x - 20$

28.) $9x^2 - 36$

Solve the following equations by factoring

29.) $w^2 - 5w = 18 + 2w$

30.) $3x^2 = x + 4$

31.) $(y-2)(y+3)=6$

32.) $x^3=-6x^2-9x$

33.) $(y-4)(y-5)+(2y+3)(y-1)=y(2y-25)-13$

34.) $9x^2=16$

35.) $3x^2=15+4x$

36.) $x^2+20x+100=0$

37.) $x^2+4x-21=0$ _____

38.) $x^2-5x-14=0$ _____

39.) $x^2+5x+6=0$ _____

40.) $x^2-2x-27=3$ _____

41.) $x^2+9x-36=0$ _____

42.) $x^2-11x+28=-2$ _____

43.) $x^2+7x-60=0$ _____

44.) $x^2+6x+9=0$ _____

1. Which of the following represents $12x^2 + 6x + 3$ in simplified form after factoring out the greatest common factor?

A $12(x^2 + 2x + 4)$
B $x(12x^2 + 6x + 3)$
C $3(4x^2 + 2x + 1)$
D $2(6x^2 + 3x + 1)$

2. Which of the following represents $4x^3 + 8x^2 + 12x$ in factored form after factoring out the greatest common factor?

A $4(x^3 + 2x^2 + 3x)$
B $2x(2x^2 + 4x + 6)$
C $4(x^3 + 8x^2 + 12x)$
D $4x(x^2 + 2x + 3)$

3. Which of the following represents $9a^2b^4 + 18a^3b^2$ in factored form after factoring out the greatest common factor?

A $9a^2b^2(b^2 + 2a)$
B $3ab(3ab^2 + 6a^2b)$
C $9a^3b^4(1 + 2ab)$
D $6a^2b^2(3b^2 + 3a)$

4. Which of the following represents $2x^2 - 2x$ in factored form after factoring out the greatest common factor?

A $2(x^2 - x)$
B $x(2x - 2)$
C $2x(x - 1)$
D $2x^2(1 - x)$

5. Which of the following expresses $x^2 + 7x - 30$ in simplified factored form?

A $(x - 3)(x + 10)$
B $(x + 3)(x - 10)$
C $(x - 6)(x + 5)$
D $(x + 6)(x - 5)$

6. Which of the following expresses $x^2 + x - 12$ in simplified factored form?

A $(x - 3)(x + 4)$
B $(x + 3)(x - 4)$
C $(x + 1)(x + 12)$
D $(x + 6)(x + 2)$

7. Which of the following expresses $2x^2 + 9x + 10$ in simplified factored form?

A $(2x - 2)(x + 5)$
B $(2x - 5)(x - 2)$
C $(2x + 1)(x + 10)$
D $(2x + 5)(x + 2)$

8. Which of the following expresses $2x^2 - 50$ in simplified factored form?

A $2(x - 1)(x + 5)$
B $2(x - 5)(x + 5)$
C $(2x + 5)(x + 10)$
D $(2x - 5)(x - 10)$

9. Which of the following expresses $x^2 + 7x + 12$ in simplified factored form?

A $(x + 3)(x + 4)$
B $(x - 3)(x - 4)$
C $(x + 6)(x + 2)$
D $(x + 5)(x + 2)$

10. Which of the following expresses $4x^2 + 7x + 3$ in simplified factored form?

A $(2x + 1)(2x + 3)$
B $(4x + 3)(x + 1)$
C $(4x + 1)(x + 3)$
D $(x + 7)(x + 4)$

11. Which of the following expresses $x^2 - 64$ in simplified factored form?

A $(x - 8)(x + 8)$
B $(x + 4)(x - 16)$
C $(x - 4)(x + 16)$
D $(x + 64)(x - 1)$

12. The area of a rectangle is calculated by multiplying the length by the width. If the area of a rectangle is $x^2 + 11x + 10$, which of the following could be the length of the rectangle?

A $x + 5$
B $x + 1$
C $x + 11$
D $x - 5$

13. The area of a rectangle is calculated by multiplying the length by the width. If the area of a rectangle is $3x^2 - 23x - 36$, which of the following could be the length of the rectangle?

A $3x + 4$
B $3x + 12$
C $x + 9$
D $3x - 23$

14. The area of a rectangle is calculated by multiplying the length by the width. If the area of a rectangle is $2x^2 + 7x + 6$, which of the following could be the length of the rectangle?

A $x + 6$
B $x + 2$
C $x + 7$
D $2x + 7$

15. Which is the solution set for the following equation: $x^2 - x - 6 = 0$?

A. {-3, 2}
B. {-2, 3}
C. {-6, 5}
D. {-5, 6}

16. When completely factored, $3x^2 - 48$ equals

A. $3(x^2 - 48)$
B. $3(x^2 + 16)$
C. $3(x - 4)(x + 4)$
D. $(3x - 16)(x + 3)$

17. Which is the solution set for the equation $x^2 - 8x + 16 = 0$?

A. {2, -6}
B. {4, -4}
C. {4}
D. {-9, 2}

18. Which is the solution set for the equation $x^2 + 5x - 6 = 0$?

A. {1, -6}
B. {-1, 6}
C. {2, -3}
D. {-2, 3}

19. Which is the solution set for the equation $3x^2 + 7x - 6 = 0$?

A. {-2/3, 3}
B. {2/3, -3}
C. {1, -6}
D. {-1, 6}

Part II: Review of Radicals and Operations

Simplify the following expressions:

1.) $\sqrt{200}$

2.) $\sqrt{45}$

3.) $\sqrt{112}$

4.) $\sqrt{400}d$

5.) $\sqrt{9y^2}$

6.) $\sqrt{25n^3}$

7.) $\sqrt{3} \bullet \sqrt{21}$

8.) $\sqrt{20} \bullet \sqrt{15}$

9.) $\sqrt{10x} \bullet \sqrt{2x}$

10.) $\sqrt{\frac{16}{81}}$

11.) $\sqrt{\frac{5}{49}}$

12.) $\sqrt{\frac{x^2}{144}}$

Simplify the expression by rationalizing the denominator.

13.) $\frac{4}{\sqrt{5}}$

14.) $\sqrt{\frac{3}{50}}$

15.) $\sqrt{\frac{9}{75}}$

16.) $\frac{2}{\sqrt{p}}$

17.) $\frac{2}{3+\sqrt{6}}$

18.) $\frac{9}{\sqrt{2x}}$

Simplify the expressions.

19.) $10\sqrt{7}+3\sqrt{7}$

20.) $4\sqrt{5}-7\sqrt{5}$

21.) $\sqrt{7}\left(4-\sqrt{7}\right)$

22.) $\sqrt{5}\left(8\sqrt{10}4+1\right)$

23.) $\left(2\sqrt{3}+5\right)^2$

24.) $\left(6+\sqrt{3}\right)\left(6-\sqrt{3}\right)$

25.) $\sqrt{45s^3}$

26.) $\sqrt{196r^4}$

27.) $\sqrt{450c^5}$

28.) $\sqrt{124m^4n^{10}}$

29.) $11\sqrt{x^7y^8}$

30.) $\sqrt{a^3b}\bullet\sqrt{ab}$

31.) $\sqrt{27xy}\bullet\sqrt{5y^3}$

32.) $\sqrt{\frac{121}{16m^2}}$

33.) $\sqrt{\frac{5d^2}{125}}$

34.) $\frac{5}{\sqrt{7}}+\frac{2}{\sqrt{14}}$

35.) $\frac{4\sqrt{10}}{\sqrt{30}}-\frac{2}{\sqrt{3}}$

36.) $\frac{4}{\sqrt{x}}+\frac{5}{2\sqrt{x}}$

Part III: Systems of Equations

*A system of equations is solved by finding the _____ (if any) that they share.

*A system of _____ equations share either ____, ____, or __ points.

*A system of linear equations can be solved using one of four methods.

	TYPE	DEF'N	WEAKNESSES
I.	Graphing		
II..	Substitution		
III.	Elimination (+ or -)		
IV.	Elimination (Multiply 1st)		

Use the GRAPHING method if…

Use the SUBSTITUTION method if…

Use the ELIMINATION (+ or -) method if…

Use the ELIMINATION (MULTIPLICATION) method if…

1.) Your teacher is giving you a test worth 100 points containing 40 questions. There are 2-point and 4-point questions on the test. How many of each type of question are on the test?

2.) Suppose you are starting an office-cleaning service. You have spent $315 on equipment. You clean the office you use $4 worth of supplies. You charge $25. How many offices must you clean to break even?

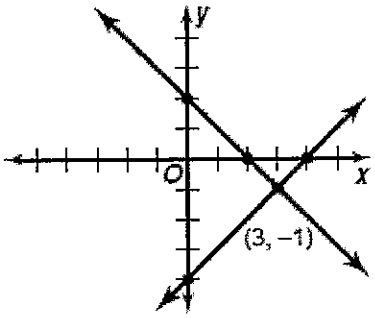
3.) The math club and the science club had fundraisers to buy supplies for a hospice. The math club spent $135 buying six cases of juice and one case of bottled water. The science club spent $110 buying four cases of juice and two cases of bottled water. How much did a case of juice cost? How much did a case of bottled water cost?

4.) Three pairs of jeans and six shirts cost $104.25. The cost of 4 pairs of jeans and 5 shirts is $112.15. Find the cost of each pair of jeans and each shirt.

7.1 Solve Linear Systems by Graphing

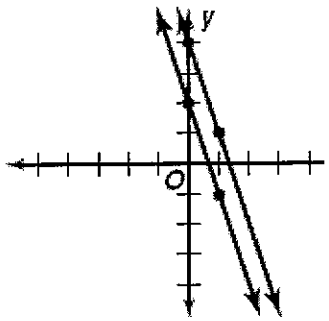
Examples: Solve each system of equations by graphing.

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

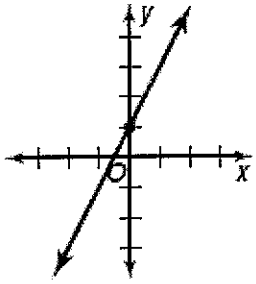


The point $(3, -1)$ lies on both lines, thus $(3, -1)$ is the solution set for the system of equations.

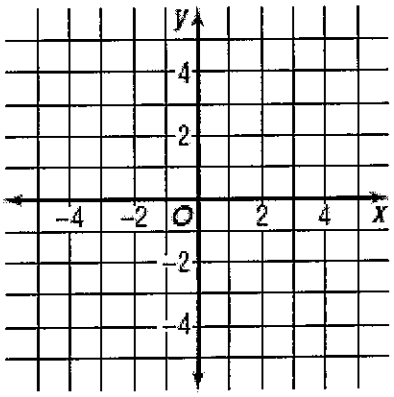
$3x + y = 2$
$3x + y = 4$
no solution



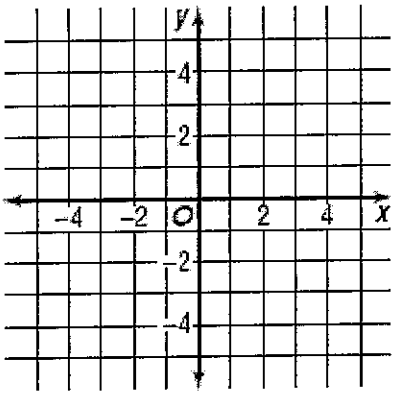
$y = 2x + 1$
$2y = 4x + 2$
infinitely many solutions



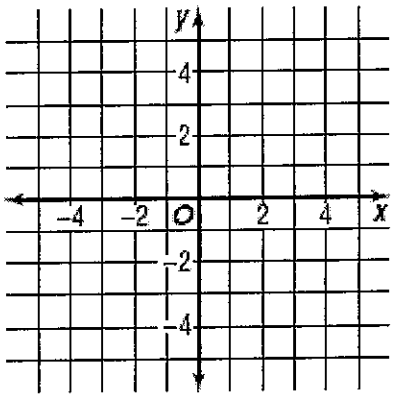
1.) x - y = 3
x - 2y = 3



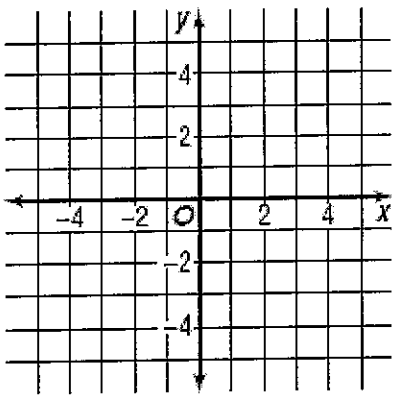
2.) 3x - y = -4
3x - y = 0



3.) y = 2x - 3
4x = 2y + 6



4.) x + 2y = 3
3x - y = -5



7.2 Solve Linear Systems by Substitution

Example: Solve $x + 3y = 7$ and $2x - 4y = 6$.

Solve the first equation for x.

$$x + 3y = 7$$
$$x = 7 - 3y$$

Substitute $7 - 3y$ for x in the second equation. Solve for y.

$$2(7 - 3y) - 4y = -6$$
$$14 - 6y - 4y = -6$$
$$-10y = -20$$
$$y = 2$$

Substitute 2 for y in either one of the two original equations to find the value of x.

$$x + 3(2) = 7$$
$$x + 6 = 7$$
$$x = 1$$

The solution of this system is $(1, 2)$.

5.) $x = 3$
$2y + x = 3$

6.) $y = 3x - 7$
$3x - y = 7$

7.) $y = 16 - x$
$2y = -2x + 2$

8.) $x = -4y$
$3x + 2y = 20$

9.) $y = x - 1$
$x + y = 3$

10.) $x = 3y - 4$
$2x + 6y = 5$

7.3 Solve Linear Systems by Adding or Subtracting

Example: Use elimination to solve the system of equations $x - 3y = 7$ and $3x + 3y = 9$.

Add the two equations.

$$\begin{array}{r} x - 3y = 7 \\ 3x + 3y = 9 \\ \hline 4x = 16 \\ x = 4 \end{array}$$

Substitute 4 for x in either original equation and solve for y.

$$\begin{aligned} 4 - 3y &= 7 \\ -3y &= 7 - 4 \\ -3y &= 3 \\ y &= -1 \end{aligned}$$

The solution of the system is $(4, -1)$.

11.) $2x + 2y = -2$
$3x - 2y = 12$

12.) $4x - 2y = -1$
$-4x + 4y = -2$

13.) $x - y = 2$
$x + y = -3$

14.) $6x + 5y = 4$
$6x - 7y = -20$

15.) $2x - 3y = 12$
$4x + 3y = 24$

16.) $-y + 3x = -1$
$-3x - y = 5$

17.) $x - y = 4$
$2x + y = -4$

18.) $x + 4y = 11$
$x - 6y = 11$

19.) $5x - y = 6$
$y - x = 2$

7.4 Solve Linear Systems by Multiplying First

Example: Use elimination to solve the system of equations $x + 10y = 3$ and $4x + 5y = 5$.

$x + 10y = 3$
$4x + 5y = 5$

Multiply $x + 10y = 3$ by -4. Then add the equations.

$$\begin{array}{r} -4x - 40y = -12 \\ 4x + 5y = 5 \\ \hline -35y = -7 \\ y = \frac{1}{5} \end{array}$$

Substitute $\frac{1}{5}$ for y into either original equation and solve for x.

$$\begin{aligned} x + 10\left(\frac{1}{5}\right) &= 3 \\ x + 2 &= 3 \\ x &= 1 \end{aligned}$$

The solution of the system is $\left(1, \frac{1}{5}\right)$.

20.) $3x + 2y = 0$
$x - 5y = 17$

21.) $2x + 3y = 6$
$x + 2y = 5$

22.) $3x - y = 2$
$x + 2y = 3$

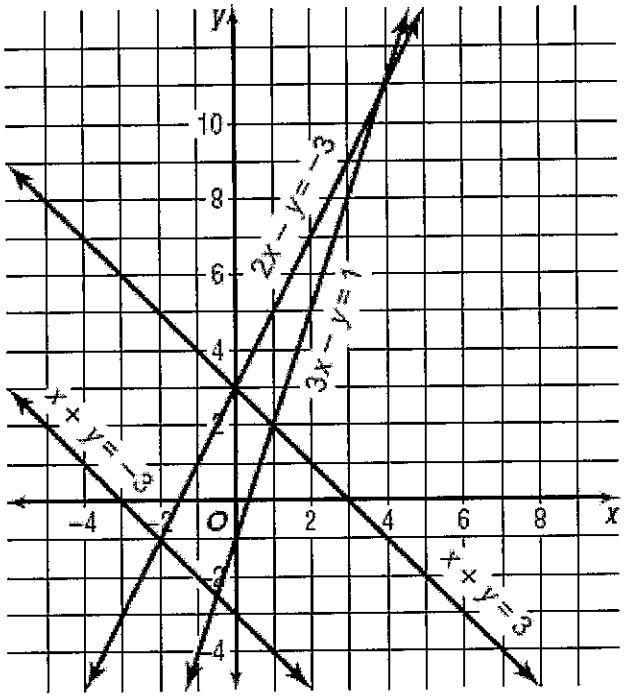
23.) $4x + 5y = 6$
$6x - 7y = -20$

24.) $7x + 4y = -4$
$5x + 8y = 28$

25.) $2x + 5y = 3$
$-x + 3y = -7$

7.5 Solving Special Types of Linear Systems

Use the graph to the right to determine if each system has <u>one solution</u>, <u>no solution</u>, or <u>infinitely many solutions</u>.



26.) $x + y = -3$
$2x - y = -3$

27.) $4x - 2y = -6$
$2x - y = -3$

28.) $3x - y = 1$
$x + y = 3$

29.) $x + y = -3$
$x + y = 3$

30.) $x + y = 3$
$2x - y = -3$

31.) $2x - y = -3$
$3x - y = 1$

Solve the following systems and state whether the system has <u>one solution</u>, <u>no solution</u>, or <u>infinitely many solutions</u>.

32.) $2x + 3y = 6$
$2x + 3y = -6$

33.) $x - y = 2$
$2x - 2y = 4$

34.) $4x - 2y = 4$
$4x - 2y = 0$

35.) $y = x + 2$
$y = 2x - 1$

36.) $x + y = 1$
$3x + 3y = 3$

37.) $2x - 2y = 2$
$y = x$

Part IV: Solving Quadratics

Directions: Solve by TAKING A SQUARE ROOT. ($x^2 = d$).

1. $5x^2 = 40$

2. $8x^2 - 24 = 0$

3. $(x + 8)^2 = 13$

4. $(x - 6)^2 = 49$

5. $x^2 = 50$

6. $2x^2 = 50$

7. $(2x - 3)^2 = 13$

8. $\frac{3}{2}(x + 1)^2 = 33$

9. $4 + 5x^2 = 34$

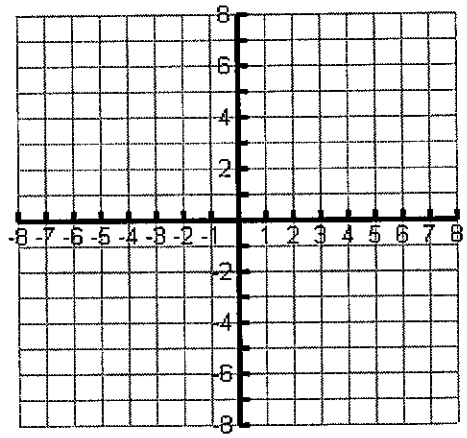
10. $\frac{4}{3}(x - 6)^2 = 20$

11. $3(x + 4)^2 = 12$

12. $2(3x - 3)^2 - 5 = 8$

Find the given information and graph the function.

13. $y = -x^2 + 8x - 11$



Vertex: _____

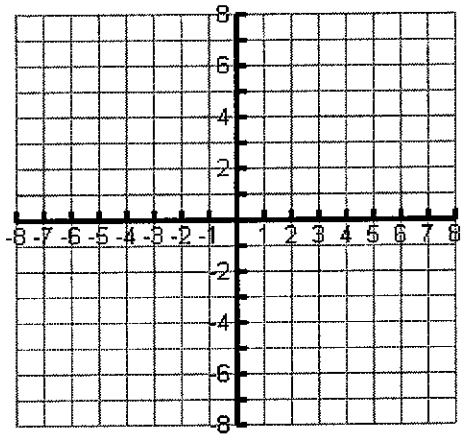
Min Value _____ or Max Value___

Axis of Symmetry: _____

Opens: Up _____ or Down _____

x	y	(x , y)

14. $y = y = x^2 + 5$



Vertex: _____

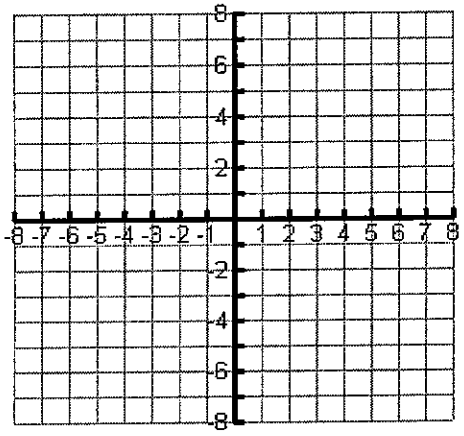
Min Value _____ or Max Value___

Axis of Symmetry: _____

Opens: Up _____ or Down _____

x	y	(x , y)

15. $y = x^2 + 2x = -1$



Vertex: _____

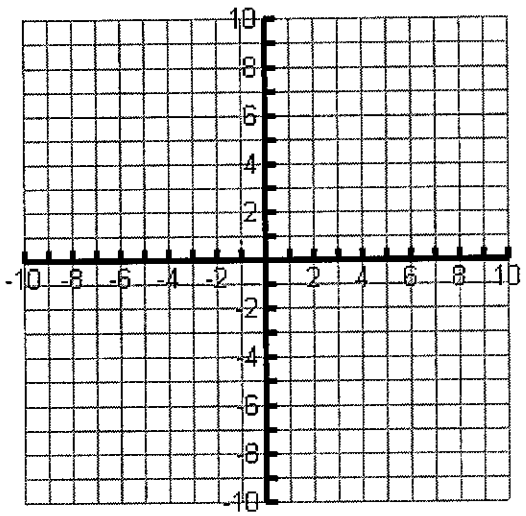
Min Value _____ or Max Value___

Axis of Symmetry: _____

Opens: Up _____ or Down _____

X	y	(x , y)

16. y = $4x^2 + x + 3$



*Vertex: _____

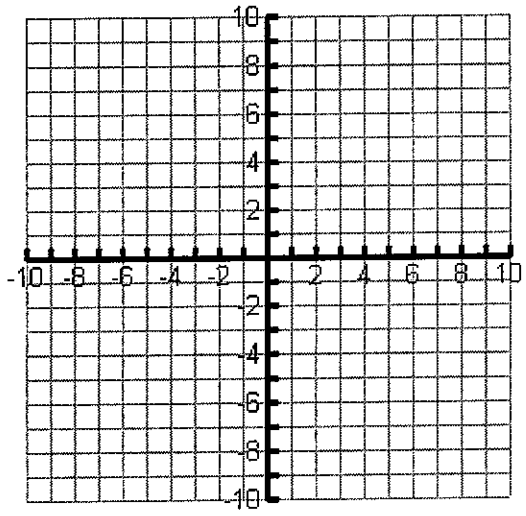
*Axis of Symmetry: _____

Opens: Up _____ or Down _____

X	Y	(x , y)

*x-intercepts: _____

17. $y = x^2 + 4x + 1$



*Vertex: _____

*Axis of Symmetry: _____

Opens: Up _____ or Down _____

X	Y	(x , y)

*x-intercepts: _____

Directions: Use the DISCRIMINANT to tell HOW MANY solutions there are.

18. $5x^2 - 8x + 2 = 0$

19. $3x^2 + 12x + 13 = 0$

20. $x^2 + 6x = -9$

21. $3x^2 - 4x = 0$

Directions: Solve by using the QUADRATIC FORMULA.

22. $3x^2 - x = 5$

23. $x^2 - 10x + 25 = 0$

24. $4x^2 + 2x = 0$

25. $2x^2 + 12x - 40 = 0$

26. $4x^2 - 36 = 0$

27. $x^2 - 100x = 0$

28. Name all the steps need to solve a quadratic equation by graphing.
    1.) Make sure equation is in standard form, if not put into standard form
    2.) Determine whether the parabola opens up or down
    3.) Find the axis of symmetry using $x = -b/2a$
    4.) Using the x-value find and plot the vertex
    5.) Make a table using a point below and above the vertex
    6.) Plot the points and connect using the u-shaped graph
    7.) Factor the equation to determine the solutions for x
    8.) Verify with where the graph crosses the x-axis

29. What form does the equation need to be in to solve using square roots?

30. What does $\pm$ mean?

31. What is the formula for the DISCRIMINANT?

32. What is the quadratic formula?