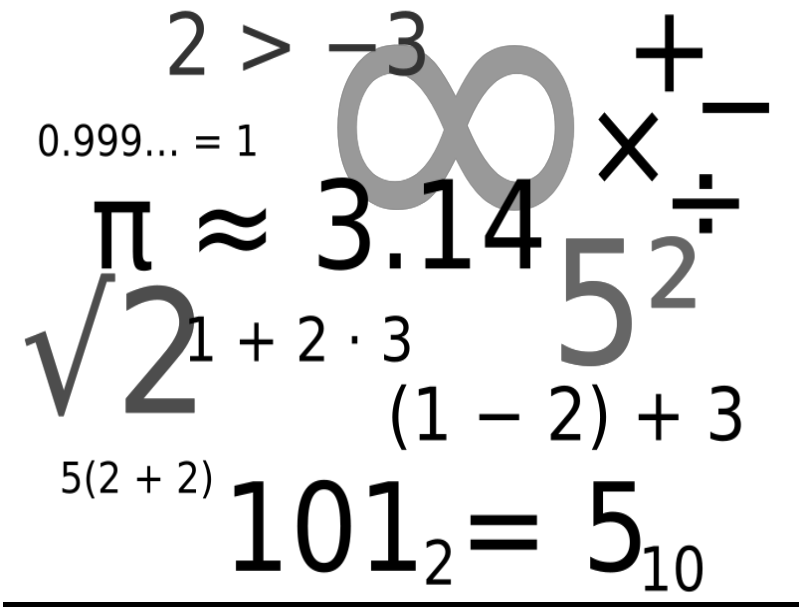
OFHS

SUMMER ASSIGNMENT

AP Pre-Calc



Revised May 2024

AP PRE-CALC SUMMER ASSIGNMENT

INSTRUCTIONS

Attached you will find a packet of exciting math problems for your enjoyment over the summer. The purpose of the summer packet is to review the topics you have already mastered in math, and to make sure that you are prepared for the class you are about to enter.

The packet contains a summary and explanation of the topics, so you don't need to worry if you don't have your math book. You will find many sample problems, which would be great practice for you before you try your own problems. The explanations are divided into sections to match the sample problems so you should be able to reference the examples easily.

This packet will be **due the first day of class**. All of your hard work will receive credit. The answers are provided in the back of the packet; *however*, you must show an amount of work appropriate to each problem in order to receive credit. If you are unsure of how much work to show, let the sample problems be your guide. You will have an opportunity to show off your skills during the first week when your class takes a quiz on the material in the packet.

This packet is to help you maximize your previous math courses and to make sure that everyone is starting off on an even playing field on the first day of school. If you feel that you need additional help on one or two topics, you may want to try math websites or google for help.

Enjoy your summer and don't forget about the packet. August will be here before you know it!

See you in August!

The OFHS Math Department

SUMMER ASSIGNMENT
For Students Entering AP Pre-Calculus

Name: _____

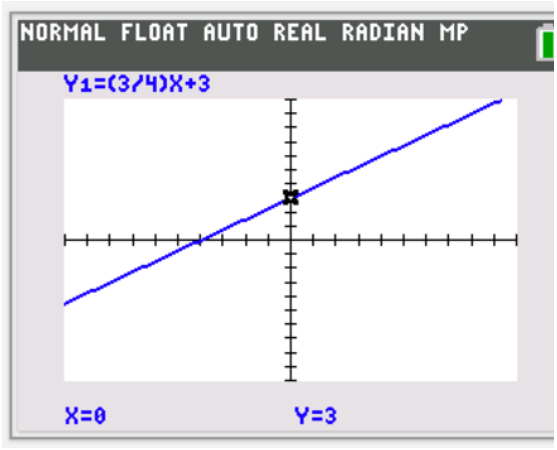
Welcome to AP Pre-Calculus! This packet contains the topics that you have learned in your previous courses that are most important to this class. This packet is meant as a REVIEW. Please read the information, do the sample problems and be prepared to turn this in when school begins again.

Enjoy your summer!

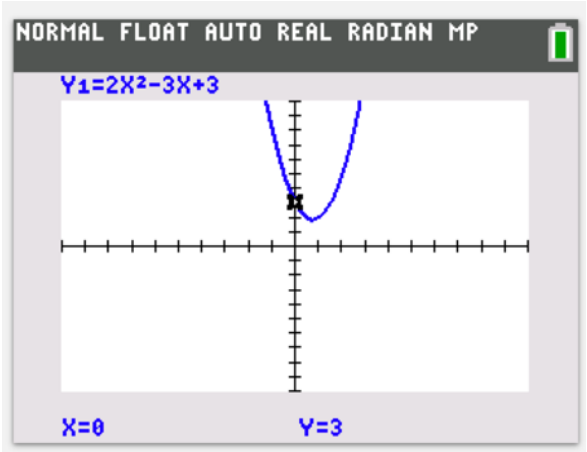
I. **Using your graphing calculator** (you will need a TI-84 plus graphing calculator for this class):

A. **Complete basic graphing**

1. Graph $y = \frac{3}{4}x + 3$



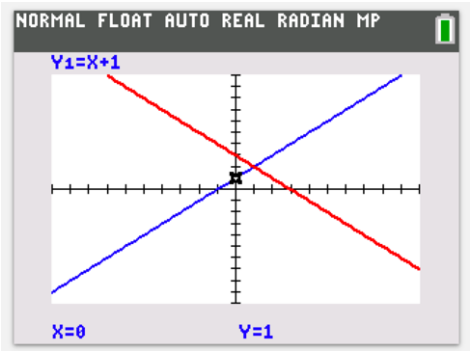
2. Graph $y = 2x^2 - 3x + 3$

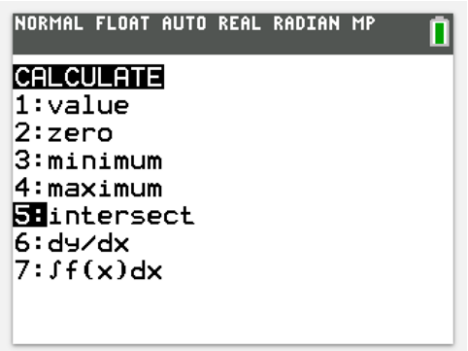


B. **Find the intersection** of the lines: $\begin{cases} y - x = 1 \\ y + x = 3 \end{cases}$ using the *intersection* function on your calculator.

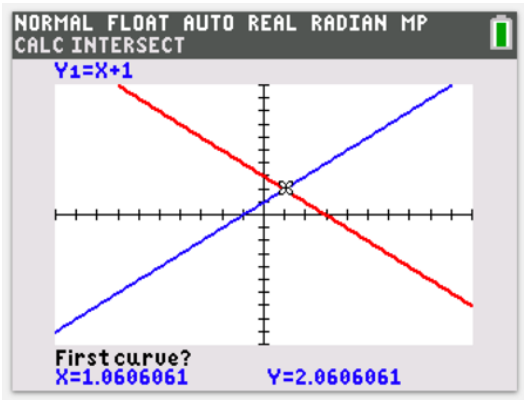
Steps:

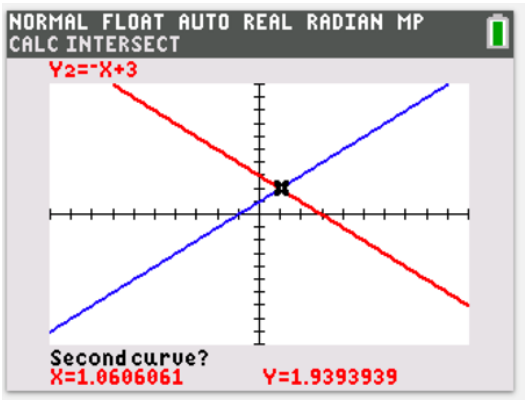
1. Solve the above equations for $\boldsymbol{y}$.
   $y = x + 1$
   $y = -x + 3$
2. **Graph** those equations on your calculator.
3. Press: [2nd] [TRACE] [INTERSECT]

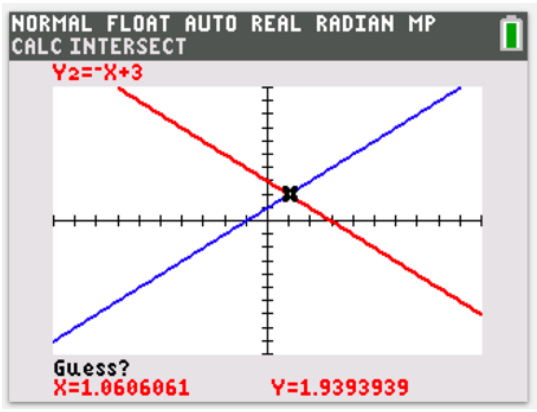


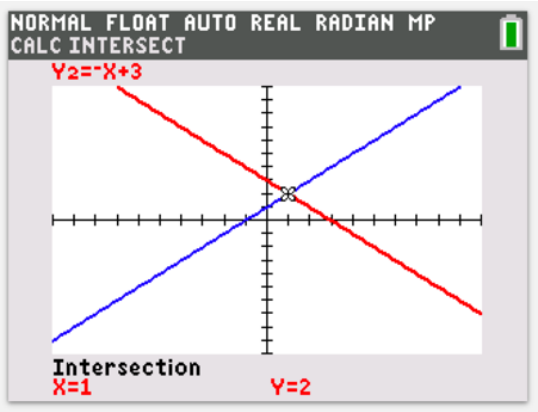


4. When "*First curve?*" is displayed, press the arrows if necessary to move the cursor to the first function, press [ENTER] (near point of intersect). When the *"Second curve"* is displayed, move the cursor to the second function press [ENTER]. When *"Guess?"* is displayed press [ENTER] near point of intersect. Point of **Intersection** is your answer.



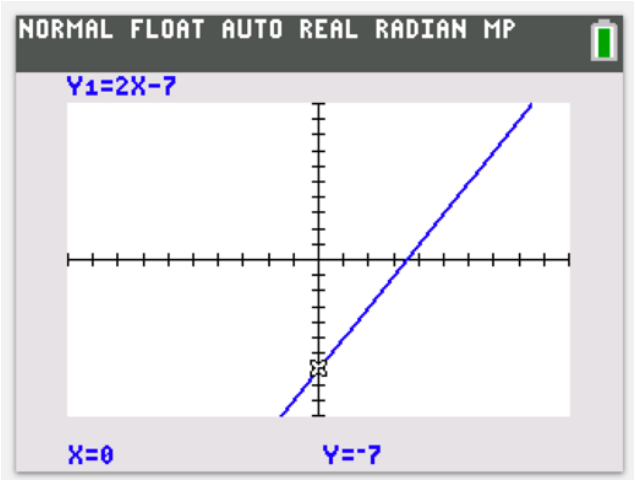


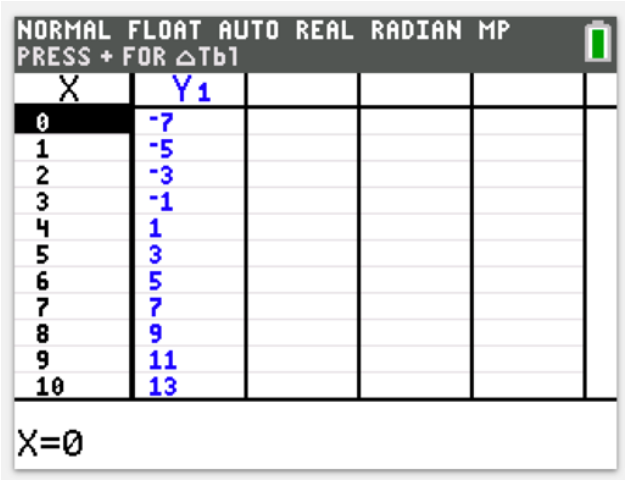




C. **Using Tables**.

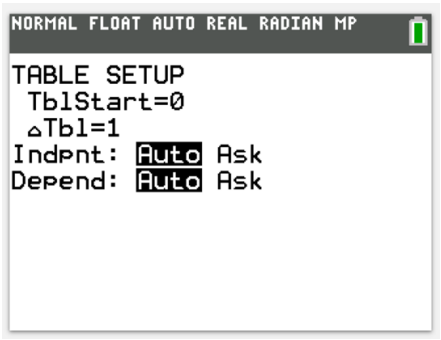
1. Graph the line $y = 2x - 7$. Access the table by pressing [2nd][GRAPH]

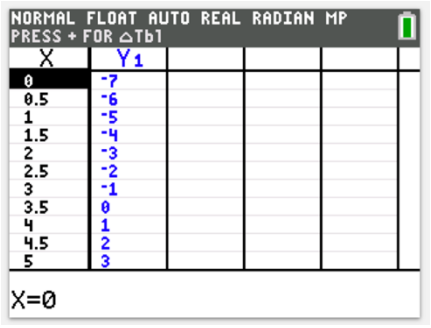




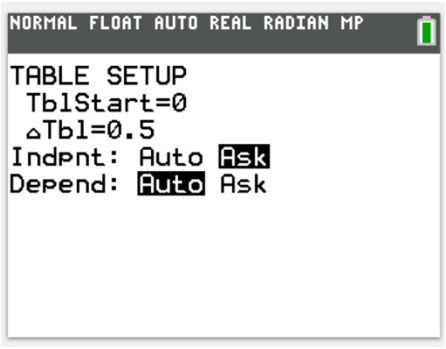
- You can scroll up and down the table by using the arrows.

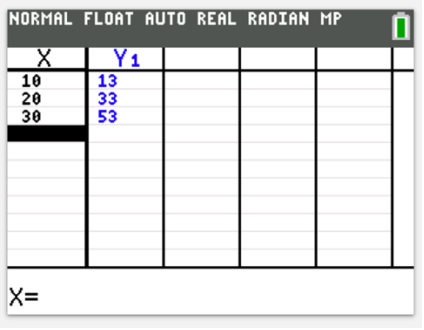
2. You can also control the **Table Setup** function. Within the settings, you can control the increments for which the x-value increases. You can also set the table to automatically fill in the x-values, or you can set it so you can choose your own x-values to test.
   - Access the Table Set (**tblset**) by pressing [2nd] [WINDOW].
   - Change the x-value increments to 0.5 by moving cursor down to $\Delta Tbl =$ ____ and change the number to 0.5. Then the independent variable will increase by 0.5.
   - Go to the **TABLE** ([2nd] [GRAPH]) and confirm this.
   - Go back to **tbleset** to change the **Indpnt:** variable to [Ask]**.**





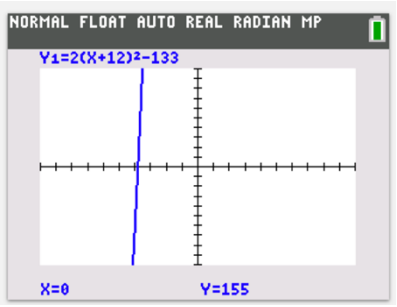
   - Move cursor down to *Indpnt*:, move cursor to the *right*, and press [ENTER] on **Ask**. You now can enter any x-value you want.
   - Go to [TABLE] and test x-values 10, 20, 30.

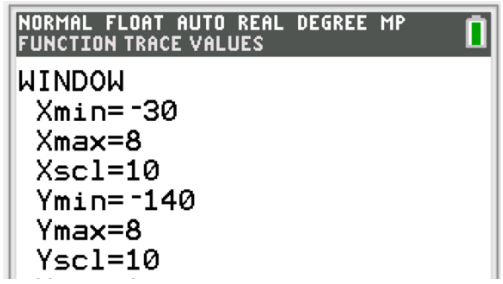


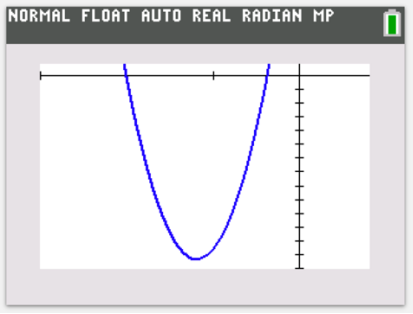


D. **Setting Windows**

1. To see the graph of $f(x) = 2(x + 12)^2 - 133$, you must **set the window manually**, using both your knowledge of functions and of the calculator.
2. To set the window so you can see the function, press [WINDOW]**.** Now, set the window by changing the values to look like the ones below. Your graph should look like the one on bottom right.







E. **Conversions**

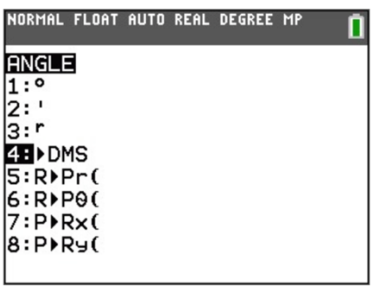
1. Convert between **decimal degrees** and **degrees, minutes and seconds** using the angle function. (You will access this function by going to the [ANGLE] button).
   - Problem:
     1. $78°07'30'' \approx 78.125°$
     2. $15.375° = 15°22'30''$

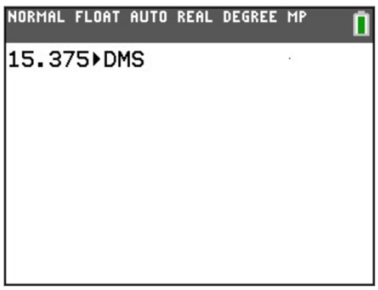
Solution to problem #1:

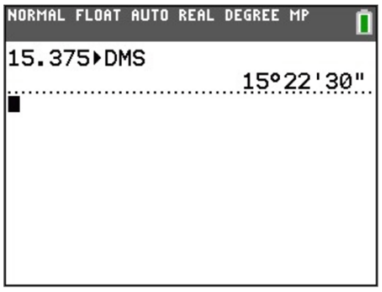
- On home screen, input 78, press [2nd] [APPS] [1], input 07, press [2nd] [APPS] [2], type 30, press [ALPHA][+]. Press [ENTER] to complete the conversion process.

Solution to problem #2:

- Make sure the calculator is in **DEGREE** mode by pressing [MODE], scrolling to DEGREE and pressing [ENTER]. Press [2nd][MODE] to QUIT and return to the home screen.
- Input 43.26
- Press [2nd] [APPS] to access the ANGLE menu, then press the [4] key to select the ▶DMS function (convert to degrees, minutes, seconds.). Prese [ENTER] and the conversion is complete.

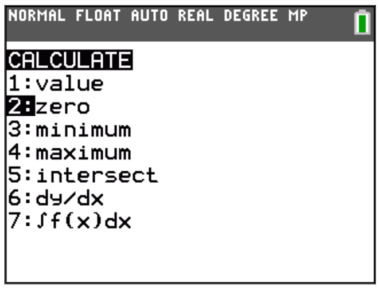




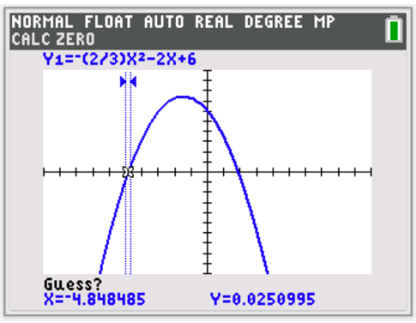


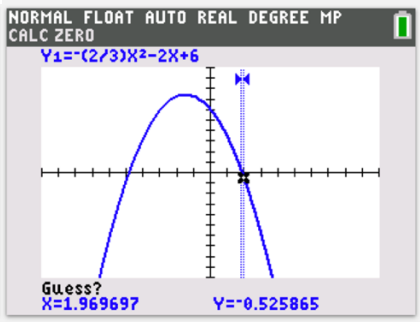
F. **Find zeros, roots or *x*-intercepts**

Find the zeros of $f(x) = -\frac{2}{3}x^2 - 2x + 6$



1. Press [Y=].
2. Enter the function.
3. Press [GRAPH].
4. Press [2nd] [CALC] [2].
5. When prompted for "Left Bound?", specify the left bound for *x* using the arrow keys or enter a value and press [ENTER].
6. When prompted for "Right Bound?", specify the right bough for *x* using the arrow keys or enter a value and press [ENTER].
7. When prompted for "Guess?", move the cursor close to the zero value or enter a value and press [ENTER].





8. The screen will show the zero(s), which is (-4.85102, 0) and (1.854102, 0)

II. Polynomials: Basic Operations

Expand Polynomials including multiplying two binomials, binomials by polynomials and cubing binomials.

Multiply the following:

1 . $7x^3y\left(2x^2y+5xy^3\right)=14x^5y^2+35x^4y^4$

2. $(2x-3)(x+4)=2x^2+5x-12$

3.
$$\begin{aligned}(x-4)\left(2x^2+3x-6\right)&=2x^3+3x^2-6x\\&\quad -8x^2-12x+24\\&\quad\overline{\qquad\qquad\qquad}\\&=2x^3-5x^2-18x+24\end{aligned}$$

4.
$$(a+b)^3=a^3+3a^2b+3ab^2+b^3$$
$$(a-b)^3=\left(a+(-b)\right)^3$$
$$(x+2)^3=x^3+6x^2+18x+8$$
$$(x-2)^3=x^3-6x^2+12x-8$$

Be a **factoring** expert! This is very important. You should be comfortable factoring out the greatest common factor from an expression, factoring by grouping, factoring quadratics when the leading coefficient is one *and* when the leading term is something other than one. For example, you should be able to factor the following:

1. $12x^2y-20x^3y=4x^2y(3-5x)$

2. $\left(x^2-9\right)=(x+3)(x-3)$

3. $x^2+7x+12=(x+4)(x+3)$

4. $3x^2-10x-8=(3x+2)(x-4)$

5. $x^4+3x^2-10=\left(x^2+5\right)\left(x^2-2\right)$

6. Using: $a^3+b^3=\left(a+b\right)\left(a^2-ab+b^2\right)$

$a^3-b^3=\left(a-b\right)\left(a^2+ab+b^2\right)$

Factor: $125x^3+y^3=\left(5x+y\right)\left(25x^2-5xy+y^2\right)$

Factor: $x^3-27y^3=\left(x-3y\right)\left(x^2+3xy+9y^2\right)$

III. Rational Expressions

1. Be able to **reduce** a rational expression. Problem: Simplify the rational expression below.

$$\frac{9x^2+6xy-3y^2}{12x^2-12y^2}=\frac{3\left(x^2+2xy-y^2\right)}{12\left(x^2-y^2\right)}$$

$$=\frac{3\left(x+y\right)\left(3x-y\right)}{3\left(4\right)\left(x+y\right)\left(x-y\right)}$$

Factor the numerator and denominator

$$=\frac{3\left(x+y\right)}{3\left(x+y\right)}\cdot\frac{3x-y}{4\left(x-y\right)}$$

Commutative Property

$$=\frac{3x-y}{4\left(x-y\right)}$$

Reduce fraction

2. **Add, subtract, multiply and divide** rational expressions.

Problem: Multiply and simplify $\frac{x+2}{x-3}\cdot\frac{x^2-4}{x^2+x-2}=\frac{\left(x+2\right)\left(x^2-4\right)}{\left(x-3\right)\left(x^2+x-2\right)}$

Multiply the numerator and denominator $=\frac{\left(x+2\right)\left(x+2\right)\left(x-2\right)}{\left(x-3\right)\left(x+2\right)\left(x-1\right)}$

Factor and reduce $=\frac{\left(x+2\right)\left(x-2\right)}{\left(x-3\right)\left(x-1\right)}$

Simplify

Problem: Divide and simplify $\frac{a^3-b^3}{a^2-b^2}\div\frac{a^2+ab+b^2}{a^2+2ab+b^2}=\frac{a^3-b^3}{a^2-b^2}\cdot\frac{a^2+2ab+b^2}{a^2+ab+b^2}$

Multiply by the reciprocal $=\frac{\left(a-b\right)\left(a^2+ab+b^2\right)\left(a+b\right)\left(a+b\right)}{\left(a-b\right)\left(a+b\right)\left(a^2+ab+b^2\right)}$

Factor and reduce $=a+b$

Problem: Addition of rational expressions $\frac{3}{x+2}+\frac{5-x}{x^2-4}=\frac{3}{x+2}+\frac{5-x}{(x+2)(x-2)}$

Factor the denominator. Find the least common denominator

$LCD=(x+2)(x-2)$ $=\frac{(x-2)}{(x-2)}\cdot\frac{3}{(x+2)}+\frac{5-x}{(x+2)(x-2)}$

Multiply by 1 in the form $\frac{(x-2)}{(x-2)}$ $=\frac{3x-6}{(x+2)(x-2)}+\frac{5-x}{(x+2)(x-2)}$

Multiply fractions $=\frac{3x-6+5-x}{x^2-4}$

Combine numerator and simplify $=\frac{2x-1}{x^2-4}$

Problem: Subtraction of rational expressions. Changing the above problem to a subtraction problem:

$\frac{3}{x+2}-\frac{5-x}{x^2-4}=\frac{3}{x+2}-\frac{5-x}{(x+2)(x-2)}$

Following the steps above, find LCD and multiply by 1 $=\frac{3x-6-(5-x)}{x^2-4}$

Remember to **distribute the negative!** $=\frac{4x-11}{x^2-4}$

Problem: Solving rational **equations**. $\frac{14}{x+2}-\frac{1}{x-4}=1$

Multiply both sides by the **least common denominator**. $(x+2)(x-4)\left[\frac{14}{x+2}-\frac{1}{x-4}\right]=(1)(x+2)(x-4)$

Using the distributive law: $(x-2)(x-4)\left(\frac{14}{x+2}\right)-(x-2)(x-4)\left(\frac{1}{x-4}\right)=(x-2)(x-4)(1)$

Simplify: $14(x-4)-(x+2)=(x+2)(x-4)$ $14x-56-x-2=x^2-2x-8$ $0=x^2-15x+50$

$0=(x-10)(x-5)$ $0=x-10$ *or* $0=x-5$ The solutions are: $x=10,\ 5$

Problem: Solve: $\frac{7x-12}{x-3}-\frac{x^2}{x+3}=\frac{54}{x^2-9}$ Multiply both sides by the LCD:

$$(x-3)(x+3)\left[\frac{7x-12}{x-3}-\frac{x^2}{x+3}\right]=(x-3)(x+3)\left(\frac{54}{x^2-9}\right)$$

Distribute: $(x-3)(x+3)\left(\frac{7x-12}{x-3}\right)-(x-3)(x+3)\left(\frac{x^2}{x+3}\right)=(x-3)(x+3)\left(\frac{54}{x^2-9}\right)$

Simplify: $(x+3)(7x-12)-(x-3)(x^2)=54$ $7x^2+9x-36-(x^3-3x^2)=54$ Distribute the negative sign and continue simplifying: $7x^2+9x-36-x^3+3x^2=54$ $-x^3+10x^2+9x-36=54$ Subtract 54 and multiply by -1: $x^3-10x^2-9x+90=0$ Factor: $x^2(x-10)-9(x-10)=0$ $(x^2-9)(x-10)=0$

Solve: $x^2-9=0$ *or* $x-10=0$

$x=\pm 3$ *or* $x=10$

Since x cannot be equal to ± 3, as the denominator in the original equation will be zero, the only solution is $x=10$.

3. Simplify a complex fraction, for example:

$$\frac{\frac{2}{x}-1}{\frac{4}{x^2}-1}=\frac{\frac{2}{x}-1\left(\frac{x}{x}\right)}{\frac{4}{x^2}-1\left(\frac{x^2}{x^2}\right)}=\frac{\frac{2-x}{x}}{\frac{4-x^2}{x^2}}$$

$$=\frac{2-x}{x}\cdot\frac{x^2}{4-x^2}$$

$$=\frac{2x-x^2}{4-x^2}$$

$$=\frac{x(2-x)}{(2-x)(2+x)}$$

$$=\frac{x}{x+2}$$

4. Know the difference between *solving* and *simplifying* a rational expression.

You would *simplify*: $\frac{2x+1}{x+3}-\frac{x-1}{x-7}$

while you would *solve*: $\frac{2x+1}{x+3}-\frac{x-1}{x-7}=1$

IV. Exponents

Know the properties of exponents and be able to simplify all types of exponents, including negative and fractional exponents. For example:

$$x^{\frac{5}{6}} \cdot x^{\frac{2}{3}} = x^{\frac{5}{6}+\frac{2}{3}}$$
$$= x^{\frac{9}{6}} = x^{\frac{3}{2}} = \sqrt{x^3}$$
$$= x\sqrt{x}$$

1. Be able to find the n^{th} root of real numbers. For example:

$$9^{\frac{1}{2}} = 3$$
$$27^{\frac{1}{3}} = 3$$
$$(-8)^{\frac{1}{3}} = -2$$

2. Simplify using rational exponents.

$$\left(\frac{4x^{\frac{1}{3}}}{x^{\frac{1}{2}}}\right)^{\frac{1}{2}} = \frac{2}{x^{\frac{1}{12}}}$$

$$\left(4x^{\frac{1}{3}} \cdot x^{-\frac{1}{2}}\right)^{\frac{1}{2}}$$

$$4^{\frac{1}{2}} x^{\frac{1}{6}} x^{-\frac{1}{4}} = 4^{\frac{1}{2}} x^{-\frac{1}{12}} = \frac{2}{x^{\frac{1}{12}}}$$

V. Radicals

1. Simplify radicals. Be able to express the following in simplest radical form:

$$\sqrt{12x^3y^5z^2} = 2xy^2z\sqrt{3xy}$$

$$\sqrt[5]{64x^7y^{10}z^3} = (2xy^2)\sqrt[5]{2x^2z^3}$$

2. Know the difference between exact versus approximate answers. For example, $\sqrt{3}$ is *exact*, while 1.732050808 is an *approximation*.

VI. Linear Equations

1. Have knowledge of linear equations. Know how to use the following formulas:

$$m = \frac{y_2 - y_1}{x_2 - x_1},\ where\ x_1 \neq x_2$$

$$y = mx + b$$

$$y - y_1 = m(x - x_1)$$

When 2 lines are parallel $(\|)$ their slopes are the same.

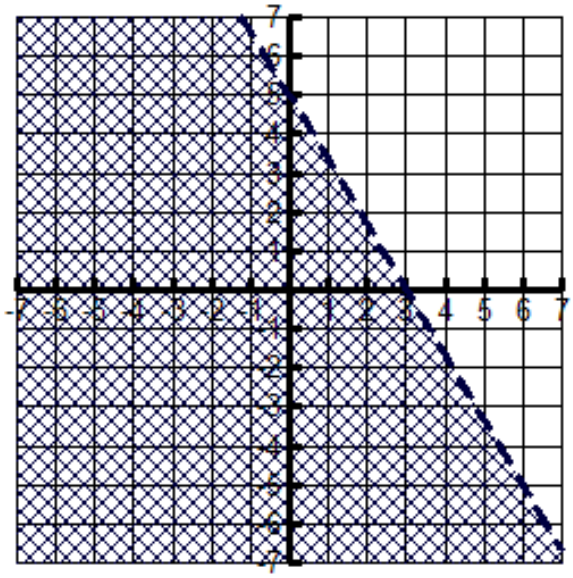
When 2 lines are perpendicular $(\perp)$ their slopes are opposite reciprocals.

$$m_1 m_2 = -1$$

2. Solve and graph linear inequalities

$5x + 3y < 15$ Solve for y

$y < -\frac{5}{3}x + 5$ Graph and shade the correct side



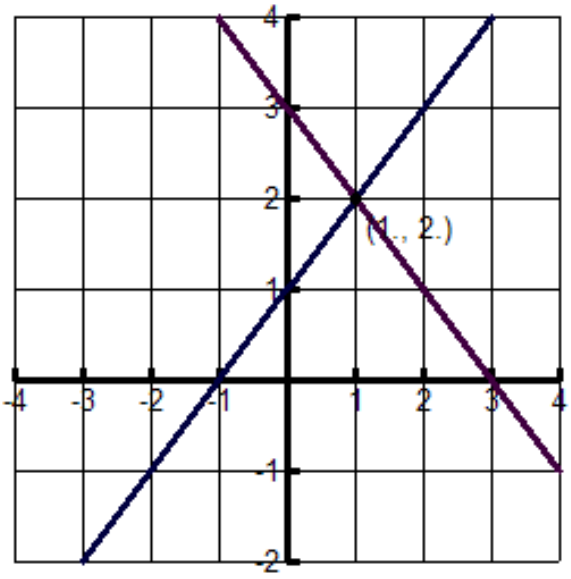
3 Solve systems of linear equations in two and three unknowns, using substitution, linear combination and matrices.

4 Be able to find the intersection of two lines on your calculator.

Problem: Solve **graphically**: $\begin{aligned} y - x &= 1 \\ y + x &= 3 \end{aligned}$

Solving both equations for y and graphing yields:

The solution to the system is $(1, 2)$



Problem: Solve using **substitution**. $\begin{aligned} 2x + y &= 6 \\ 3x + 4y &= 4 \end{aligned}$

Solve the first equation for y. $y = 6 - 2x$

Since y and $6 - 2x$ are equivalent, substitute $6 - 2x$ for y into the second equation.

$$3x + 4(6 - 2x) = 4$$

Use the distributive property. $3x + 24 - 8x = 4$

Solve for x. $x = 4$

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

$$\begin{aligned} 2x + y &= 6 \\ 2 \cdot 4 + y &= 6 \\ y &= -2 \end{aligned}$$

The solution is the ordered pair $(4, -2)$

Problem:
Solve using **linear combination**:

$$\begin{array}{rl} & 3x-4y=-1 \\ + & -3x+2y=0 \\ \hline & -2y=-1 \end{array} \qquad \textit{Add the x's and add the y's}$$

Solving for y yields: $y=\frac{1}{2}$.

Substitute $y=\frac{1}{2}$ into either of the two original equations: $-3x+2\left(\frac{1}{2}\right)=0$

Solve for : $x=\frac{1}{3}$

The solution is the ordered pair $\left(\frac{1}{3},\frac{1}{2}\right)$

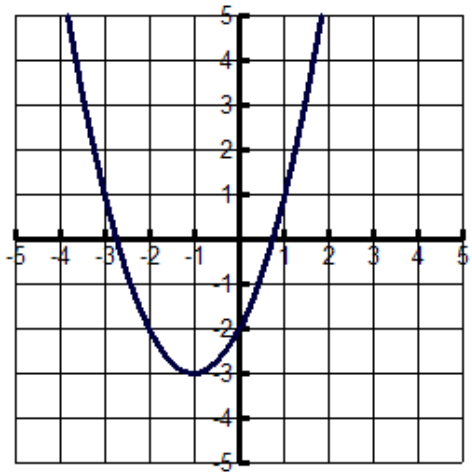
VII. Functions

1 Know how to use function notation and what it means. $f(2)=5\longrightarrow(2,5)$

2 Identify a function from a set of ordered pairs, a graph or an equation.

3 Determine the domain and range of a function from a graph.

Given the graph:



Domain All Real Numbers

Range $y\geq -3$

4 Evaluate functions.

Given $f(x)=5x^2-3x+1$

$f(2)=15$

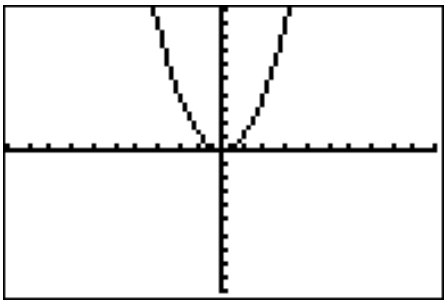
$f(0)=1$

$f(-3)=55$

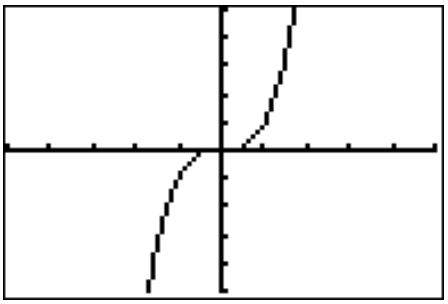
$f(h)=5h^2-3h+1$

5 Recognize the graphs of the following functions:

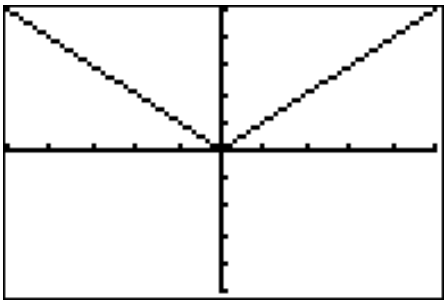
a) $f(x)=x^2$



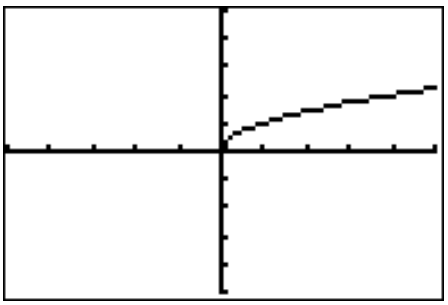
b) $f(x)=x^3$



c) $f(x)=|x|$



d) $f(x)=\sqrt{x}$



VIII. Quadratic Functions

1. Solve quadratic equations using factoring and the quadratic formula.

2. Solve equations in quadratic *form*

a) $x^4-3x^2-10=0$

Factor $(x^2+2)(x^2-5)=0$ Set each factor equal to zero $x^2+2=0$ $x^2-5=0$

Solve $x=\pm i\sqrt{2}$ or $x=\pm\sqrt{5}$

b) $x-4\sqrt{x}+3=0$ Substitute: $a=\sqrt{x}$

$a^2-4a+3=0$ Solve for a: $a=1$ or $a=3$ Substitute: $\sqrt{x}=a$ $\sqrt{x}=1$ or $\sqrt{x}=3$ Square both sides: $x=1$ or $x=9$

Check your answer!

Sample Problems

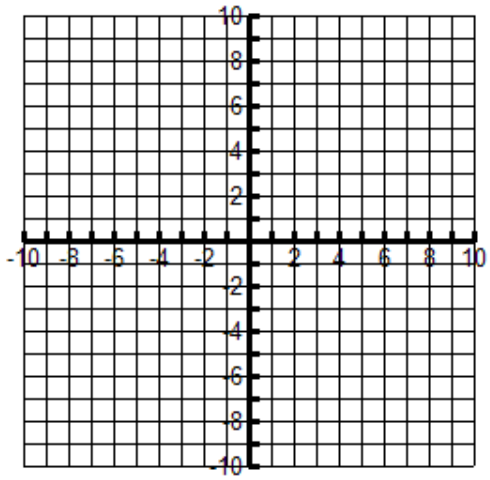
Complete the problems below, showing work where necessary. Feel free to do your work on separate sheets of paper, which you should attach. Remember you will be required to turn this in. An answer key is provided for you, but in math class, the work is as important as the answer!

**** Denotes Pre-Calculus students only**

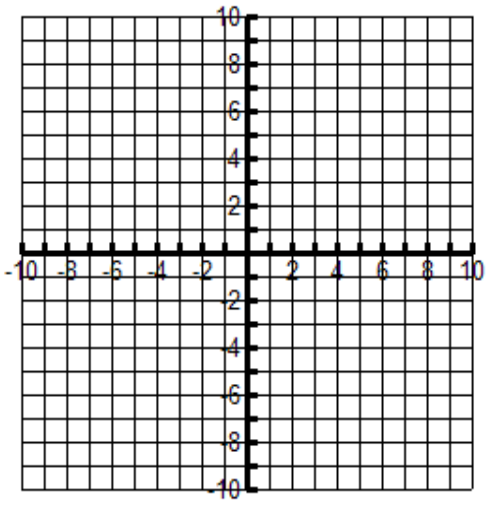
I. Perform the following operations using your graphing calculator.

1. Graph the following on your calculator and sketch the graph on the axis provided.

a) $y = -\frac{7}{6}x - 2$

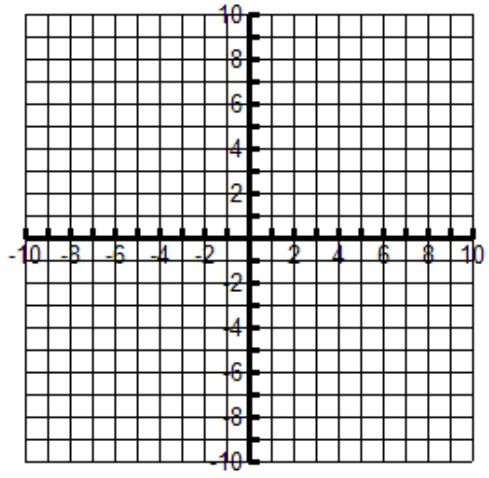


b) $y = 3x^2 - 7x + 3$

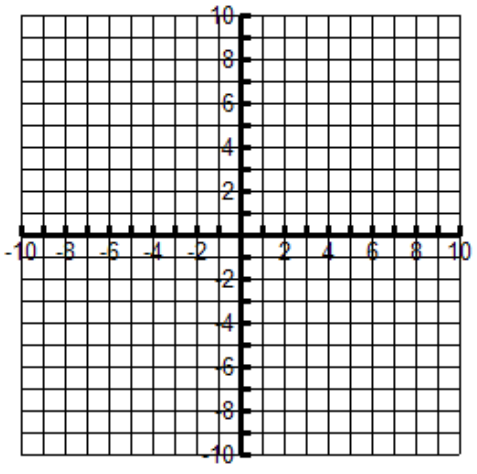


2. Find the intersection of the following systems of equations using your graphing calculator.

a) $\begin{cases} y - x = 1 \\ y + x = 3 \end{cases}$



b) $\begin{cases} x - 5y = 4 \\ y - 2x = 1 \end{cases}$



3. Find the roots of the following using your graphing calculator: $f(x) = -5x^2 + 5x + 3$.

4. Complete the following table for $f(x) = -3x^2 - 5x + 1$, using the ask function on your calculator.

X	Y_2
6	
-2	
1	

II. Polynomials

Multiply the following:

5. $(2x^2 + 4x + 16)(3x - 4)$

6. $(4a^2b - 2ab + 3b^2)(ab - 2b)$

7. $(5x + 2y)^2$

8. $(5x^3 + 2y^2)^2$

9. $(m^2 - 2n)^3$

10. $(3t^2 + 4)^3$

11. $(x + h)^2 - 4(x + h) - 9 - (2x^2 - 4x - 9)$

Factor the following completely:

12. $w^2 - 7w + 10$

13. $2x^2 + 6x - 56$

14. $a(b-2) + c(b-2)$

15. $x^3 + 3x^2 + 6x + 18$

16. $y^2 - 64z^2$

17. $6y^4 - 96x^4$

18. $x^3 - 27$

19. $4t^3 - 32$

20. $6(2p+q)^2-5(2p+q)-25$

III. Rational Expressions

Simplify the following:

21. $\dfrac{(x^2-4)(x+1)}{(x+2)(x^2-1)}$

22. $\dfrac{a^2-a-6}{a^2-7a+12}\cdot\dfrac{a^2-2a-8}{a^2-3a-10}$

23. $\dfrac{3x+12}{2x-8}\div\dfrac{(x+4)^2}{(x-4)^2}$

24. $\dfrac{a^2-a-2}{a^2-a-6}\div\dfrac{a^2-2a}{2a+a^2}$

25. $\dfrac{a-3b}{a+b}+\dfrac{a+5b}{a+b}$

26. $\dfrac{6}{y^2+6y+9}-\dfrac{5}{y+3}$

27. $\dfrac{5a}{a-b}+\dfrac{ab}{a^2-b^2}+\dfrac{4b}{a+b}$

28. $\dfrac{\dfrac{x^2-y^2}{xy}}{\dfrac{x-y}{y}}$

29. $\dfrac{a-\dfrac{a}{b}}{b-\dfrac{b}{a}}$

30. $\dfrac{\dfrac{a^2}{b}+\dfrac{b^2}{a}}{a^2-ab+b^2}$

31. $\dfrac{c+2}{5c-5}-\dfrac{c-2}{3c-3}+\dfrac{c}{1-c}$

32. $\dfrac{1+\dfrac{2}{x}-\dfrac{15}{x^2}}{1+\dfrac{4}{x}-\dfrac{5}{x^2}}$

33. $\dfrac{x^2y^{-2}-y^2x^{-2}}{xy^{-1}+yx^{-1}}$

34. $\dfrac{x^{-1}+y^{-1}}{x^{-2}-y^{-2}}$

IV. Exponents

Use the properties of exponents to simplify the following:

35. $\left(4xy^2\right)\left(3x^{-4}y^5\right)$

36. $\left(2x\right)^3\left(3x\right)^3$

37. $\dfrac{12x^2y^3z^{-2}}{21xy^2z^3}$

38. $\dfrac{\left(3ab^{-2}c^4\right)^3}{\left(2a^{-1}b^2c^{-3}\right)^2}$

39. $2m^{\frac{1}{3}}\left(3m^{\frac{2}{3}}-m^6\right)$

40. $\left(3x^{\frac{1}{2}}-y^{\frac{1}{2}}\right)^2$

41. *Find* $-x^2$ *and* $(-x)^2$, *when*

a) $x = 5$ *b*) $x = -7$

V. Radicals

Write the following in simplest radical form:

42. $\sqrt{180}$

43. $\sqrt{162c^4d^5}$

44. $\sqrt{2x^3y}\sqrt{12xy}$

45. $\sqrt[3]{3x^2y}\sqrt[3]{36xy}$

46. $\dfrac{\sqrt{21ab^2}}{\sqrt{3ab}}$

47. $\sqrt{\dfrac{9a^2}{8b}}$

48. $\sqrt[3]{\frac{2x^2 2y^3}{25z^4}}$

49. $\sqrt{12}-\sqrt{27}+\sqrt{75}$

50. $2\sqrt[3]{8x^2}+5\sqrt[3]{27x^2}-3\sqrt[3]{x^3}$

51. $\left(\sqrt{y}-2\right)\left(\sqrt{y}-4\right)$

52. $\left(\sqrt[3]{x^2}-\sqrt[3]{y^2}\right)\left(\sqrt[3]{x}+\sqrt[3]{y}\right)$

53. $\frac{1}{\sqrt[3]{m}+2}$

54. $\dfrac{2\sqrt{5}+3\sqrt{2}}{5\sqrt{5}+2\sqrt{2}}$

55. $\sqrt{\sqrt[6]{x^8y^6}}$

VI. Linear Functions

56. Write the equation of the line containing the points $(2,-4)\ and\ (4,-3)$ in slope intercept form.

57. Determine whether the following lines are parallel, perpendicular or neither.

a) $\begin{aligned} 2x-5y&=-3\\ 2x+5y&=4 \end{aligned}$

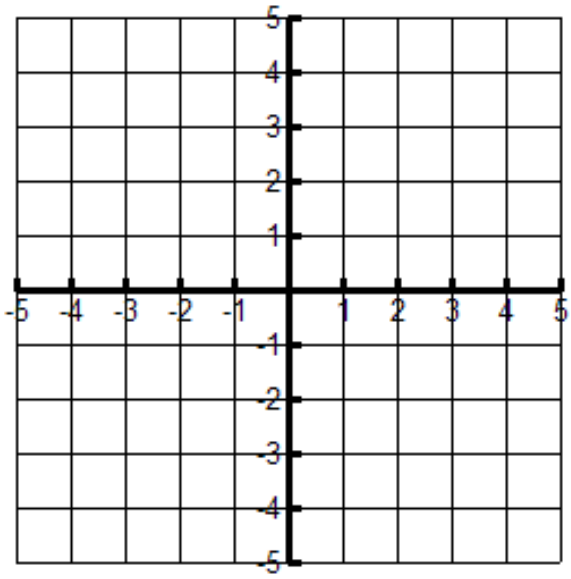
b) $\begin{aligned} 4y&=8-x\\ y&=4x-5 \end{aligned}$

c) $\begin{aligned} x+2y&=5\\ 2x+4y&=8 \end{aligned}$

58. Find the equations of the lines parallel *and* perpendicular to the given line $2x+y=-4$, and containing the given point $(-4,-5)$

---

59. Solve the following inequality. $y>-\frac{2}{3}x+2$



60. Solve the following system of equations graphically, *using your calculator*.

$5x + y = -2$

$x + 7y = 3$

---

61. Solve using substitution.

$x - 5y = 4$

$y = 7 - 2x$

---

62. Solve using the elimination method.

$2x + 3y = 5$

$4x + 7y = 11$

---

63. Solve using elimination.

$$2x - 4y + 6z = 22$$
$$4x + 2y - 3z = 4$$
$$3x + 3y - z = 4$$

---

64. Solve using matrices.

$$x + y + z = 6$$
$$2x - y - z = -3$$
$$x - 2y + 3z = 6$$

VII. Functions

Using your knowledge of functions answer the following:

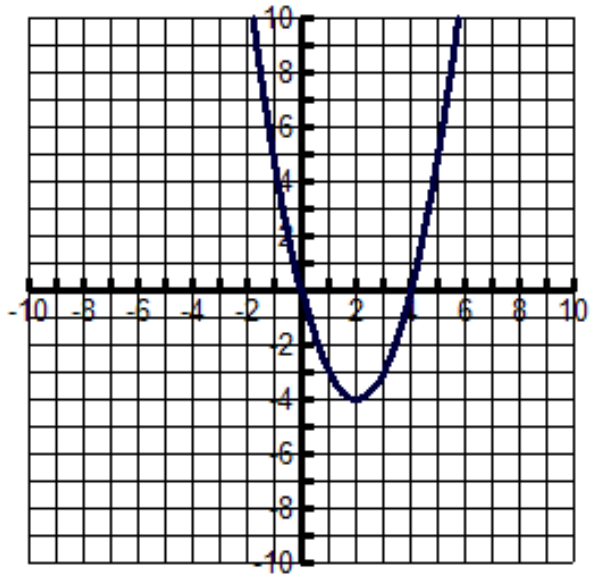
65. Determine whether the following are functions:

a) $\{(2,-3),(7,9),(-11,13),(2,6)\}$

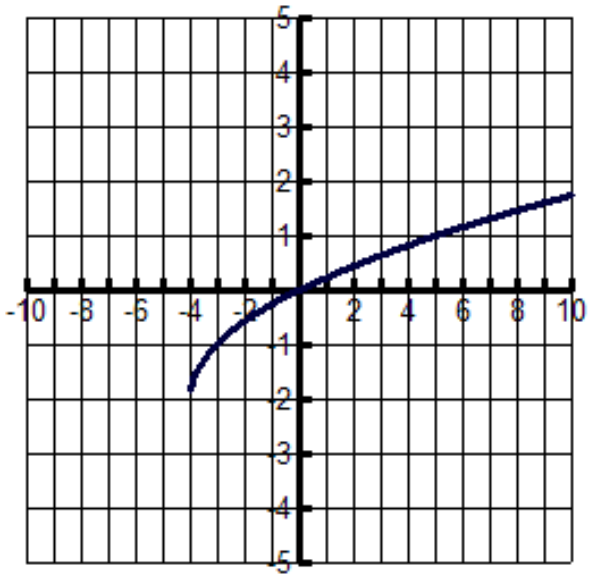
b) $\{(1,19),(-2,11),(6,-9),(7,11)\}$

66. Determine the domain and range of the following graphs:

a)



b)



67. Evaluate the following:

$f(x)=5x^2-4x$ for

a) $f(3)$

b) $f(-2)$

_____ _____

c) $f(t-1)$

d) $f(a+h)-f(a)$

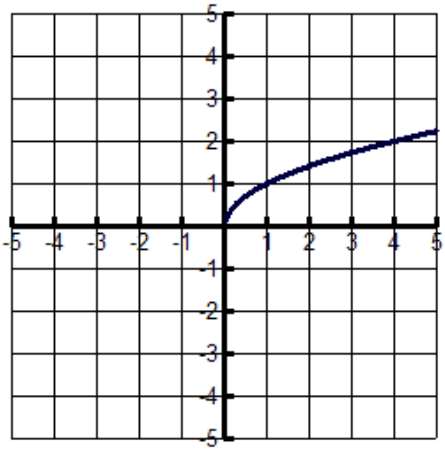
_____ _____

68. Following are the graphs of the functions

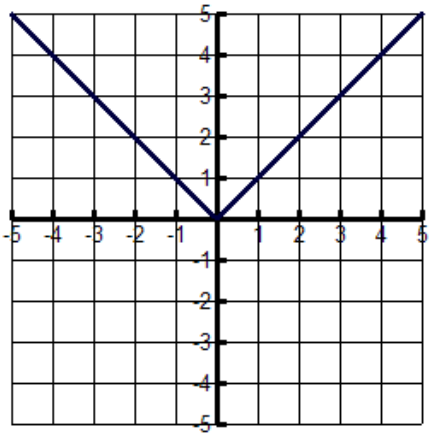
$f(x)=x^2,\quad f(x)=x^3,\quad f(x)=\sqrt{x},\quad and\quad f(x)=|x|$

Label each graph with the correct function.

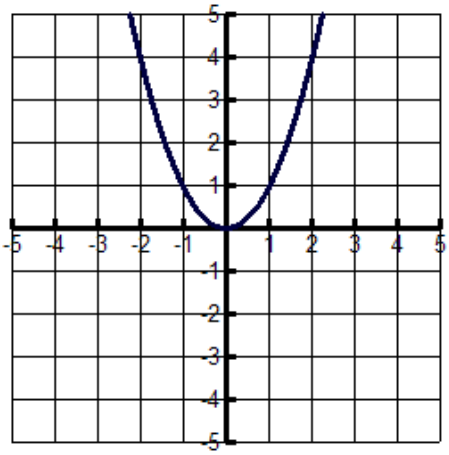
a)_____



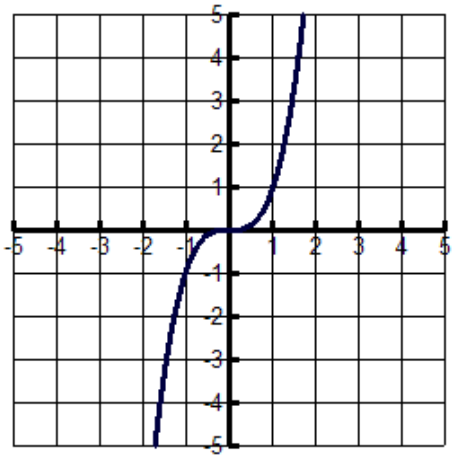
b)_____



c)_____

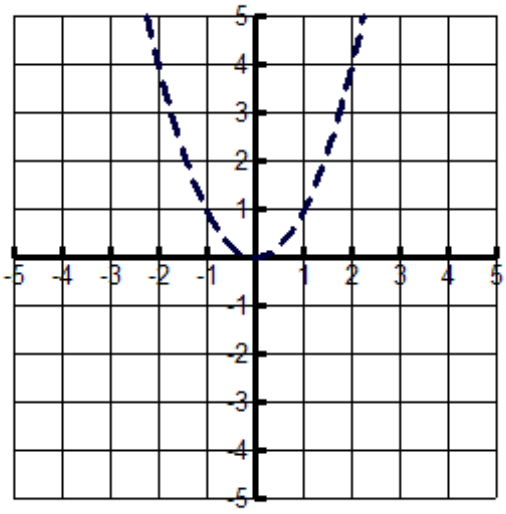


d)_____

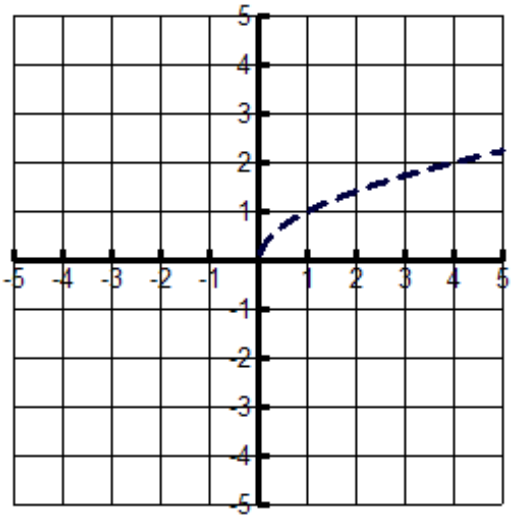


69. Perform the following transformations and translations given the parent function.

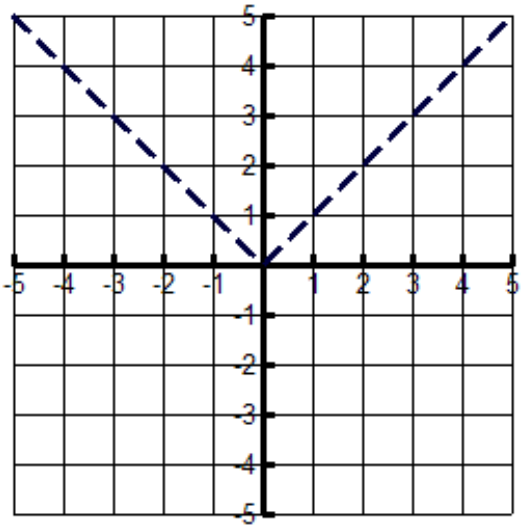
a) $f(x)=(x-2)^2+3$



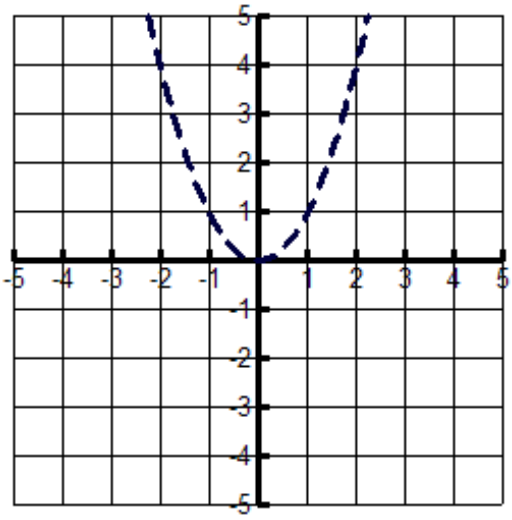
b) $f(x)=\sqrt{x+1}-3$



c) $f(x)=-|x-1|+4$



d) $f(x)=x^2+1$



VIII. Quadratic Equations

Solve the following quadratic equations:

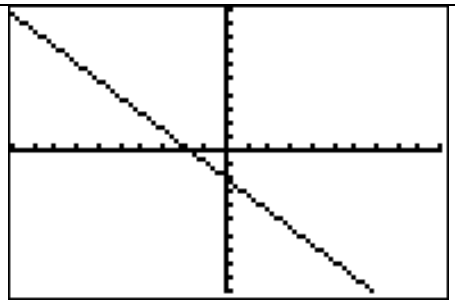
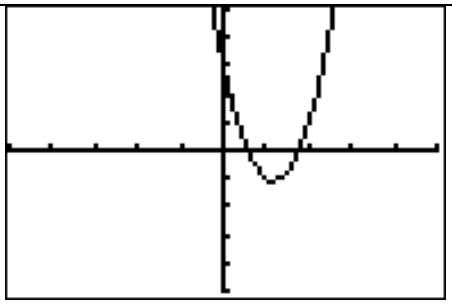
70. $x^2 - 3x - 4 = 0$

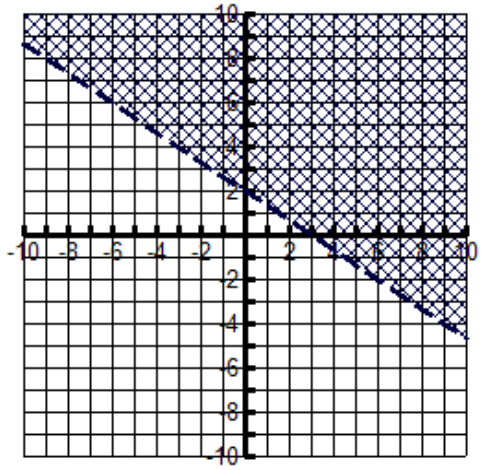
71. $2x^2 + 3x = 2$

72. $x + 2\sqrt{x} - 3 = 0$

73. $2x^4 - 5x^2 - 3 = 0$

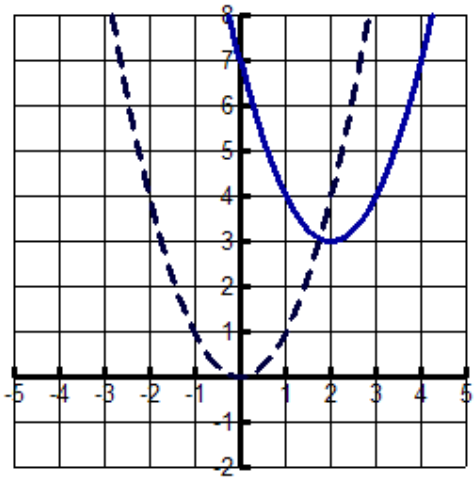
74. $(x-2)^2 - 2(x-2) - 15 = 0$

Answers:	
1a. 	1b. 
2a. $(1,2)$	2b. $(-1,-1)$
3. $x=-0.42,\ 1.42$	4. $(6,-137)$ $(1,-7)$ $(-2,-1)$
5. $6x^3+4x^2+32x-64$	6. $4a^3b^2-10a^2b^2+3ab^3+4ab^2-6b^3$
7. $25x^2+20xy+4y^2$	8. $25x^6+20x^3y^2+4y^4$
9. $m^6-6m^4n+12m^2n^2-8n^3$	10. $27t^6+108t^4+144t^2+64$
11. $-x^2+2xh-4h+h^2$	12. $(w-5)(w-2)$
13. $2(x-4)(x+7)$	14. $(b-2)(a+c)$
15. $(x^2+6)(x+3)$	16. $(y-8z)(y+8z)$
17. $6(y^2+4x^2)(y+2x)(y-2x)$	18. $(x-3)(x^2+3x+9)$
19. $4(t-2)(t^2+2t+4)$	20. $(6p+3q+5)(4p+2q-5)$
21. $\dfrac{x-2}{x-1}$	22. $\dfrac{a+2}{a-5}$
23. $\dfrac{3(x-4)}{2(x+4)}$	24. $\dfrac{a+1}{a-3}$
25. 2	26. $\dfrac{-9-5y}{(y+3)^2}$
27. $\dfrac{5a^2+10ab-4b^2}{(a+b)(a-b)}$	28. $\dfrac{x+y}{x}$
29. $\dfrac{a^2b-a^2}{ab^2-b^2}$	30. $\dfrac{a+b}{ab}$
31. $\dfrac{-17c+16}{15(c-1)}$	32. $\dfrac{x-3}{x-1}$
33. $\dfrac{x^2-y^2}{xy}$	34. $\dfrac{xy}{(y-x)}$
35. $\dfrac{12y^7}{x^3}$	36. $216x^6$
37. $\dfrac{4xy}{7z^5}$	38. $\dfrac{27a^5c^{18}}{4b^{10}}$

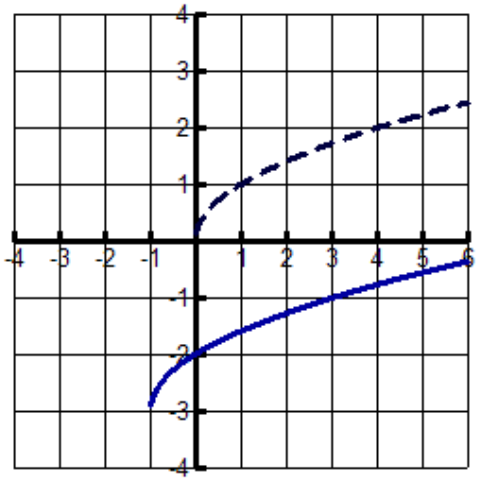
39. $6m-2m^{\frac{19}{3}}$	40. $9x-6x^{\frac{1}{2}}y^{\frac{1}{2}}+y$
41a. $-5^2=-25$ $(-5)^2=25$	41b. $-7^2=-49$ $(-7)^2=49$
42. $6\sqrt{5}$	43. $9c^2d^2\sqrt{2d}$
44. $2x^2y\sqrt{6}$	45. $3x\sqrt[3]{4y^2}$
46. $\sqrt{7b}$	47. $\frac{3a\sqrt{2b}}{4b}$
48. $\frac{y\sqrt[3]{20x^2z^2}}{5z^2}$	49. $4\sqrt{3}$
50. $19\sqrt[3]{x^2}-3x$	51. $y-6\sqrt{y}+8$
52. $x+\sqrt[3]{x^2y}-\sqrt[3]{xy^2}-y$	53. $\frac{\sqrt[3]{m^2}-2\sqrt[3]{m}+4}{m+8}$
54. $\frac{38+11\sqrt{10}}{117}$	55. $\sqrt[6]{x^4y^3}$
56. $y=\frac{1}{2}x-5$	57. *a)neither* *b)* $\perp$ *c)* $\parallel$
58. *parallel* $y=-2x-13$ *perpendicular* $y=\frac{1}{2}x-3$	59. 
60. $(-0.5,0.5)$	61. $\left(\frac{39}{11},-\frac{1}{11}\right)$
62. $(1,1)$	63. $x=3$ $y=-1$ $z=2$
64. $x=1$ $y=2$ $z=3$	65. *a)* *no* *b)* *yes*
66a. $D=\mathbb{R}$ $R=y\geq -4$	66b. $D=x>-4$ $R=y>-2$

67. $a)\ 33$
$b)\ 28$
$c)\ 5t^2-14t+9$
$d)\ 5h^2+10ah-4h$

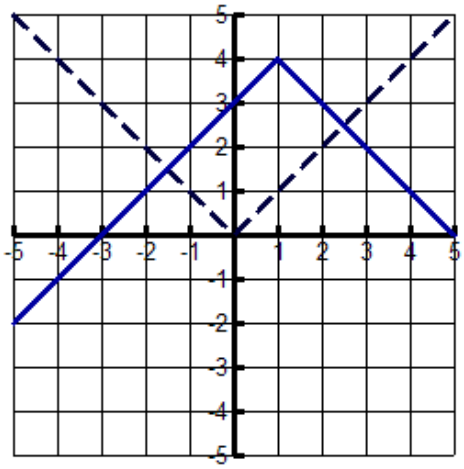
68. $a)\ f(x)=\sqrt{x}$
$b)\ f(x)=|x|$
$c)\ f(x)=x^2$
$d)\ f(x)=x^3$



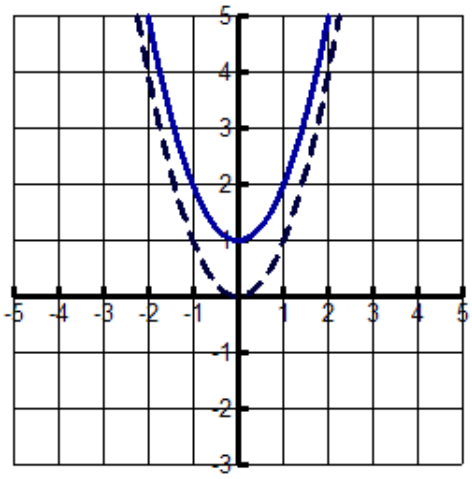
69a.



69b.



69c.



69d.

70. $x=4,-1$

71. $x=\frac{1}{2},-2$

72. $x=1$

73. $x=\pm\sqrt{3},\pm i\frac{\sqrt{2}}{2}$

74. $x=7,-1$