

**What:** Intermediate/College Algebra Packet

**When:** First Week of School - August 2005

**Who:** Students Entering Intermediate/Col.Alg.

**Why:** These are the skills from Algebra and Geometry you will be using throughout the year in your class. You may be asked to make reference to sections throughout the course.

**How:** Show all work. Problems should be completed without a calculator unless otherwise indicated. The Packet will be collected and may be part of your first quarter grade.

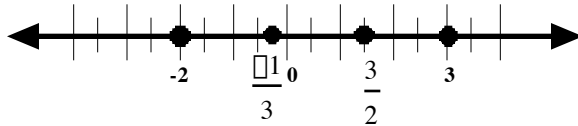
## Section 1: Ordering Numbers

Example: Graph the numbers on a number line, then write the numbers in increasing order.

Given:  $3, \frac{3}{2}, -2, \frac{1}{3}$

Step 1: Rewrite #'s as decimals 3, 1.5, -2, -.33

Step 2: Plot on number line



Step 3: Write the #'s from least to greatest.

$$-2, \frac{1}{3}, \frac{3}{2}, 3$$

**Try these:**

1.  $4, \frac{5}{2}, 0, \frac{3}{4}$

2.  $1, \frac{2}{3}, \frac{7}{2}, -4$

---

## Section 2: Vocabulary

Circle the sign of the operation that corresponds to the term.

3. Product    +    -    •    ÷

4. Sum        +    -    •    ÷

5. Difference +    -    •    ÷

6. Quotient  +    -    •    ÷

---

## Section 3: Order of Operation (no calculator)

When given an expression to evaluate use the following steps:

1. **P**arentheses
2. **E**xponents
3. **M**ultiplication & **D**ivision (left to right)
4. **A**ddition & **S**ubtraction (left to right)

Example:

$$(3 - 1)^2 + 10 \div 5$$

$$(2)^2 + 10 \div 5$$

$$4 + 10 \div 5$$

$$4 + 2$$

$$6$$

**Try These:**

Evaluate the following expressions without a calculator.

7.  $4 + 4 \div 2 - 1$

8.  $20 + (7 - 5)^2 \div 2$

**Section 4: Combining Like Terms**Example:

$$5x^2 + 3x - 2 - 4x^2 + 5x - 4 =$$

$$\underline{5x^2} + 3x - \underline{2} - \underline{4x^2} + 5x - \underline{4} =$$

$$x^2 + 8x - 6$$

**Try these:**

9.  $5x^2 + 3x - 2x + 4x^2$

10.  $2(x - 2) + 4(x + 3)$

**Section 5: Fractions (Without Calculator)****Simplifying or Reducing Fractions**Example:

a.  $\frac{3}{6} = \frac{1}{2}$

b.  $\frac{4 \pm 6\sqrt{2}}{2} = \frac{4}{2} \pm \frac{6\sqrt{2}}{2} = 2 \pm 3\sqrt{2}$

**Try These:**

11.  $\frac{4}{16}$

12.  $\frac{4 \pm 2\sqrt{3}}{6}$

13.  $\frac{15 \pm 10\sqrt{5}}{25}$

**Adding and Subtracting (Find the Least Common Denominator)**Example:

To add:  $\frac{1}{4} + \frac{5}{6}$  LCD = 12

$$\frac{3}{12} + \frac{10}{12} = \frac{13}{12}$$

To subtract:  $\frac{2}{3x} - \frac{1}{6}$  LCD = 6x

$$\frac{4}{6x} - \frac{x}{6x} = \frac{4-x}{6x}$$

**Try These:** Add or Subtract

14.  $\frac{1}{3} + \frac{4}{5}$

15.  $\frac{7}{12} - \frac{1}{4x}$

16.  $\frac{2}{3} - \frac{1}{5} + \frac{3}{4}$

## Multiplying Fractions

Example:

- Step 1: Multiply the numerators
- Step 2: Multiply denominators
- Step 3: Simplify or reduce if necessary

$$\text{Ex. } \frac{3}{4} \cdot \frac{3}{5} = \frac{9}{20}$$

**Try these:**

$$17. \frac{3}{4} \cdot \frac{8}{9} =$$

$$18. \frac{2}{3} \cdot \frac{4}{5} =$$

$$19. \frac{15}{4} \cdot \frac{6}{5} \cdot \frac{8}{9} =$$

## Dividing Fractions

Example:

- Step 1: Find reciprocal of second fraction
- Step 2: Multiply the 2 fractions
- Step 3: Reduce if necessary

$$\text{Ex. } \frac{3}{10} \div \frac{1}{5} = \frac{3}{10} \cdot \frac{5}{1} = \frac{15}{10} = \frac{3}{2}$$

**Try These:**

$$20. \frac{1}{3} \div \frac{8}{5} =$$

$$21. \frac{4}{7} \div \frac{4}{5} =$$

$$22. \frac{8}{9} \div \frac{\boxed{\phantom{00}}\boxed{24}\boxed{\phantom{00}}}{\boxed{\phantom{00}}\boxed{15}\boxed{\phantom{00}}} =$$

---

## Section 6: Solving Equations

Example:

- Step 1: Clear fraction by multiplying by LCD (Lowest Common Denominator) if necessary
- Step 2: Move all variables to one side
- Step 3: Move constants to other side

$$\begin{aligned} \text{Given: } & \frac{3}{2}x + 6 = 5 + x \\ & \frac{\boxed{3}}{\boxed{2}}x + 6 = 5 + x \cdot \frac{\boxed{2}}{\boxed{2}} \cdot 2 \\ & 3x + 12 = 10 + 2x \\ & x + 12 = 10 \\ & x = -2 \end{aligned}$$

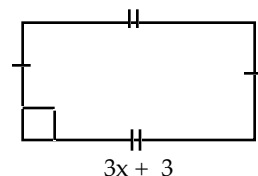
**Try These:** Find the value of x.

$$23. 3x - 9 = 2(x - 5)$$

$$24. \frac{3}{4}x + 1 = 4$$

$$25. \frac{x}{5} = \frac{8}{2}$$

$$26. \text{Perimeter} = 20$$



x

## Section 7: Inequalities

Example: Solve and Graph

$$2x + 1 \leq 6x - 1$$

> Move variable to one side

$$-4x + 1 \leq -1$$

> Bring constant to other side

$$-4x \leq -2$$

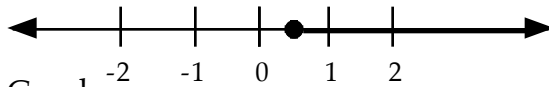
> Divide by -2

$$x \geq \frac{1}{2}$$

**NOTE:** When multiplying or dividing by a negative, flip the inequality sign.

If sign  $<$  or  $>$ , then dot on graph is open  $\circ$

If sign  $\leq$  or  $\geq$ , then dot on graph is solid  $\bullet$



**Try These:** Solve and Graph

27.  $3x + 2 < 5$

28.  $3 - 2x \leq 5$

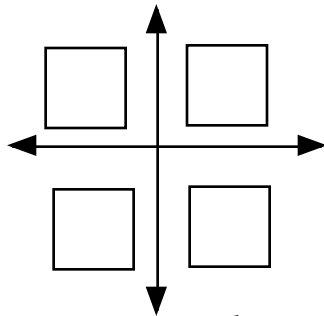
## Section 8: Graphing

29. Complete the following.

a.) Label the quadrants I, II, III, IV

b.) Clearly label the x & y axis

c.) Clearly label the origin, using a point and the ordered pair

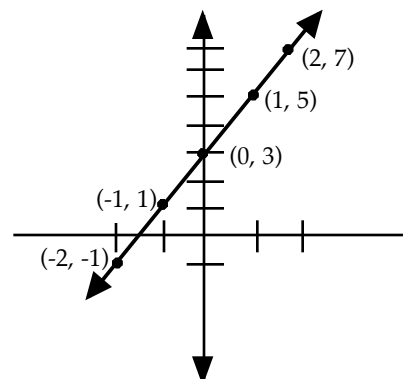


Example:

Complete the table of values for the given function. Then graph the function.

$$y = 2x + 3$$

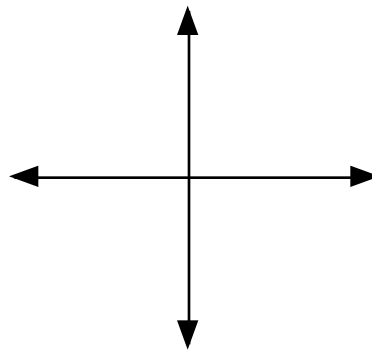
x	$y = 2x + 3$	y
-2	$2(-2) + 3$	-1
-1	$2(-1) + 3$	1
0	$2(0) + 3$	3
1	$2(1) + 3$	5
2	$2(2) + 3$	7



**Try This:** Complete the table of values for the given function. Then graph the function.

30.  $y = \frac{1}{2}x + 4$

x	y

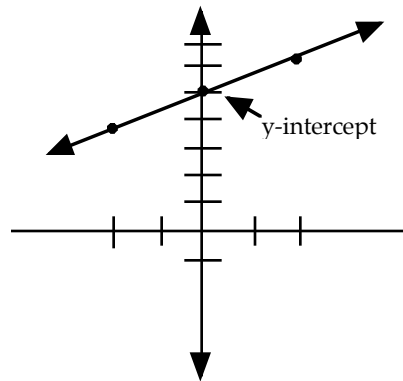


Example:

Graph  $y = \frac{1}{2}x + 5$  using the slope and the y-intercept.

$$\text{slope} = \frac{1}{2} = \frac{\text{rise}}{\text{run}}$$

$$\text{y-int} = (0, 5)$$

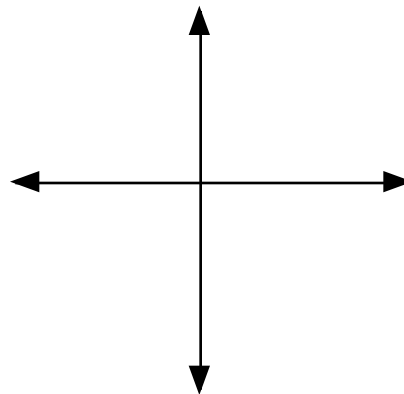


**Try This:** State the slope and y-intercept. Sketch the graph.

31.  $y = -3x - 5$

slope \_\_\_\_\_

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



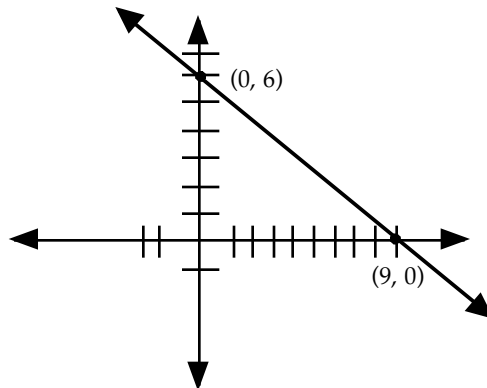
Example:

Sketch the graph by finding the x & y intercepts.

$$2x + 3y = 18$$

x-intercept:  $2x + 3y = 18$   
 $2x + 3(0) = 18$   
 $2x = 18$   
 $x = 9$   
 $(9, 0)$

y-intercept:  $2x + 3y = 18$   
 $2(0) + 3y = 18$   
 $3y = 18$   
 $y = 6$   
 $(0, 6)$

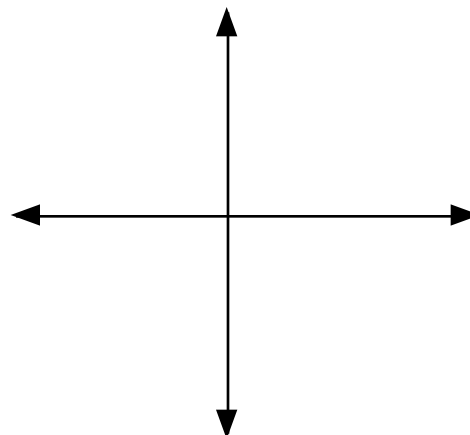


**Try This:** Find the x and y intercepts. Sketch and graph.

32.  $5x - 2y = 20$

x-intercept = \_\_\_\_\_

y-intercept = \_\_\_\_\_



---

**Section 9: Write the Equation of a Line**

Example:

Given the following two points, find the slope.

$$\begin{matrix} (-10, -12), & (2, -6) \\ x_1 & y_1 & x_2 & y_2 \end{matrix}$$

$$m = \frac{y_2 - y_1}{x_2 - x_1} \longrightarrow m = \frac{-6 - (-12)}{2 - (-10)}$$

$$m = \frac{-6 + 12}{2 + 10}$$

$$m = \frac{6}{12} = \frac{1}{2}$$

**Try this:** Find the slope given the two points.

33.  $(1, -4), (2, 6)$

Example:

W.E.L. if  $m = -3$  and  $b = -4$

$$y = mx + b$$

$$y = (-3)x - 4$$

$$\boxed{y = -3x - 4}$$

**Try This:** Write the equation of the line

34.  $m = \frac{3}{5}, b = 6$

Example:

W.E.L. given the point  $(-3, -7)$  and the slope  $= 2$ .

$$y = mx + b$$

$$-7 = (-3)(2) + b$$

$$-7 = -6 + b$$

$$-1 = b$$

$$\boxed{y = 2x - 1}$$

**Try This:** W.E.L.

35. point  $(1, 2), m = -2$

Example:

W.E.L. given the two points  $(1, 1)$  and  $(5, 9)$

1st:  $m = \frac{9 - 1}{5 - 1} = \frac{8}{4} = 2$

2nd:  $y = mx + b$  (choose either point)

$$1 = 2(1) + b$$

$$1 = 2 + b$$

$$-1 = b$$

$$\boxed{y = 2x - 1}$$

**Try This:** W.E.L.

36.  $(2, 1)$  and  $(3, -7)$

Example:

W.E.L. **parallel** to  $y = 3x + 2$  passing through the point  $(-1, -2)$ .

$m = 3$  (parallel lines have SAME slope)

$$y = mx + b$$

$$-2 = 3(-1) + b$$

$$1 = b$$

$$y = 3x + 1$$

**Try This:** W.E.L.

37. Parallel to  $y = -2x + 1$  through  $(3, 1)$

Example:

W.E.L. **perpendicular** to  $y = \frac{1}{2}x + 6$  through  $(1, 1)$

$m = 2$  (perpendicular lines have OPPOSITE RECIPROCAL slopes)

$$y = mx + b$$

$$-1 = 2(1) + b$$

$$-1 = 2 + b$$

$$-3 = b$$

$$y = 2x - 3$$

**Try This:** W.E.L.

38. Perpendicular to  $y = \frac{1}{2}x + 7$  through  $(1, 1)$

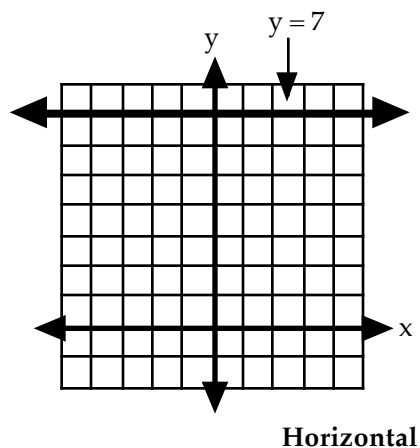
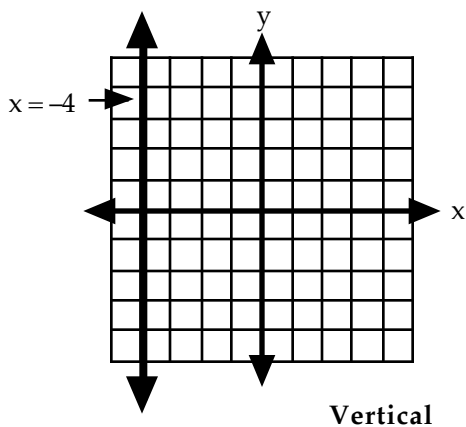
Example:

Write the equation of the vertical and horizontal line through the point  $(-4, 7)$

Vertical  $x = -4$

Horizontal  $y = 7$

Graph these lines.....

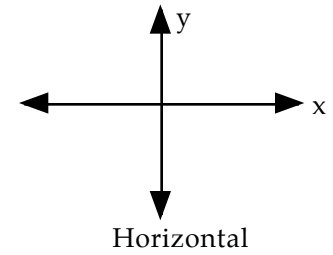
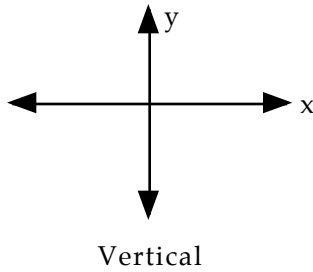


**Try this:** Write the equation of the vertical and horizontal line through the given point, and sketch their graphs.

39. Through (2, -3)

Vertical \_\_\_\_\_

Horizontal \_\_\_\_\_



**Section 10: Solving Systems**

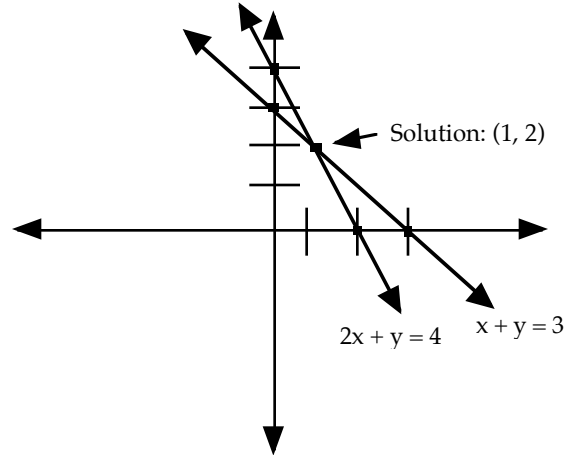
**Solve the System by Graphing**

Example:

$$x + y = 3 \begin{cases} \text{x-int. (3, 0)} \\ \text{y-int. (0, 3)} \end{cases}$$

$$2x + y = 4 \begin{cases} \text{x-int. (2, 0)} \\ \text{y-int. (0, 4)} \end{cases}$$

Solution: (1, 2)

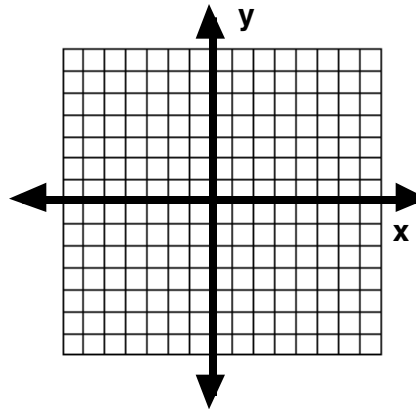


**Try This:**

40. Solve the system by graphing.

$$x - y = 7$$

$$x + y = 3$$



**Solve the System by Substitution**

Example:

$$y = 4x + 8$$

$$x - 3y = 9$$

Substitute:  $x - 3(4x + 8) = 9$   
 $x - 12x - 24 = 9$   
 $-11x - 24 = 9$   
 $-11x = 33$   
 $x = -3$

Substitute  $x = -3$  to solve for  $y$ :  $y = 4(-3) + 8$   
 (choose either equation)  $y = -4$

Solution: (-3, -4)

**Try This:** Solve by substitution.

41.  $x = y + 12$

$$2x + 3y = -1$$

## Solve System Using Linear Combination

Example:

Step 1:  $x + 2y = 7$  multiply by  $(-3)$   
 $3x + 5y = 17$

Step 2:  $-3x - 6y = -21$   
 $3x + 5y = 17$   
 $0x - y = -4$   
 $\frac{\square y}{\square 1} = \frac{\square 4}{\square 1}$   
 $y = 4$

Step 3: Substitute  $y = 4$  into either equation  
 $x + 2(4) = 7$   
 $x + 8 = 7$   
 $x = -1$

Solution:  $(-1, 4)$

**Try this:** Solve by linear combination

42.  $3x + 2y = -2$   
 $2x - 5y = 24$

---

## Section 11: Foiling

Example:

Multiply

$(2x + 3)(x - 5)$  (First, outside, inside, last)

$2x^2 - 10x + 3x - 15$

Combine like terms:  $2x^2 - 7x - 15$

**Try This:** Multiply

43.  $(3x + 2)(x - 1)$

Example:

Multiply  $(2x - 1)^2 = (2x - 1)(2x - 1)$   
 $= 4x^2 - 4x + 1$

**Try This:** Multiply

44.  $(3x - 5)^2$

## Section 12: Factoring

Example:

Factor:

$$3x^3y + 6x^2y + 9xy$$

Factor out

$$\text{GCF (Greatest Common Factor): } 3xy$$

$$3xy(x^2 + 2x + 3)$$

**Try This:** Factor

45.  $2a^4b^2 - 4a^3b^2 + 10a^2b^2$

46.  $10x^3y^2 + 15x^4y - 20x^2y^3$

Example:

Factor:

$$x^2 - 5x - 24$$

Step 1: Is there a GCF? No, there isn't!

Step 2: Notice: 3 terms

Step 3: List factors of last term

24

---

$$-1 \times 24$$

$$-2 \times 12$$

$$-3 \times 8$$

$$-4 \times 6$$

$$-6 \times 4$$

$$-8 \times 3$$

$$-12 \times 2$$

Step 4: Which multiplication pair adds up to the middle term (-5)?

$$-8 \times 3$$

Step 5: Write as 2 factors:

$$(x - 8)(x + 3)$$

**Try This:** Factor

47.  $x^2 + 3x - 28$

48.  $x^2 + 3x - 40$

Example:

Factor:  $2x^2 - 5x - 3$

Step 1: Is there a GCF? No there isn't!

Step 2: Notice: 3 terms

Step 3: List factors of first term

$$\frac{2}{2 \cdot 1}$$

use these factors in the first position of each grouping.

$$(2x \quad \quad)(1x \quad \quad)$$

Step 4: List the factors of -3

$$\frac{\square 3}{\square 1 \cdot 3}$$
$$1 \cdot \square 3$$

use these factors in the last position of each grouping.

Step 5: "Guess" where each should go. Check by multiplying it back together.

$$(2x - 3)(x + 1) = 2x^2 + 2x - 3x - 3 = 2x^2 - x - 3 \quad \text{No}$$

$$(2x + 1)(x - 3) = 2x^2 - 6x + x - 3 = 2x^2 - 5x - 3 \quad \text{Yes!}$$

Step 6: Answer:  $(2x + 1)(x - 3)$

**Try this:** Factor

49.  $3x^2 + 11x - 4$

50.  $5x^2 - 7x - 6$

Example:

Factor:

$$2x^2 - 50$$

Step 1: Look for GCF:  $2(x^2 - 25)$

Step 2: 2 terms - Difference of two squares  $(a)^2 - (b)^2 = (a + b)(a - b)$

Step 3:  $2[(x)^2 - (5)^2] = 2(x + 5)(x - 5)$



**Try This:** Factor

51.  $16x^2 - 9$

52.  $25x^2 - y^2$

---

**Section 13: Solving Quadratics**

Example: Use the quadratic formula to find the solutions  $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

$$y = x^2 - 3x - 2$$

$$a = 1 \quad b = -3 \quad c = -2$$

$$x = \frac{3 \pm \sqrt{(-3)^2 - 4(1)(-2)}}{2(1)}$$

$$x = \frac{3 \pm \sqrt{9 + 8}}{2} = \frac{3 \pm \sqrt{17}}{2}$$

**Try this:**

53. Use the quadratic formula to find the solutions

$$y = x^2 + 5x - 1$$

## Section 14: Graphing Quadratics (No Calculator)

### Steps for graphing a quadratic:

Step 1: Find the width

$|a| > 1$  narrow

$|a| = 1$  normal

$|a| < 1$  wide

Step 2: If  $a$  is positive, opens up  
If  $a$  is negative, opens down

Step 3:  $y$  intercept: substitute 0 in for  $x$  and simplify

Step 4: vertex:  $x$ -coordinate:  $-\frac{b}{2a}$

$y$ -coordinate: substitute  $x$  into the equation and simplify

Step 5:  $x$ -intercepts: let  $y = 0$  and solve for  $x$  by factoring or quadratic formula.

### Example:

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

$a = 1$        $b = -2$        $c = -3$

1. Width: normal

2. up/down: up

3.  $y$ -int: -3

4. vertex: (1, -4)

$$x\text{-coordinate} = \frac{-b}{2a} = \frac{2}{2(1)} = 1$$

$$y\text{-coordinate} = (1)^2 - 2(1) - 3 = -4$$

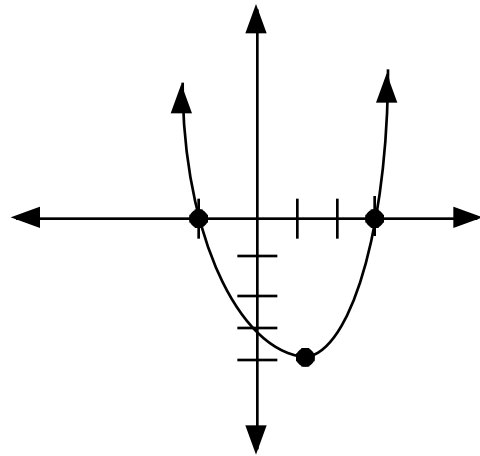
5.  $x$ -intercepts: (-1, 0) and (3, 0)

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x = \frac{2 \pm \sqrt{(2)^2 - 4(1)(-3)}}{2(1)}$$

$$x = \frac{2 \pm \sqrt{4 + 12}}{2} = \frac{2 \pm \sqrt{16}}{2} = \frac{2 \pm 4}{2}$$

$$x = \frac{2 + 4}{2} = 3 \qquad x = \frac{2 - 4}{2} = -1$$



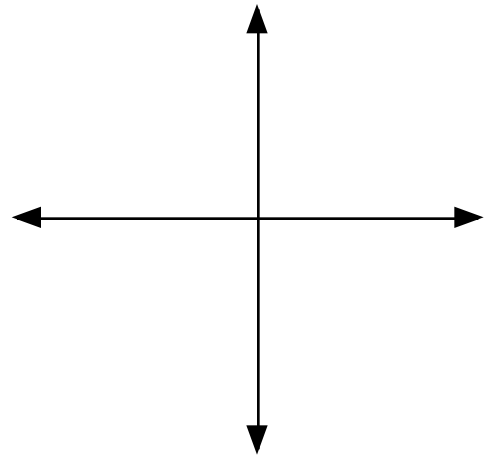
**Try This:** Find the information and sketch the quadratic.

54. Graph  $y = x^2 + 2x - 8$   
a = \_\_\_\_\_ b = \_\_\_\_\_ c = \_\_\_\_\_  
width: \_\_\_\_\_  
up/down: \_\_\_\_\_  
y-int: \_\_\_\_\_  
vertex: \_\_\_\_\_

x - coordinate =

y -coordinate =

x - intercepts: (\_\_\_\_, 0) & (\_\_\_\_, 0)

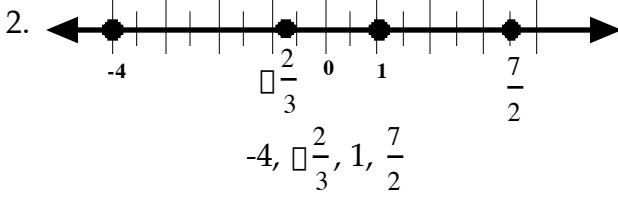
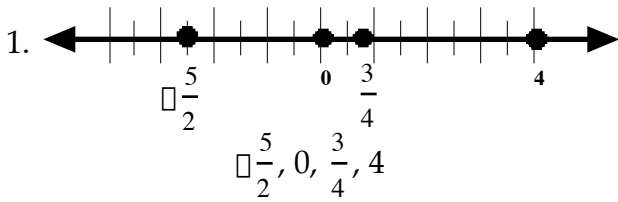


### Exponents

55. Complete the table by raising each value of x to the given power. (Note: you will be responsible for knowing the following values without a calculator)

x	$x^2$	$x^3$	$x^4$	$x^5$
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				

**Answers:**



3. \*    4. +    5. -    6. ÷

7. 5                    8. 22

9.  $9x^2 + x$

10.  $6x + 8$

11.  $\frac{1}{4}$

12.  $\frac{2 \pm \sqrt{3}}{3}$

13.  $\frac{3}{5} \pm \frac{2\sqrt{5}}{5}$

14.  $\frac{17}{15}$

15.  $\frac{7x \pm 3}{12x}$

16.  $\frac{73}{60}$

17.  $\frac{2}{3}$

18.  $\frac{8}{15}$

19. 4

20.  $\frac{5}{24}$

21.  $\frac{5}{7}$

22.  $\frac{\pm 5}{9}$

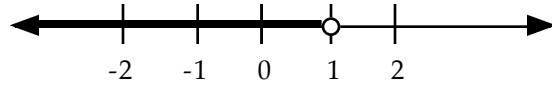
23.  $x = -1$

24.  $x = 4$

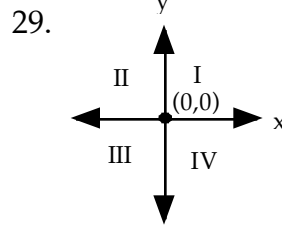
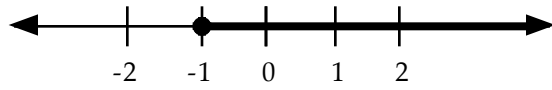
25.  $x = 20$

26.  $x = \frac{7}{4}$

27.  $x < 1$

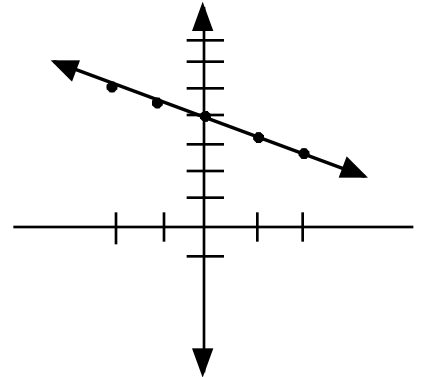


28.  $x \geq -1$



30.  $y = \frac{1}{2}x + 4$

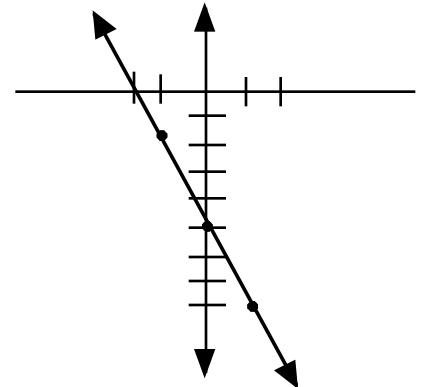
x	y
-2	5
-1	4.5
0	4
1	3.5
2	3



31.  $y = -3x - 5$

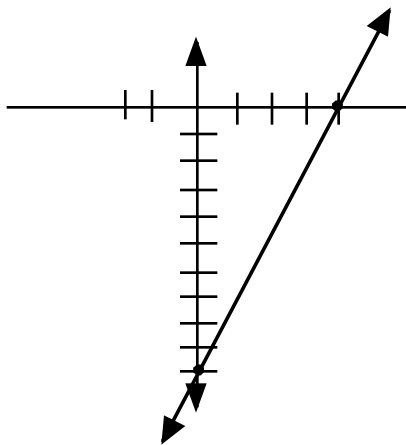
slope: -3

y-int: -5



32. x-int. (4, 0)

y-int. (0, -10)



41. (7, -5)

42. (2, -4)

43.  $3x^2 - x - 2$

44.  $9x^2 - 30x + 25$

45.  $2a^2 b^2 (a^2 - 2a + 5)$

33.  $m = 10$

34.  $y = \frac{3}{5}x + 6$

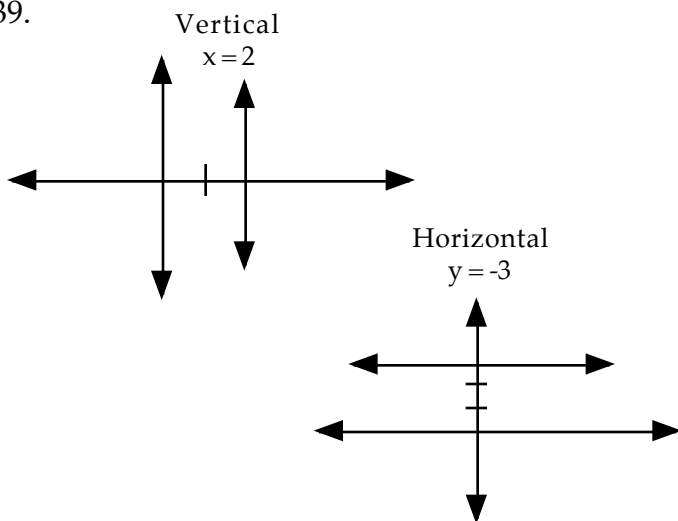
35.  $y = -2x + 4$

36.  $y = -8x + 17$

37.  $y = -2x + 7$

38.  $y = -2x + 3$

39.



46.  $5x^2y(2xy + 3x^2 - 4y^2)$

47.  $(x + 7)(x - 4)$

48.  $(x - 5)(x + 8)$

49.  $(3x - 1)(x + 4)$

50.  $(5x + 3)(x - 2)$

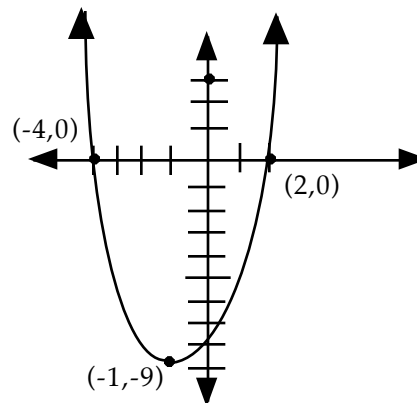
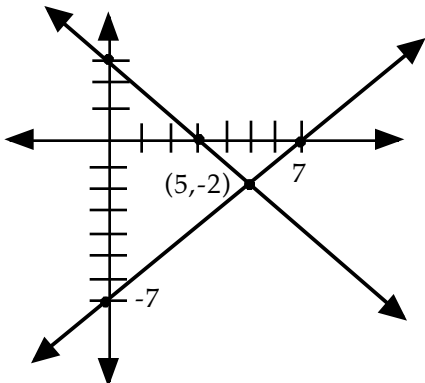
51.  $(4x + 3)(4x - 3)$

52.  $(5x - y)(5x + y)$

53.  $\frac{5 \pm \sqrt{29}}{2}$

54.

40.



## Introduction to Graphing Calculators

### TI-83 or TI-83 Plus (Recommended Calculator)

1. **THE CONTRAST KEYS** To make the screen darker or lighter, press the following keys.

TI-83:  $\boxed{2\text{nd}} \boxed{\blacktriangle}$  (hold) Darker

$\boxed{2\text{nd}} \boxed{\blacktriangle}$  (hold) Lighter

2. **THE VARIABLE X AND STORE KEYS** Evaluate the expression  $\frac{2}{3}x + 100$  when  $x = 16.5$ .  
(The value is 111.)

TI-83: 16.5  $\boxed{\text{STO}}$   $\boxed{\text{X,T},\theta}$   $\boxed{\text{ENTER}}$   $\boxed{2 \div 3}$   $\boxed{\text{X,T},\theta}$   $\boxed{+}$  100  $\boxed{\text{ENTER}}$

3. **THE ALPHABET KEY** The letters A through Z are located above the keys. Each letter of the alphabet can represent a variable in which a value can be stored. To see the value of the stored variable, H, press  $\boxed{\text{ALPHA}} \boxed{\text{H}} \boxed{\text{ENTER}}$ . To store a value of 10 in H, press the following:

TI-83: 10  $\boxed{\text{STO}>}$   $\boxed{\text{ALPHA}} \boxed{\text{H}} \boxed{\text{ENTER}}$

For many consecutive letters, you can activate the "Alpha-lock" key.

TI-83:  $\boxed{2\text{nd}} \boxed{\text{A-LOCK}} \boxed{\text{A}} \boxed{\text{L}} \boxed{\text{G}} \boxed{\text{E}} \boxed{\text{B}} \boxed{\text{R}} \boxed{\text{A}} \boxed{\text{ALPHA}} 2$

Press  $\boxed{\text{CLEAR}}$  to clear the screen.

4. **THE REPLAY AND CURSOR KEYS** Use to avoid retyping. Suppose you need to evaluate the volume of two cylinders using the formula  $V = \pi r^2 h$ . Both have a radius of 17.8. The height of the first is 20 and the height of the second is 30. Instead of retyping the second calculation, you can use the replay and cursor keys.

TI-83:  $\boxed{2\text{nd}} \boxed{\square}$   $\boxed{\times}$  17.8  $\boxed{x^2}$   $\boxed{\times}$  20  $\boxed{\text{ENTER}}$   $\boxed{2\text{nd}} \boxed{\text{ENTRY}}$ , Cursor to 2, Type 3,  $\boxed{\text{ENTER}}$

Also, use to make a correction. Suppose you entered a formula incorrectly and need to make a change. You entered  $33.4(11.2 + 15.7)$  when you meant to enter  $33.7(11.2 + 15.7)$ . To correct your error, use the replay and cursor keys.

TI-83: 33.4  $\boxed{(}$  11.2  $\boxed{+}$  15.7  $\boxed{)}$   $\boxed{\text{ENTER}}$   $\boxed{2\text{nd}} \boxed{\text{ENTRY}}$ , Cursor to 4, Type 7,  $\boxed{\text{ENTER}}$

5. **THE INSERT AND DELETE KEYS** Suppose you entered  $33.7(11.2 + 15.7)$  when you meant to enter  $33.7(11 + 15.7)$ . To correct your error, use the replay, cursor, and delete keys.

TI-83:  $\boxed{2\text{nd}} \boxed{\text{ENTER}}$ , cursor to .2,  $\boxed{\text{DEL}} \boxed{\text{DEL}} \boxed{\text{ENTER}}$

Suppose you entered  $33.7(11 + 15.7)$  when you meant to enter  $33.17(11 + 15.7)$ . To correct your error, use the replay, cursor, and insert keys.

TI-83:  $\boxed{2\text{nd}} \boxed{\text{ENTER}}$  cursor to 7,  $\boxed{2\text{nd}} \boxed{\text{INS}} 1 \boxed{\text{ENTER}}$

6. **THE NEGATIVE AND SUBTRACTION KEYS** The negative key is  $\boxed{(-)}$  and the subtraction key is  $\boxed{-}$ . To enter  $-8 - \pi$  or  $50 - -1$ , use the following.

TI-83:  $\boxed{(-)} \ 8 \ \boxed{-} \ \boxed{2nd} \ \boxed{\pi} \ \boxed{ENTER}$

$50 \ \boxed{-} \ \boxed{(-)} \ 1 \ \boxed{ENTER}$

7. **THE EXPONENT AND ABSOLUTE VALUE KEYS** Some common powers

such as  $x^2$ ,  $x^3$ ,  $x^{\frac{1}{2}} = \sqrt{x}$ , and  $x^{\frac{1}{3}} = \sqrt[3]{x}$  have special keys. For powers such as  $1.4^4$ , use the following.

To evaluate the absolute value of a number such as  $|2 \square 4|$ , enter the following.

TI-83:  $\boxed{MATH} \ \boxed{\blacktriangleright} \ \boxed{NUM} \ \boxed{ENTER} \ \boxed{(} \ 2 \ \boxed{-} \ 4 \ \boxed{)}$

8. **FRACTIONS FOR THE TI-83** To add fractions such as  $\frac{5}{8} + \frac{6}{15}$  and have your answer given as a fraction do the following.

TI-83:  $\boxed{(} \ 5 \ \boxed{\div} \ 8 \ \boxed{)} \ \boxed{+} \ \boxed{(} \ 6 \ \boxed{\div} \ 15 \ \boxed{)} \ \boxed{MATH} \ \boxed{FRAC}$

### Graphing Linear Equations with a Calculator

Graph  $y = -3x + 5$

I. Preparing to graph

- A.  $\boxed{MODE}$  everything should be highlighted on the left
- B.  $\boxed{ZOOM} \ \boxed{6}$  (standard)
- C.  $\boxed{2nd} \ \boxed{ZOOM}$  everything should be highlighted on the left
- D.  $\boxed{2nd} \ \boxed{Y=}$   $\boxed{4} \ \boxed{ENTER}$  (Stat Plots off)

II. Entering equation

- A.  $\boxed{Y_1=}$  type in equation \*Note: equation must be in slope-intercept form ( $y = mx + b$ )
- B.  $\boxed{GRAPH}$

III. Adjusting windows

- A.  $\boxed{ZOOM} \ \boxed{3}$  (zoom out)  $\boxed{ENTER}$
- B.  $\boxed{ZOOM} \ \boxed{2}$  (zoom out)  $\boxed{ENTER}$

## Graphing Quadratics with a Calculator

Graph  $y = x^2 + 2x - 5$

### I. Preparing to graph

- MODE** everything should be highlighted on the left
- ZOOM** **6** (standard)
- 2nd** **ZOOM** everything should be highlighted on the left
- 2nd** **Y=** **4** **ENTER** (Stat Plots off)

### II. Entering Equation

- Y<sub>1</sub> =** type in equation
- GRAPH**

### III. Finding the Vertex

- 2nd** **TRACE** select **4** (Maximum) or **3** (Minimum)



- Left Bound?: Move cursor to left of vertex **ENTER**
- Right Bound?: Move cursor to the right of vertex **ENTER**
- Guess?: **ENTER**
- Use values at bottom of screen for the vertex

**Answer: (-1, -6)**

### IV. Finding the x-intercepts/roots/zeros/solutions

#### A. Left Intercept

- 2nd** **TRACE** **2** (zero)

- Left Bound: Move cursor to the left (in this case above) of the left x-intercept **ENTER**
- Right Bound: Move cursor to the right (below) of the left x-intercept **ENTER**
- Guess:

#### B. Right Intercept

- 2nd** **TRACE** **2** (zero)

- Left Bound: Move cursor to the left (in this case above) of the left x-intercept **ENTER**
- Right Bound: Move cursor to the right (below) of the left x-intercept **ENTER**

- Guess: **ENTER**

**Answer: (1.4494897, 0)**