

## Traditional Algebra 1 Summer Packet

This packet is meant for students entering Traditional Algebra 1 in 9<sup>th</sup> grade. This packet should be completed by the first day of school. These concepts will be reviewed rapidly in the first weeks of school so students should be very comfortable with them.

### Order of Operations

Simplify. **Do not use a calculator.**

1.  $[36 \div (3 \cdot 4)] + 2$

2.  $60 - 7(5 + 6 \div 2) + 2^4$

3.  $4 + 6(5 - 2)$

4.  $2 + 8 \cdot 3^2$

5.  $24 - 6 \cdot 2$

6.  $4 \cdot 9 + 7 \cdot 8$

7.  $14 + 8 \div 2 - 1$

8.  $\frac{63 - 8}{3 + 8} - 2$

9.  $5 \cdot \frac{19 - 7}{5 + 1}$

10.  $4 \cdot (3 + 2)^2$

Writing expressions and equations from sentences

*Write the expression described*

1. Subtract 2 from  $x$ , then add  $y$
2. Multiply  $x$  by the sum of 7 and  $y$
3. One-eighth of  $z$
4. Add  $x$  and  $y$ , then square the result
5. Divide  $y$  by the sum of 7 and  $z$
6. Subtract the product of 5 and  $x$  from 7
7. Subtract the cube of  $z$  from 15
8. 13 less than the quotient of 5 divided by  $p$
9. 4 times the sum of 10 and  $x$
10. 5 more than the product of 3 and  $c$
11. Make 5 dollars per hour for  $x$  hours, plus \$7.50
12. Go 40 miles per hour for  $x$  hours, then go 70 miles further
13. Start with 50 grapes and eat 3 grapes per minute for 6 minutes
14. Start 20 miles from home. Walk 4 miles per hour toward home for  $x$  hours.

Solving word problems using equations.

*Write an equation to describe the problem then solve.*

1. Suzy is selling cookies for 25 cents plus 5 cents for the box. Let  $x$  be the number of cookies you buy.

a) Write an expression for the number of cents you pay for  $x$  cookies.

b) How much will you pay for 5 cookies? 10 cookies?

c) If you paid \$4.30 (430 cents), how many cookies did you buy? (Write an equation first.)

2. A gas tank holds 20 gallons of gas and uses  $\frac{1}{10}$  of a gallon every mile.

a) Let  $x$  be the number of miles driven. Write an expression for the number of gallons left after  $x$  miles.

b) How many gallons are left after 10 miles? 120 miles?

c) At the end of a trip you find that you have 11.5 gallons left. How far did you travel?

3. Hillary is traveling to her friend's house. Her friend's house is 40 miles away. If Hillary travels at a constant rate of 30 miles per hour:

a) how close will she be after 30 minutes?

b) how long has she been traveling if she is only 5 miles away?

Evaluating a number raised to a power

*Simplify. Do not use a calculator.*

1.  $3^3$

2.  $2^7$

3.  $(-2)^4$

4.  $-2^4$

*Write in expanded form.*

5.  $x^6$

6.  $5^4$

*Write in exponential form.*

7.  $x \cdot x \cdot x \cdot x \cdot x \cdot x$

8.  $3 \cdot 3 \cdot 5 \cdot 5 \cdot 5 \cdot 5$

Operations with negative numbers

*Simplify. Do not use a calculator.*

1.  $-6 + -3$

2.  $9 - 15$

3.  $12 - (-6)$

4.  $-9 + 5$

5.  $18 \cdot -3$

6.  $-8 \cdot -10$

7.  $\frac{-35}{-5}$

8.  $\frac{27}{-3}$

Percentages

*Solve.*

1. What is 45% of 70?
2. 30 is what percent of 60?
3. 16 is 15% of what number?
4. Andy received an 85% on his test. If the test had 25 questions, how many did Andy get right?
5. Tyler made 80 ounces of a juice drink. If he used 20 ounces of apple juice, what percent of the drink is apple juice?

Proportions

Solve for  $x$ .

1.  $\frac{x}{5} = \frac{24}{15}$

2.  $\frac{8}{x} = \frac{20}{17.5}$

3. In one basketball league, there are 96 players on 8 teams. In another basketball league, there are 12 teams. All of the teams in both leagues have the same number of players. How many players are in the 12-team league?

4. A car is able to get 25 miles per gallon of gasoline. The car has a 16 gallon gas tank. How many miles can the car travel if you start the trip with a full tank?

5. A flower delivery person is able to make 5 deliveries in 30 minutes. He has 3 more hours left to work today. With his remaining time on the job, how many more deliveries can he make?

Solving 1-step equations

Solve. **Do not use a calculator.**

1.  $x - 8 = 15$

2.  $x + 15 = 6$

3.  $5x = 6$

4.  $\frac{x}{8} = -6$

5.  $x - 8 = -12$

6.  $6 + x = -5$

Solving 1-step equations (continued)

7.  $-1.3x = 2.6$

8.  $\frac{x}{-9} = -12$

9.  $\frac{2}{3}x = 18$

10.  $-\frac{5}{6}x = 10$

Finding the absolute value of a number or numerical expression

*Simplify.*

1.  $|8|$

2.  $|-78|$

3.  $|\beta - 17|$

4.  $|15 + -7|$

5.  $|\beta \cdot 4|$

6.  $|-24 \div 3|$

Solving 2-step equations

*Solve for x.*

1.  $2x + 3 = 19$

2.  $5x - 3 = 12$

3.  $4x - 2 = -1$

4.  $-2 + 3x = 8$

5.  $\frac{1}{5}x + 3 = 7$

6.  $4.6 + 5x = -9$

Solving 2-step equations (continued)

7.  $13 = 9 - \frac{1}{3}x$

8.  $5 - 3c = 17$

9.  $-\frac{4}{3}x = -\frac{1}{3}$

10.  $71 = 4 - x$

Distributive property

*Simplify.*

1.  $3(x+7)$

2.  $-2(11-y)$

3.  $\frac{1}{3}(12x-15y)$

4.  $\frac{7x+63-14d}{7}$

5.  $\frac{3}{5}(5x-35)$

Combining like terms

*Simplify.*

1.  $7x+6x+8$

2.  $9x-5+7x+4$



3.  $7x^2 + 7x$

4.  $3x^2 - 5x + 6 - 8x^2$

Combining like terms (continued)

5.  $3(4x + 7) - 2$

6.  $13 - 2(3x + 4)$

7.  $8(x + 4) - (x - 5)$

8.  $\frac{1}{4}(12x + 20) - \frac{1}{5}(30 - 15x)$

9.  $\frac{1}{3}(9x - 12) + 4(3x + 3)$

10.  $6x - x(4x + 1)$

Factoring out a GCF from an expression

*Factor out the common factors.*

1.  $3x + 3y$

2.  $3a - 6$

3.  $4ax + 12bx$

4.  $x^2 - 4x$

5.  $3x + 3y - 6z$

6.  $6x + 8y$

Solving equations with the distributive property

Solve for  $x$ .

1.  $5(x+3) - 2x = -21$

2.  $5x + 3(x+4) = 28$

3.  $7x - 4(2 - 3x) = -27$

4.  $4x - (3x + 11) = -11$

5.  $2(x+3) - 5(x-1) = 32$

6.  $66 = 4(2x - 3) + 2(x + 4)$

Solving equations with variables on both sides

Solve for  $x$ .

1.  $5x + 27 = 2x$

2.  $7z = -16 - 9z$

3.  $5x + 8 = 7x + 8$

4.  $4(x + 3) = 6x$

5.  $7(2 - r) = 3(r + 8)$

6.  $4x - 2(1 - x) = 2(3x - 2)$

Solving equations with variables on both sides (continued)

7.  $6(x+4)-(x+3)=x-1$

8.  $\frac{2}{3}x+8=x-5$

9.  $\frac{x+5}{4}-7x=\frac{x}{5}+1$

10.  $6+\frac{1}{3}(x-9)=\frac{1}{2}(2-x)$

Linear Equations

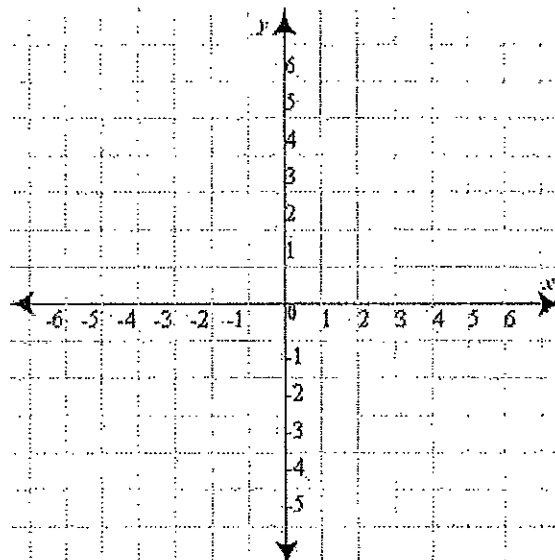
- a) Transform the equation so  $y$  is given in terms of  $x$ .
- b) Pick 4 numbers, substitute them for  $x$ , and evaluate  $y$ .
- c) Plot the graph of the equation.

1.  $2x+3y=6$

a)

b)

| X | Y |
|---|---|
|   |   |
|   |   |
|   |   |
|   |   |



Linear Equations (continued)

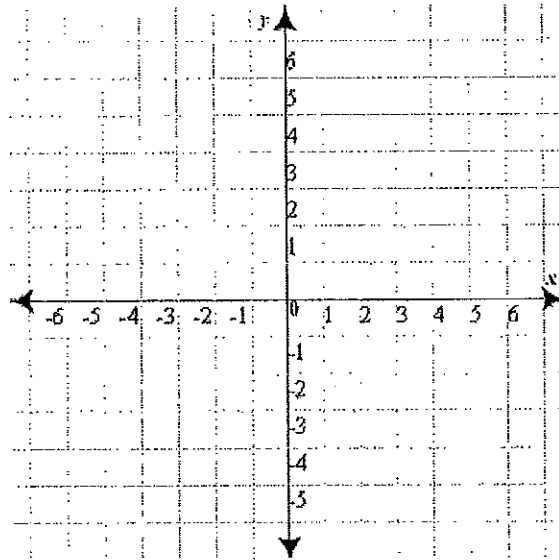
- a) Transform the equation so  $y$  is given in terms of  $x$ .
- b) Pick 4 numbers, substitute them for  $x$ , and evaluate  $y$ .
- c) Plot the graph of the equation.

2.  $5x - y = 2$

a)

b)

| X | Y |
|---|---|
|   |   |
|   |   |
|   |   |
|   |   |

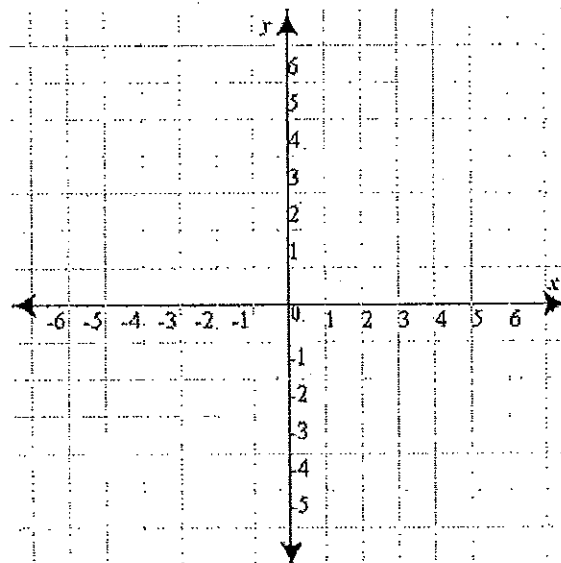


3.  $x + 2y = 4$

a)

b)

| X | Y |
|---|---|
|   |   |
|   |   |
|   |   |
|   |   |



Slope

Find the slope of the line containing the following points:

1. (4, 2) and (-1, 3)

2. (6, 7) and (-2, 7)

3. (-3, -8) and (-1, -3)

4. (3, -4) and (3, 12)

Intercepts

Find the x- and y-intercepts.

1.  $8x + 3y = 24$

2.  $y = \frac{2}{3}x - 2$

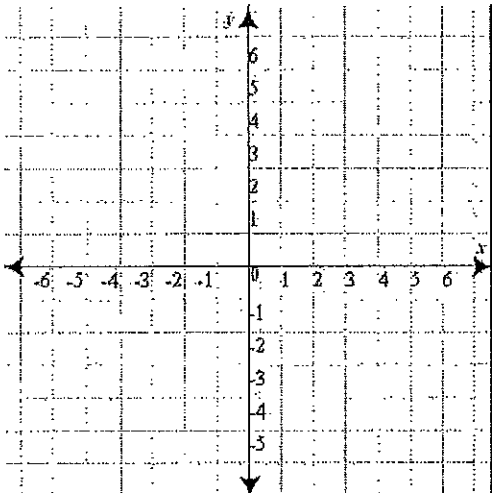
3.  $-5x + 3y = -12$

4.  $y = -3x + 9$

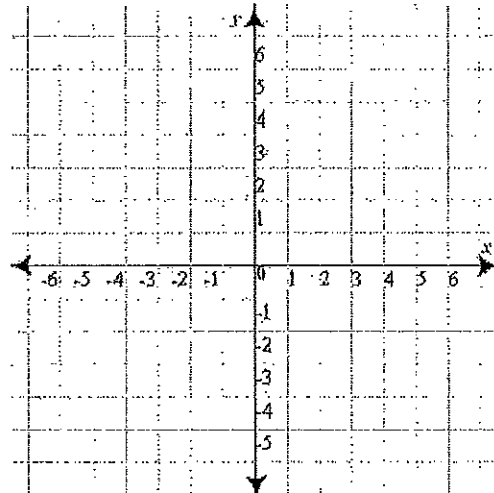
Graphing equations using slope-intercept form

Plot the graph using the slope and y-intercept.

1.  $y = 2x - 1$



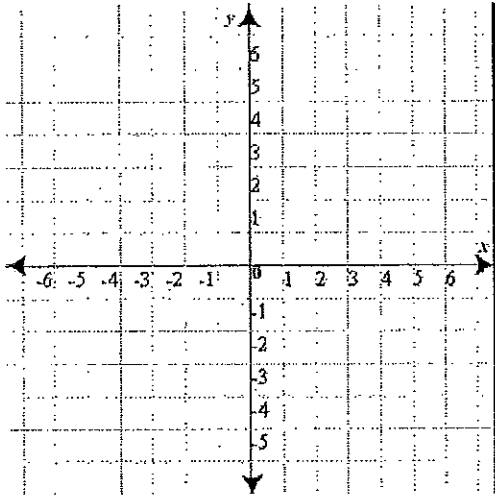
2.  $y = -\frac{2}{5}x + 3$



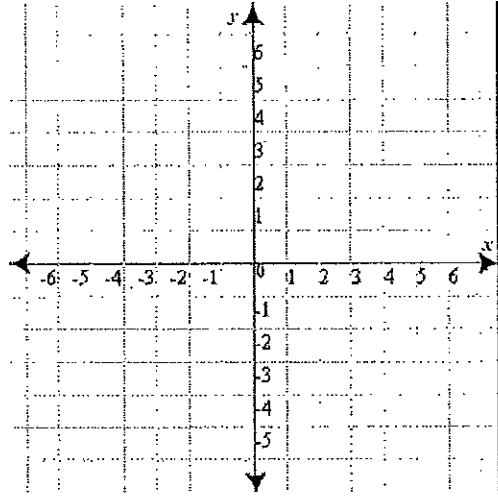
Graphing equations using slope-intercept form (continued)

Plot the graph using the slope and y-intercept.

3.  $y = \frac{1}{2}x$

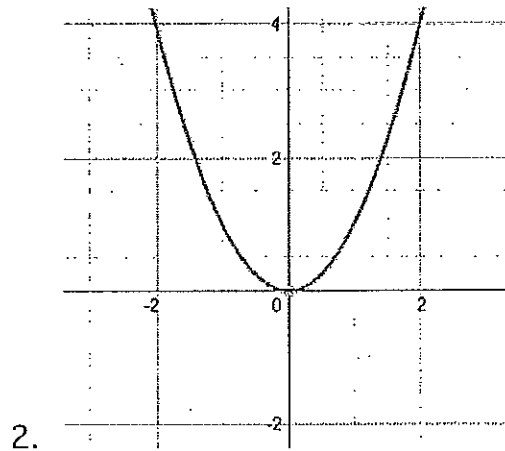
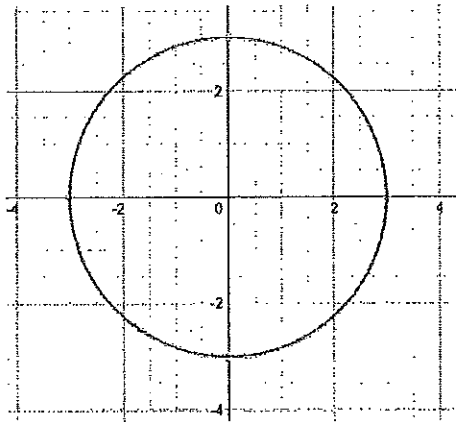


4.  $y = x - 4$



Functions

Is it a function?



3.

|   |    |    |   |
|---|----|----|---|
| X | 1  | 2  | 3 |
| Y | -3 | -3 | 8 |

4. (2, 4), (4, 5), (2, 7), (3, 9)

## Domain & Range

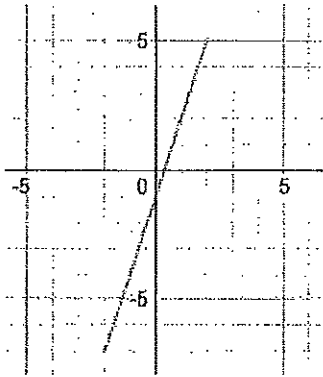
Identify the domain and range.

1.

|   |    |   |    |    |
|---|----|---|----|----|
| X | -2 | 0 | 3  | 6  |
| Y | 1  | 7 | 10 | 12 |

2.  $(-4, 1), (2, -3), (1, 0)$

3.



4.

