

SETON SCHOOL  
SUMMER MATH REFRESHER PROGRAM

# ***ALGEBRA I REVIEW***

Many studies have shown that, during the summer, students lose a substantial portion of their math skills acquired over the course of a school year. This puts them at a disadvantage upon returning for a new school year, as the expectations of a new course presuppose the skills and knowledge taught in the previous course.

The Seton math department, in cooperation with the administration, has a program similar to the summer reading program for English. Our hope is that this program will help students transition out of the summer recess and into their new math courses smoothly and with less stress.

We recommend that the sessions be worked gradually over several weeks, perhaps one session done in a day, and two or three days a week. There are ten sessions, each one of which should take about a half hour, though the times will undoubtedly vary among students.

As with summer reading, the work is expected to be done before the new school year starts. You are responsible for keeping your papers and having them ready to turn in the first day. The summer work will count for approximately 5% of your first quarter grade in the next math course. (For this review, that is usually Geometry.)

***IMPORTANT: It is essential that you show all your work, and that it is organized and legible. Space has been provided for you to work directly on the packet, but you may attach extra loose leaf pages if necessary. You must fill in the answer boxes for each question. Put your name clearly on each page of work. If these conditions are not met, you will not get full credit for your work. Also, I strongly suggest that you scan or copy your papers, so that if you lose your originals, you will have a backup.***

## ALGEBRA I REVIEW HELP PAGE

### Properties of Exponents

Given  $a \neq 0$  and  $m, n > 0$ :

Product Rule:  $a^m \cdot a^n = a^{m+n}$

Quotient Rule:  $\frac{a^m}{a^n} = a^{m-n}$

Zero Exponent Rule:  $a^0 = 1$

Negative Exponent Rule:  $a^{-m} = \frac{1}{a^m}$

Power of a Power Rule:  $(a^m)^n = a^{mn}$

Power of a Product Rule:  $(ab)^m = a^m b^m$

Power of a Quotient Rule:  $\left(\frac{a}{b}\right)^m = \frac{a^m}{b^m}$

### Factoring Examples

Greatest Common Factor:  $3x^2 - 12x = 3x(x - 4)$

Difference of Perfect Squares:  $9x^2 - 25 = (3x + 5)(3x - 5)$

Trinomial,  $a = 1$ :  $x^2 - 3x - 4 = (x - 4)(x + 1)$

Trinomial,  $a \neq 1$ :  $2x^2 + x - 6 = (2x - 3)(x + 2)$

### Quadratic Formula

For the quadratic equation  $ax^2 + bx + c = 0$ ,

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

and the discriminant  $= b^2 - 4ac$ .

If the discriminant  $> 0$ ,  $x$  has two real solutions.

If the discriminant  $< 0$ ,  $x$  has two imaginary solutions.

If the discriminant  $= 0$ ,  $x$  has one real solution.

### Linear Equations

Slope-Intercept Form:  $y = mx + b$ ; where  $m = \text{slope}$ ;  $b = y\text{-intercept}$

Point-Slope Form:  $y - y_1 = m(x - x_1)$ ; where  $m = \text{slope}$ ;  $(x_1, y_1)$  a point on the line

Standard Form:  $Ax + By = C$ , where  $A$ ,  $B$ , and  $C$  are integers

Vertical Line:  $x = a \text{ constant}$

Horizontal Line:  $y = a \text{ constant}$

## ALGEBRA I REVIEW SESSION 1

1. Make an input-output table for the function using -3, -1, 0, 1, and 3 as the domain.

$$y = 4x + 1$$

2. Evaluate the following expressions.

a.  $-8 - 15$

b.  $54 + (-21)$

c.  $(13 - 18) - (-4 + 9)$

3. Graph the two equations on the same coordinate plane.

a.  $x = -4$

b.  $y = 2$

4. Solve:  $\frac{m}{7} = -4$

5. Find the x- and y-intercepts of the equation.  
 $-2x + y = -4$

6. Solve.  
 $21z - 15 = -9z$

7. Which ordered pair is a solution to the equation  $-3x + 6y = 12$  ?  
a.  $(-4, 0)$       b.  $(0, 3)$       c.  $(2, 2)$

8. Evaluate the following expression for the given values.

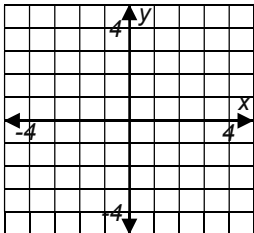
$$\frac{4a - 7b}{3b}, \text{ when } a = 5 \text{ and } b = -2$$

9. Benny is a lifeguard and earns \$7 per day plus \$6.50 per hour. Write and solve an equation to find out how many hours he worked in one day if he earned \$46.

10. Find the slope of each equation.

a.  $y = -6x + 4$

b.  $2y = 7 - x$

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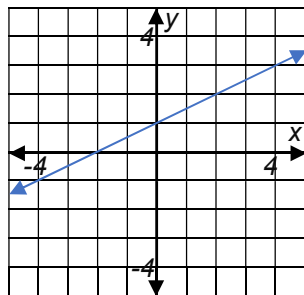
## ALGEBRA I REVIEW SESSION 2

1. Plot each pair of points and find the slope of the line passing through each pair.

a.  $(0, 2), (5, -2)$

b.  $(-7, 1), (1, 5)$

2. Find the equation of the line graphed below.



3. Write the slope intercept form of the following equation.

$$2 + 3y - x = 11$$

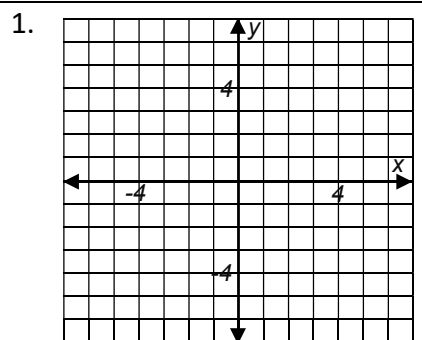
4. The following equation gives the average daily production,  $P$ , in pairs of shoes for a factory worker with  $y$  years of experience.

$$P = 2.5y + 21$$

What most clearly describes meaning of “2.5” in the equation?

- More experienced workers make 2.5 times as many shoes as inexperienced workers.
  - An average worker increases his daily production by 2.5 pairs of shoes each year.
  - A worker with one year of experience produces an average of 2.5 pairs of shoes per day.
  - An average worker increases his daily production by one pair of shoes every 2.5 years.
5. Is the following set of ordered pairs a function? Explain.

$$\{(7, -2), (3, 5), (9, -2), (0, 6)\}$$



2.

3.

4.

5.

## ALGEBRA I REVIEW SESSION 2 (CONTINUED)

6. Which 2 of the following lines are parallel?

a.  $y = -3x$

b.  $x + y - 5 = 0$

c.  $3x + y = 5$

d.  $y = \frac{-x+7}{3}$

7. Simplify using only positive exponents.

$$\frac{5}{6y^{-3}z^4}$$

Solve each of the following inequalities (8-10). Then graph each on a number line.

8.  $-2 < 2x - 3 < 7$

9.  $15 - 2x \leq 3$  or  $2x \leq -4$

10.  $|x - 3| \leq 3$

6.

7.

8.



9.



10.



## ALGEBRA I REVIEW SESSION 3

1. Write each number in scientific notation.

a. 342,000

b. 0.0000075

2. Write each number in standard notation (NOT scientific notation).

a.  $6.98 \times 10^{-4}$

b.  $1.054 \times 10^6$

3. Write the following in standard form using only integer coefficients.

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

1.a.

1.b.

2.a.

2.b.

3.

### ALGEBRA I REVIEW SESSION 3 (CONTINUED)

4. What is the slope of the line passing through the following points?  
 $(4, -6)$  and  $(2, -10)$

4.

5. What is the slope of a line which is perpendicular to  $y - 6 = 3(x - 7)$ ?

5.

6. François is on a charity walk raising money for food for the homeless. By noon he has walked to the 8.5-mile marker. At exactly 1:30, he reaches the 15.25-mile marker. During that time interval, what is his speed in miles per hour?

6.

7. Given the equation  $3x - 7y = 35$ , complete the following:

**a)** Write in slope-intercept form.

7.a.

7.b.

7.c.

**b)** Determine the slope.

**c)** Determine the y-intercept.

8. A line with a slope of  $-2$  passes through  $(3, -1)$  and  $(k, 5)$ . Find the value of  $k$ .

8.

9. Find the value of each function when  $x = -3$ .

**a.**  $f(x) = 3x - 7$

**b.**  $f(x) = 7 - x^2$

9.a.

9.b.

10. Which two lines are parallel?

a.  $6x + 5y = 10$

b.  $6x = 5y - 2$

c.  $6y = -5x - 4$

d.  $10y = -12x + 13$

10.

## ALGEBRA I REVIEW SESSION 4

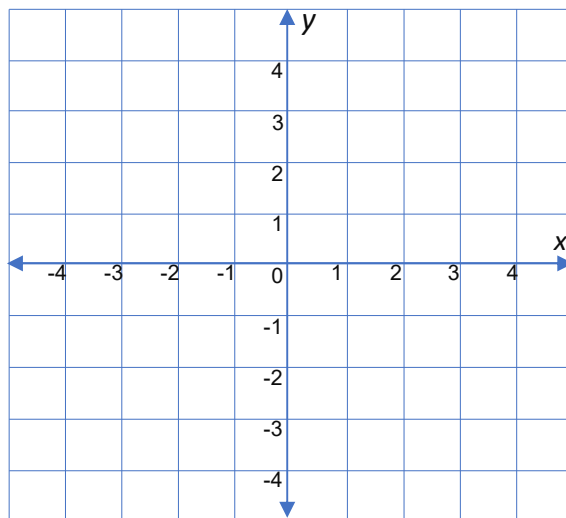
Graph the following lines (1-5).

1.  $y = -x + 1$
2.  $y = 2$
3. A line passing through  $(2, 0)$  having a slope of  $-2$ .
4.  $x - 2y = 4$
5. A line with an  $x$ -intercept of  $-3$  and a  $y$ -intercept of  $3$ .

Solve each of the following (6-8).

6.  $\frac{1}{2}x - \frac{5}{6} + \frac{1}{3} = \frac{1}{2}$
7.  $\frac{x}{35} = \frac{20}{100}$
8.  $5(x+7) = 107 - x$
9. The area of a trapezoid is  $A = \frac{1}{2}(b_1 + b_2)h$ . Solve the equation for  $h$ .
10. Eloise saved \$7.00 on a new shirt because it was marked down 20%. What was the original price of the shirt?

Graph and label the lines for 1-5 here:



6.

7.

8.

9.

10.

## ALGEBRA I REVIEW SESSION 5

1. Choose which of the following is false.
  - a. An integer is a rational number.
  - b. The number  $3.\overline{7}$  is a real number.
  - c. The number  $-4$  is a whole number.
  - d. The number  $\frac{36}{4}$  is an integer.
2. Write using mathematical symbols. Then solve the equation.  
*23 less than 17 times a number is 79.*

1.

2.

3. Write in slope-intercept form.  
 $3(y+2) = 7x+4$

3.

4. What is the domain of  $y = \frac{21}{x-7}$  ?

4.

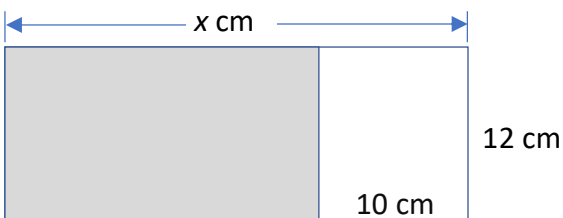
5. Simplify.  
 $-6r^2s - (-5r^2s) + (-13r^2s)$

5.

6. Simplify.  
 $9 - 2(5 + 3^2) + 7$

6.

7. Write a variable expression for the area of the shaded portion of the figure below.



7.

*Below is a chart of the students in Martha's Algebra I class, described by boys or girls and by 16 years and older or under 16 years old.*

	16 or older	Under 16
Boys	5	7
Girls	8	8

*If a student is selected at random from Martha's class, what is the probability that:*

8. The student is a boy?
9. The student is NOT a girl who is under 16?
10. The student is 16 or older?

8.

9.

10.



## ALGEBRA I REVIEW SESSION 6

Simplify the radical expressions. (1-4)

1. a.  $\sqrt{6} \cdot \sqrt{15}$                       b.  $3\sqrt{20} \cdot 4\sqrt{30}$

2. a.  $\frac{\sqrt{49}}{\sqrt{4}}$                                       b.  $\sqrt{\frac{45}{120}}$

3. a.  $-2\sqrt{27} \cdot \sqrt{3}$                       b.  $3\sqrt{63} \cdot (-\sqrt{4})$

4. a.  $\sqrt{200}$                                       b.  $\frac{-2\sqrt{20}}{\sqrt{100}}$

5. Factor completely.  
 $3x^2 - 6x$

6. Factor completely.  
 $x^2 + 15x + 56$

7. Evaluate. Write in scientific notation.  
 $(3 \times 10^4)(8 \times 10^{-7})$

8. Find the mean, median, and mode of the following data.  
4, 11, 9, 6, 2, 9, 2, 10, 7, 9

9. Write the equation in slope-intercept form.  
 $10x - 6y = 45$

10. Solve.  
 $\frac{21}{x} = \frac{70}{25}$

1.a.
1.b.
2.a.
2.b.
3.a.
3.b.
4.a.
4.b.
5.
6.
7.
8. Mean: Median: Mode:
9.
10.

## ALGEBRA I REVIEW SESSION 7

1. Solve.

$$5x + 17 = 7(2x - 13)$$

1.

2. A box turtle averages 0.17 miles per hour. How long would it take a box turtle to walk 0.085 mile?

2.

3. Factor completely.

$$x^2 - 49$$

3.

4. Write the point-slope form of a linear equation whose slope is -2 and which passes through the point (7, -3).

4.

5. Martin buys a winter coat priced at \$122. If the sales tax is 6.0%, what is the total he must pay?

5.

6. Find the equation of the line parallel to  $y = 3x - 11$  which passes through the point (0, 8).

6.

7. Express in general form ( $y = ax^2 + bx + c$ ).

$$y - 9 = (x - 2)(3x + 5)$$

7.

8. Simplify.

$$(3x - 2) - (5x^2 + 6x - 7)$$

8.

9. Write in standard form.

$$(3x - 1)(x^2 - 5x - 3)$$

9.

10. Write in standard form.

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

10.

### ALGEBRA I REVIEW SESSION 8

1. Solve and graph the inequality.

$$|x+3| < 2$$

1.



2. Solve and graph the inequality.

$$|3-2x| \geq 4$$

2.



3. Simplify. Express without parentheses and with positive exponents.

$$(-2x^3y^{-2})^3$$

3.

4. Evaluate. Express with positive exponents.

$$\frac{3xy^4}{x^{-1}y} \cdot \frac{2x^{-2}y^4}{xy^{-1}}$$

4.

5. Solve.

$$(x+4)(2x-1) = 0$$

5.

6. Factor.

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

6.

7. Find an equation, in slope-intercept form, of a line having slope 3 and y-intercept 4.

a.  $y = 3x - 4$

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

c.  $y = 3x + 4$

d.  $x = 3y + 4$

7.

8. The cost of a school banquet is \$75 plus \$12 per person attending.

**a)** Determine the linear equation that models this problem.

**b)** What is the cost for 99 people?

8.a.

8.b.

9. Write an equation of a line with slope  $-6$  passing through the point  $(-7, -1)$ .

9.

10. Write the equation of the line in slope-intercept form that passes through the points  $(7, -1)$  and  $(2, 9)$ .

10.

## ALGEBRA I REVIEW SESSION 9

1. The length of a rectangle is 3 cm more than three times the width. If the perimeter of the rectangle is 30 cm, what are its dimensions?

1.
----

2. Solve.

$$x^2 - 5x - 2 = 0$$

2.
----

3. Use the discriminant to choose the correct description of the solution.

$$x^2 - x + 1 = 0$$

- a. no solution                      b. one real solution  
c. two real solutions              d. two imaginary solutions

3.
----

4. Solve by any method.

$$0 = (x - 7)(7x - 1)$$

4.
----

5. If  $y$  is a function of  $x$ ,  $x$  and  $y$  vary directly, and  $(10, 16)$  is a point on the graph of the function, find the equation of the function.

5.
----

6. Simplify as much as possible.

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

6.
----

7. Simplify. Express without negative exponents.

$$\frac{1}{5x^{-2}y^{-1}}$$

7.
----

8. Write the equation of a line perpendicular to  $y = 2x - 5$  which passes through the point  $(0, 6)$ .

8.
----

9. Factor completely.

$$9x^2 - 6x - 3$$

9.
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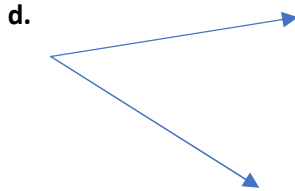
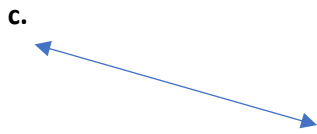
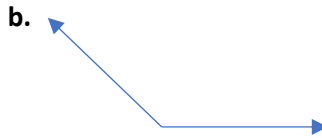
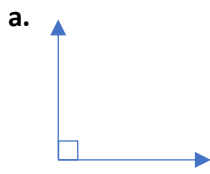
10. Solve.

$$\frac{x-1}{2} = \frac{10}{x}$$

10.
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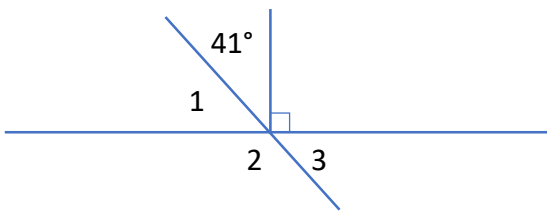
## ALGEBRA I REVIEW SESSION 10

1. Match each angle with its type: Acute, Obtuse, Right, Straight.

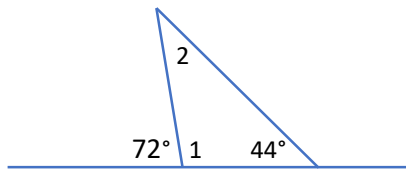


Find the measure of each numbered angle. (2 and 3)

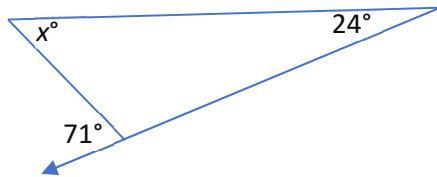
2.



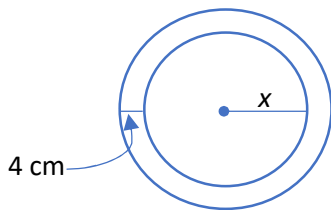
3.



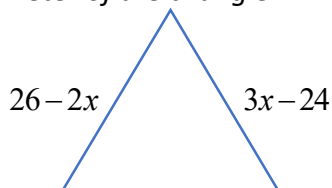
4. Solve for  $x$ .



5. Find the value of  $x$ . Use  $\pi = 3.14$ .  
Circumference of large circle = 53.38 cm.



6. The figure below is an equilateral triangle. Find the value of  $x$  and the perimeter of the triangle.



1.a.  
1.b  
1.c.  
1.d.

2.  $m\angle 1 =$   
 $m\angle 2 =$   
 $m\angle 3 =$

3.  $m\angle 1 =$   
 $m\angle 2 =$

4.

5.

6.