SETON SCHOOL
SUMMER MATH REFRESHER PROGRAM

PRE-ALGEBRA REVIEW
(Mrs. Baughman)

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 Algebra I.)

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.

PRE-ALGEBRA HELP PAGE

Distributive Property

$a(b+c)=ab+ac$, and $a(b-c)=ab-ac$

Example: Simplify. $9x+3(5-2x)$

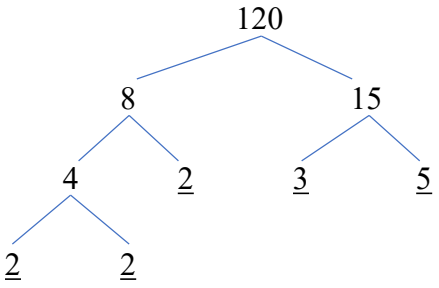
Answer: $9x+3(5-2x)$
$=9x+15-6x$
$=\boxed{3x+15}$

Example: Simplify. $6(x-2y)-9(x-7y)$

Answer: $6(x-2y)-9(x-7y)$
$=6x-12y-9x+63y$
$=\boxed{-3x+51y}$ or $\boxed{51y-3x}$

Prime Factorization

Example: Write the prime factorization of 120.



Answer: $\boxed{120=2^3\cdot 3\cdot 5}$

Greatest Common Factor (GCF) = Product of *lowest* exponent of *common* prime factors

Least Common Multiple (LCM) = Product of *highest* exponent of *all* prime factors

Circle Formulas

$C=\pi d$, $C=2\pi r$, $A=\pi r^2$,

where C = circumference, r = radius, d = diameter, and A = area.

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

Pythagorean Theorem Formula

$$a^2+b^2=c^2$$

where a and b are the legs and c is the hypotenuse of a right triangle

Linear Equations

Slope-Intercept Form: $y=mx+b$, where m = slope; b = y-intercept

Vertical Line: $x=$ constant

Horizontal Line: $y=$ constant

PRE-ALGEBRA REVIEW SESSION 1 – No Calculators

1. Evaluate the expression when $x = -3$, $y = -6$, and $z = 5$.
$2y + 3xz$

Use the distributive property to simplify. (2 and 3)

2. $4y + 6(y - 11)$

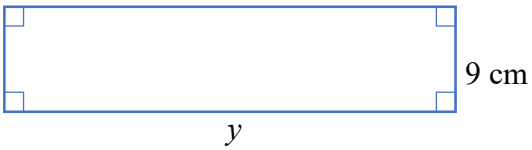
3. $-3(x + 4) - 12(x - 5)$

4. Simplify. $-12g + 6f - 13g - 21f$

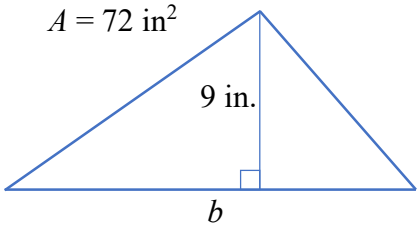
5. Solve. $y - \frac{3}{4} = 5\frac{1}{2}$

6. A plant is 47 cm tall. It grows 5 cm per year. Write and solve an equation to find how many years it will take to grow to a height of 72 cm.

7. Find the value of y. (P = perimeter)
$P = 68$ cm



8. Find the value of b. (A = area)
$A = 72$ in^2



9. Solve.
$6x < -21$

10. Solve.
$-\frac{2}{3}y \geq 34$

1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	
10.	

PRE-ALGEBRA REVIEW SESSION 2 – No Calculators

1. Evaluate. $6 + 4 \cdot 2^3 - 11$

2. Evaluate the following expression at $x = 6$ and $y = 3$.

$$\frac{7y - 3}{4x + 12}$$

3. The population of a town is 3500. It is growing at the rate of 35 people per year. Write a variable expression for the population, P, of the town after t years.

4. How far does a train travel in 4.5 hours at the rate of 54 miles per hour?

5. Simplify. $12(7 - 2y) + 16y$

6. Write the prime factorization of 147.

Multiply. Express each answer as a power. (7 and 8)

7. $21^{12} \cdot 21^{13}$

8. $s^{-5} \cdot s^{13}$

9. Evaluate. $3\frac{2}{5} + 2\frac{4}{15}$

10. Evaluate. $7\frac{3}{8} - 2\frac{5}{12}$

1.
2.
3.
4.
5.
6.
7.
8.
9.
10.

PRE-ALGEBRA REVIEW SESSION 3 – No Calculators

Find the sum, difference, product, or quotient. (1 – 4)

1. $23.71 - 9.285$

2. $-0.403 + 2.19$

3. $2.301 \cdot (-4.5)$

4. $-7.992 \div 2.16$

Write as a decimal. (5 and 6)

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

6. $\frac{7}{40}$

7. Solve. $3(w - 6) = 39$

8. Write as **a)** a decimal, and **b)** a simplified fraction. 58%

9. A customer bought a cantaloupe for $\$1.35$, and 3 heads of lettuce. Another customer bought 5 cans of soup for $\$0.84$ each. Both customers spent the same amount of money. What is the price of one head of lettuce?

10. Divide. Express as a power.

$$\frac{37^{16}}{37^{3}}$$

1.
2.
3.
4.
5.
6.
7.
8.a. 8.b.
9.
10.

PRE-ALGEBRA REVIEW SESSION 4 – No Calculators

Write the equivalent unit rate. (1 and 2)

1. $\dfrac{\$4.75}{5\text{ tickets}} = \dfrac{?}{1\text{ ticket}}$

1.

2. $\dfrac{2.5\text{ yds}}{1\text{ minute}} = \dfrac{?\text{ yds}}{1\text{ hour}}$

2.

Write as a simplified fraction. (3 and 4)

3. 0.28

3.

4. $0.\overline{2}$

4.

5. Solve. $3x = 4 - 9x$

5.

A box contains the letters of the word BABOON. You draw one letter from the box. Find the probability of the event. (6 – 8)

6. Drawing the letter *B*.

6.

7. Drawing the letter *N*.

7.

8. Drawing the letter *S*.

8.

Find the unknown measure where C = circumference, r = radius, and d = diameter. Use $\pi = 3.14$. (9 and 10)

9. $C = 28.26$ cm, $r = ?$

9.

10. $d = 25$ ft, $C = ?$

10.

PRE-ALGEBRA REVIEW SESSION 5 – No Calculators

1. Divide.

$$2\frac{2}{3} \div 5$$

1.

2. Multiply.

$$4\frac{1}{8} \cdot \left(-3\frac{5}{11}\right)$$

2.

3. Write in scientific notation: $34{,}200{,}000\ \text{m}$

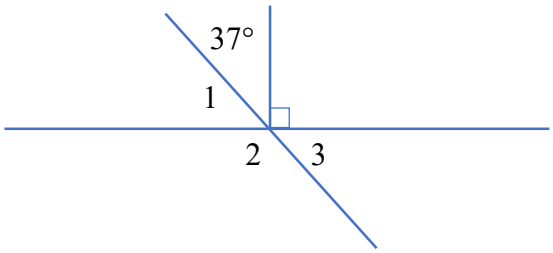
3.

4. Divide. Answer in scientific notation.

$$\frac{3.2\times10^{6}\,\text{m}}{4\times10^{3}\,\text{s}}$$

4.

5. Find the measure of each numbered angle.

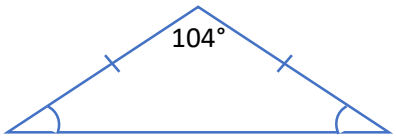


5. $m\angle 1 =$

$m\angle 2 =$

$m\angle 3 =$

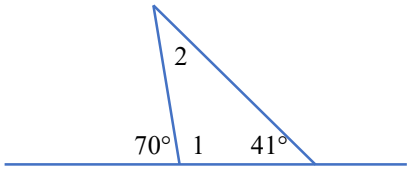
6. Classify the triangle **a)** by angles and **b)** by sides.



6.a.

6.b.

7. Find the measure of each numbered angle.



7. $m\angle 1 =$

$m\angle 2 =$

8. State whether each number is rational or irrational. Explain.

a. $\frac{7}{13}$ **b.** $\sqrt{\frac{9}{25}}$ **c.** $\sqrt{24}$

8.a.

8.b.

8.c.

9. Solve.

$x^2 = \sqrt{121}$

9.

10. Solve.

$7 + x^2 = 71$

10.

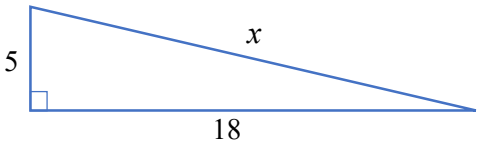
PRE-ALGEBRA REVIEW SESSION 6 – Calculators Allowed

(Note: When calculating with π in this session, please use the "π" button on your calculator.)

1. Find the area of a circle with a radius of 7.1 m. Round to the nearest tenth of a m^2.

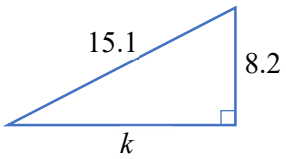
2. Find the diameter of a circle with an area of 59 cm^2. Round to the nearest tenth of a cm. (Hint: First find the radius.)

3. Find x in the figure below to the nearest tenth.



4. Find the perimeter of the triangle above.

5. Find k in the figure below to the nearest hundredth.



6. Find the area of the triangle above to the nearest tenth.

7. Evaluate. Round to nearest hundredth. $-\sqrt{426}$

Find all solutions. Round to the nearest hundredth. (8 and 9)

8. $y^2 - 15 = -7$

9. $x^2 - 21 = 17$

10. You are standing 30 ft from the base of a cliff. Using a laser range finder, you measure the distance from where you are to the top of the cliff to be 78 ft. What is the height of the cliff?

1.
2.
3.
4.
5.
6.
7.
8.
9.
10.

PRE-ALGEBRA REVIEW SESSION 7 – No Calculators

1. Solve and graph. $x+4 \le 3x-6$

1.

2. Carlos and Martin are on the same basketball team. So far this season, Carlos has made 27 of 48 free throws, and Martin has made 50 of 80. Who has the better free throw percentage? Why?

2.

3. Last week, Bethany had $340 in her bank account. Today, after depositing her paycheck for 24 hours work, she has $520 in her account. Write and solve an equation to find Bethany's hourly wage.

3.

4. Order from least to greatest.

$$\frac{3}{4},\ 0.7\overline{5},\ \frac{7}{9},\ 0.\overline{75}$$

4.

5. Find **a)** the GCF and **b)** the LCM of the following integers: $28,\ 105$.

5.a.

5.b.

6. Find the mean, median, mode, and range of the following numbers of children in ten families: $5,\ 3,\ 8,\ 2,\ 6,\ 5,\ 11,\ 1,\ 7,\ 4$.

6. Mean: Median:

Mode: Range:

Evaluate each polynomial expression and write in standard form. (7 – 10)

7. $8m^2+2m^3+1+4m-5m^2+4$

7.

8. $(6w^2+7w-5)-(4w^2-3w+8)$

8.

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

9.

10. $(3x^4)(2x^2y)^3$

10.

PRE-ALGEBRA REVIEW SESSION 8 – No Calculators

1. The length and width of a room are 28 ft 3 in. and 18 ft 7 in., respectively. How much longer is the room than it is wide? Answer in feet and inches.

1.

2. Simplify each of the following.

   a. $-|-12|$ **b.** $-(-12)$

   c. $|12|+|-12|$ **d.** $(12)+(-12)$

2.a. 2.b.

2.c. 2.d.

3. Write as a mathematical expression: (Do not attempt to solve.)
   14 less than the quotient of 7 and a number

3.

4. A membership at a bowling club costs $\$89$ for a year. It costs $\$4$ each day you bowl if you are a member and $\$7$ if you are not a member. Write and solve an inequality to find how many days in a year you would need to bowl so that getting a membership is cheaper (less than) than not getting one.

4.

5. What number is 28% of 430?

5.

6. Candace wants to buy a sweater marked at $\$40.50$. If sales tax is 6%, what would be the total cost of the sweater, including tax?

6.

7. Which is larger: 35% of 68 or 68% of 35? Explain.

7.

8. Write and solve an equation for the following verbal sentence:
   12 times a number is 14 times one less than the number.

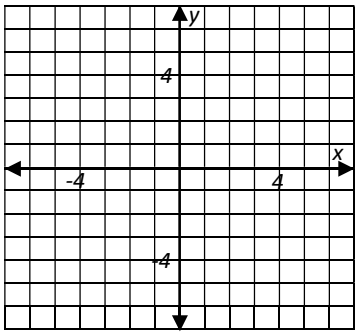
8.

9. **a.** Graph the following points: $(6, -2)$, $(-3, -2)$, $(-3, 5)$, $(6, 5)$.

   b. Connect them to form a figure.

   c. Find the perimeter of the figure.

9.



9.c.

10. What number am I? Here are my clues:
    I am a two-digit number.
    I am a prime number.
    I am one more than a perfect square.
    The sum of my digits is more than 9.

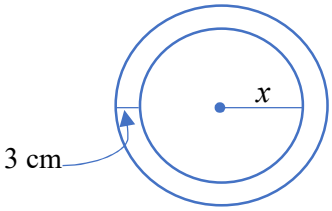
10.

PRE-ALGEBRA REVIEW SESSION 9 – No Calculators

1. What is the probability that a two-digit perfect square selected at random will have the tens digit larger than its units digit? Explain.

1.

2. Find the value of x. Use $\pi = 3.14$.
Circumference of large circle $= 87.92$ cm.



2.

3. Zachery would like to earn a 90 or better average for this quarter in math. His grade for the quarter is the average of 7 tests. If his average for the first 6 tests is 88.5, what must he get on his last test to bring his average for the quarter up to 90?

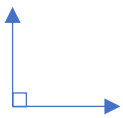
3.

4. Which is larger: 3^5 or 5^3? Explain.

4.

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

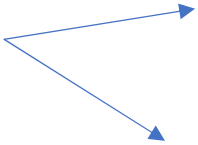
a.



b.

c.

d.



5.a.

5.b

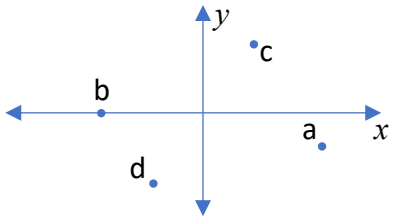
5.c.

5.d.

6. A serving size of a snack is $1\frac{3}{4}$ oz. If the snack bag contains 18 oz, how many servings are in the bag? Answer as a simplified mixed number.

6.

7. Determine the quadrant or axis in which each point (a – d) lies.



7.a.

7.b.

7.c.

7.d.

PRE-ALGEBRA REVIEW SESSION 9 (CONTINUED) – No Calculators

8. Solve. $\frac{g}{9} - 21 = -10$

8.

9. A family goes out to dinner. The food bill is $\$57.00$. If the family adds a 20% tip to the cost of the food, and there is an 8% sales tax on the food, what is the total cost?

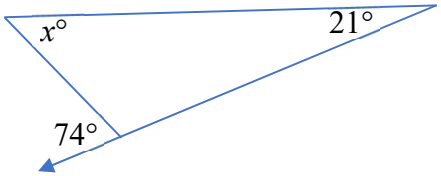
9.

10. If it takes Toni 3.5 hours to drive 203 miles, what is her average speed in miles per hour?

10.

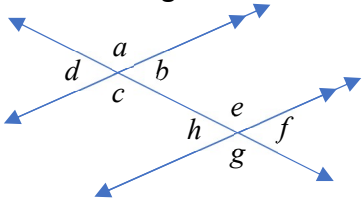
PRE-ALGEBRA REVIEW SESSION 10 – No Calculators

1. Find x in the figure below.



1.

2. In the diagram below, $m\angle h = 62°$. Find the measures of each of the unknown angles.



2.a. 2.b.

2.c. 2.d.

2.e. 2.f.

2.g.

3. Which set of numbers is a Pythagorean Triple?

a. $6, 8, 10$ b. $9, 9, 12$ c. $4, 5, 6$

3.

4. Give the next two terms in the pattern.

$9, 15, 21, 27, \_?\_, \_?\_$

4.

5. Find the lowest common denominator.

$\frac{11}{15}, \frac{1}{10}, \frac{2}{9}$

5.

PRE-ALGEBRA REVIEW SESSION 10 (CONTINUED) – No Calculators

6. Which one of the following pairs is relatively prime?
   a. $21, 91$ b. $35, 102$ c. $47, 141$

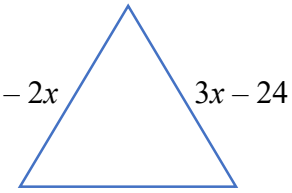
6.

7. Express as a unit rate.

$$\frac{105 \text{ bracelets}}{3 \text{ crates}}$$

7.

8. The figure below is an equilateral triangle. Find **a)** the value of x *and* **b)** the perimeter of the triangle.



8.a.

8.b.

9. Simplify (write without an exponent). $(-13)^0$

9.

10. The following solution to an equation is erroneous. Describe the error and redo it correctly.
    Solve.

$$2(10x+7)=18x+4$$
$$20x+7=18x+4$$
$$-18x \quad -18x$$
$$2x+7=4$$
$$-7 \quad -7$$
$$\frac{2x}{2}=\frac{-3}{2}$$
$$x=-1.5$$

10.

END OF REVIEW