Point Pleasant Boro High School
Mathematics Department
Transitional Algebra
Summer Review Packet

* Welcome to Transitional Algebra! This summer review assignment is designed for ALL students enrolled in Transitional Algebra for the 2018-2019 school year to refresh your Algebra and Geometry skills and prepare for a successful year!

π The packet is to be completed <u>by the first day of school</u>.

π It <u>will be collected</u> and graded based upon completion and effort.

π To receive full credit on the summer work, every problem must be attempted even if the final answer was not obtained.

π Because these are not new concepts, topics in this packet will be reviewed at a rapid pace during the beginning of the school year.

π All of the material in the math packet are math skills that you should had learned in your previous math classes.

π A <u>formal assessment will be given</u> based on information reviewed in this packet during the first few weeks of school in September.

π You will be required to take this assessment even if you are absent for the in-class review sessions.

π When necessary, use the formulas provided in this packet and online sites to help refresh your memory!

π **You MUST show all work for each problem in order to receive credit!**

π Only answers are allowed to be written on this packet (all work must be shown on additional sheets of paper and remember to *label your work.*
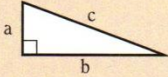
<div align="center">Have fun with the problems! =)</div>

Information Page

SOH - CAH - TOA

$$\text{sine} = \frac{\text{opposite}}{\text{hypotenuse}}, \qquad \sin \emptyset = \frac{a}{c}$$

$$\text{cosine} = \frac{\text{adjacent}}{\text{hypotenuse}}, \qquad \cos \emptyset = \frac{b}{c}$$

$$\text{tangent} = \frac{\text{opposite}}{\text{adjacent}}, \qquad \tan \emptyset = \frac{a}{b}$$

Rules for Exponents

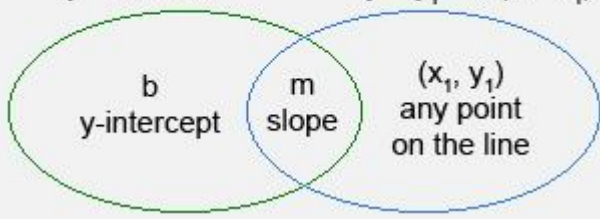| Definition:	$a^n = a \times a \times a$ ("n" times)
$a^m a^n = a^{m+n}$	keep the base, add the exponents
$(a^m)^n = a^{mn}$	keep the base, multiply the exponents
$(ab)^m = a^m b^m$	distribute exponent to sign, number and variable
$\left(\dfrac{a}{b}\right)^m = \dfrac{a^m}{b^m}$	distribute exponent to sign, number and variable
$\dfrac{a^m}{a^n} = a^{m-n}$	when m > n
$\dfrac{a^m}{a^n} = \dfrac{1}{a^{n-m}}$ or a^{m-n} (negative exponent)	when m < n
$\dfrac{a^m}{a^n} = 1$	when m = n
$a^0 = 1$	

Factoring Patterns

- **Common Terms**
  $ax + ay = a(x + y)$

- **Difference of Two Squares**
  $a^2 - b^2 = (a + b)(a - b)$

- **Perfect Square Trinomial**
  $a^2 + 2ab + b^2 = (a + b)^2$
  $a^2 - 2ab + b^2 = (a - b)^2$

- **Basic Trinomial**
  $ax^2 + bx + c = 0$ (will vary)

- **Sum/Difference of Cubes**
  $a^3 + b^3 = (a + b)(a^2 - ab + b^2)$
  $a^3 - b^3 = (a - b)(a^2 + ab + b^2)$

Order of Operations

To solve math problems with more than one operation $(+, -, \times, \div)$, remember this sentence for the correct order:

PLEASE EXCUSE MY DEAR AUNT SALLY

PLEASE = **Parenthesis** (or a different grouping symbol)
EXCUSE = **Exponents**
MY DEAR = **Multiply** and/or **Divide**
AUNT SALLY = **Add** and/or **Subtract**

Do each operation from left to right.

$(6-3) + (2 \times 3)^2 \times 4 + (3+1)$ First, do what's in **Parenthesis**

$3 + 6^2 \times 4 + 4$ Then, do the **Exponents**

$3 + 36 \times 4 + 4$ Next, **Multiply** and/or **Divide**

$3 + 144 + 4$ Last, **Add** and/or **Subtract**

$= 151$

Continue working the problem to complete all operations.

Real Numbers

Real
Rational — Can be expressed as: Integer / Integer
Integers — ..., -3, -2, -1, 0, 1, 2, 3, ...
Whole — 0, 1, 2, ...
Natural — 1, 2, ...
Non-existent, terminal, or repeating decimal
Irrational — Decimal is not terminal, does not repeat

Slope-Intercept Form
$y = mx + b$

b — y-intercept
m — slope

Point-Slope Form
$y - y_1 = m(x - x_1)$

(x_1, y_1) any point on the line

The following websites may be useful tools as you work through this packet and prepare for Transitional Algebra.

- Video demonstrations: http://www.khanacademy.org/math/algebra

- Written lessons, math dictionary, and practice games: http://www.coolmath.com/

- Written lessons, sample problems, and practice quizzes: http://www.shmoop.com/algebra/

- Written lessons and practice problems: http://www.algebralab.org/lessons/lesson.aspx

- Written lessons, math advice, and links to other sources: http://www.purplemath.com/

List all the elements of B that belong to the specified set.

1. List all the elements that are <u>natural numbers</u> of the set B= $\left\{3, \sqrt{6}, -4, 0, \dfrac{6}{7}, -\dfrac{7}{6}, 4.1, \sqrt{16}\right\}$

2. List all the elements that are <u>whole numbers</u> of the set B= $\left\{14, \sqrt{8}, -9, 0, \dfrac{3}{4}, -\dfrac{4}{3}, 6.9, \sqrt{9}\right\}$

3. List all the elements that are <u>integers</u> of the set B= $\left\{4, \sqrt{6}, -10, 0, \dfrac{4}{7}, -\dfrac{7}{4}, 1.7, \sqrt{14}\right\}$

4. List all the elements that are <u>rational numbers</u> of the set B= $\left\{18, \sqrt{5}, -10, 0, \dfrac{2}{3}, \sqrt{16}, 0.61\right\}$

5. List all the elements that are <u>real numbers</u> of the set B= $\left\{10, \sqrt{8}, -8, 0, \dfrac{1}{8}, \sqrt{16}\right\}$

Use the graph of <u>population change per year</u> for a metro area to answer the following questions.

Population Change for Metro Area
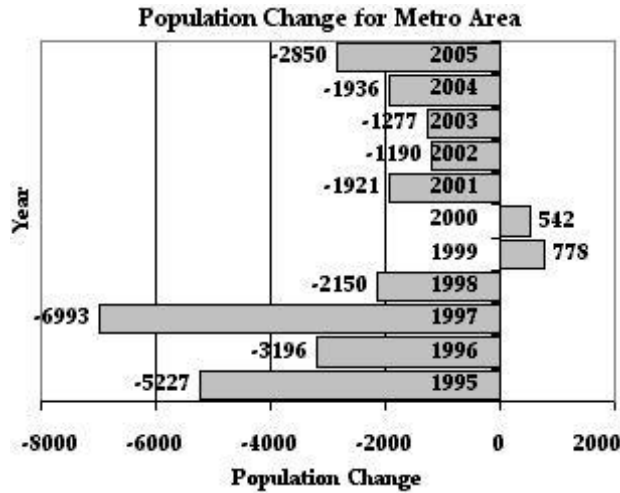
6. What is the difference of the 2001 and 2000 population changes?

7. In which two years did the population of the metro area increase?

8. In which year did the population of the metro area decrease the most?

Solve the following problems on the calculator you will be using in class.

9. $9 \bullet 7 - 7 \bullet 5^2 + 2(8-4)$

10. $3^2 \bullet 3^{-2} \div 3^{15} \div 3^{-6}$

11. $\dfrac{5(4-6)^2 - 5 \bullet 9 + 8 \bullet 25}{4^1 + 17^0}$

Write the following fractions as a decimal, and the decimals as fractions.

12. $\dfrac{3}{8}$

13. $\dfrac{7}{9}$

14. 0.676

15. 0.28

Write the following fractions in lowest terms.

16. $\dfrac{51}{68}$

17. $-\dfrac{62}{86}$

If the given number is a mixed number, covert it to an improper fraction. If the given number is an improper fraction, convert it to a mixed number.

18. $9\dfrac{1}{4}$

19. $\dfrac{81}{16}$

Perform the operation and give the answer in lowest terms.

20. $\dfrac{4}{9}+\dfrac{1}{10}$

21. $-\dfrac{11}{14}+\dfrac{3}{5}$

22. $\left(\dfrac{5}{6}\right)\left(-\dfrac{6}{11}\right)$

23. $\left(-\dfrac{7}{8}\right)\div\left(\dfrac{3}{4}\right)$

24. $\dfrac{9}{4}\div\left(-\dfrac{8}{7}\div\dfrac{1}{5}\right)$

25. $7\dfrac{2}{3}+3\dfrac{3}{7}$

A BRIEF REVIEW OF SOME GEOMETRY FACTS

Give the symbol that represents the portion of the line named and draw a figure showing just the portion named.

P   Q   R   S
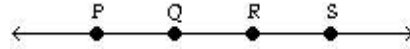
26. Line segment QR

27. Ray QR

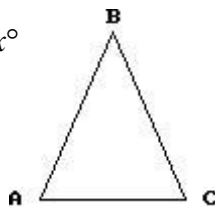Classify the following triangles as acute, right, or obtuse and as equilateral, isosceles, or scalene.

28.

29.

30.
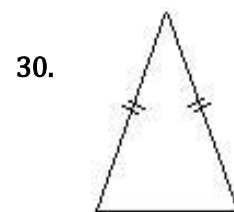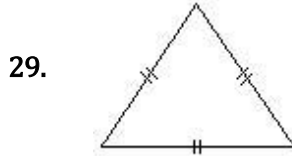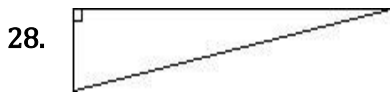
Find the requested angle.

31. Complement of 35°

32. Supplement of 72°

Find the measure of each angle.

33. $\angle A = x°$, $\angle B = 48°$, $\angle C = x°$

34. $\angle A = (7m)°$, $\angle B = (5m)°$
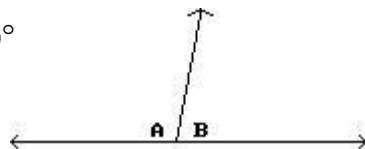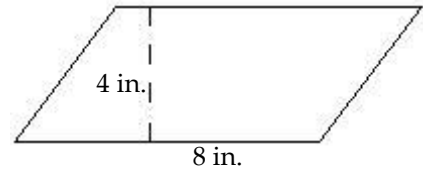
35. $\angle A = (7f)°$, $\angle B = (2f)°$
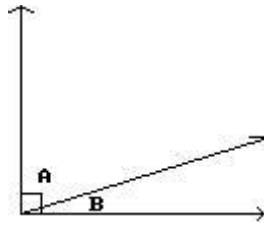
FIND THE AREA OF EACH OF THE FOLLOWING FIGURES. WRITE THE EQUATION YOU ARE USING FOR EACH PROBLEM, SHOW YOUR SUBSTITUTION, SOLVE. DO NOT FORGET TO INCLUDE THE UNITS.
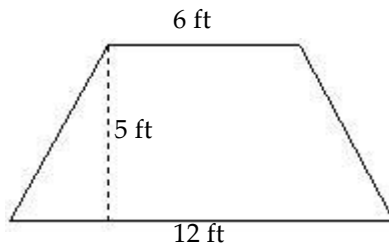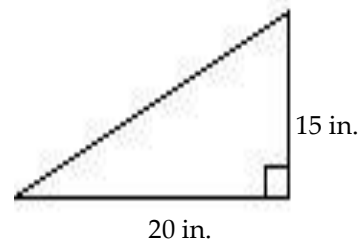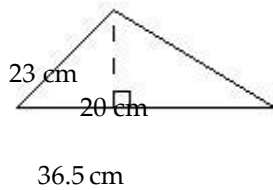
36. a = 2.2 m, b = 7.4 m

37. Parallelogram

4 in.

8 in.

38. Trapezoid

6 ft

5 ft

12 ft

39.

15 in.

20 in.

40.
41.

23 cm

20 cm

36.5 cm

42.

6 cm

43.

9 mi