Booker T. Washington
Summer Math Packet 2017
Geometry

Completed by Thursday, August 24, 2017

Each student will need to print the packet from our website.

Go to the BTW website (http://btw.tulsaschools.org/) then click the summer assignments (beach ball) and choose the course that you are enrolled in for the 2015-16 school year.

Helpful websites:

http://patrickjmt.com/
Free site with video lectures

http://www.khanacademy.org/
Free site with video lectures

http://tutorial.math.lamar.edu/Classes/Alg/Alg.aspx
Free site with notes and problems

www.pearsonsuccessnet.com
Site from textbook publisher Pearson

(Only available to students who have access from prior years)

Geometry Name:_____

Linear Equations and Cartesian Plane Problem Set

I. Given: $3X - 4Y = -24$ as the equation of a line.

_____ a. Identify the form in which the line is expressed?

_____ b. Evaluate the slope of the line.

_____ c. Evaluate the X-intercept. **(plug zero into y and solve for x)**

_____ d. Evaluate the Y-intercept. **(plug zero into x and solve for y)**

_____ e. Write the equation of this line above **IN SLOPE-INTERCEPT FORM**: **y=mx+b**

_____ f. Write the equation **IN STANDARD FORM (Ax + By = C)** of the line parallel to this line passing through (4 , -2).

_____ g. Write the equation of the line perpendicular to this line passing through (-5 , 3) **IN STANDARD FORM (Ax + By = C)**

II. Given: (-4 , -9) & (20 , 23) are two points on a line segment.

_____ a. What is the slope of the line connecting these two points?

_____ b. What is the length of the segment?

_____ c. Write the equation **IN STANDARD FORM**

III. Given: $Y = \frac{-3}{4}X - 6$ as the equation of a line

_____ a. What is the slope of the line.

_____ b. What is the y-intercept? (2)

_____ c. Write the equation of this line **IN STANDARD FORM**.

_____ d. What is the x-intercept?

_____ e. True or False: The point (16 , -6) lies on this line.

Geometry Name:_____

IV. For the equation in the box to the right, identify the following. (10 pts total)

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

_____ a. X-intercept (2 pts.)

_____ b. Y-intercept (2 pts.)

_____ c. Slope (2 pts.)

_____ d. Write the equation of the line in Standard Form. (10 points)

V. Find the distances between the following pairs of points.
[Hint: all solutions are whole numbers.]

Distance Formula

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

Mrs. E Teaches Math

_____ a. (7 , -2) and (-5 , 33)

_____ b. (-27 , -5) and (-6 , 15)

VI. Describe the slopes of the following lines. { positive, negative, zero, undefined }

_____ a. $4x - 7y = 13$

_____ b. $9 + 3x = 42$

_____ c. $19 - 13x = y$

_____ d. $4y - 7 = 35 - 2y$

VII. Plotting Points. Name the point at each pair of coordinates listed below. (1 point each)

_____ a. **(6 , - 9)**

_____ b. **(5 , 0)**

_____ c. **(4 , 8)**

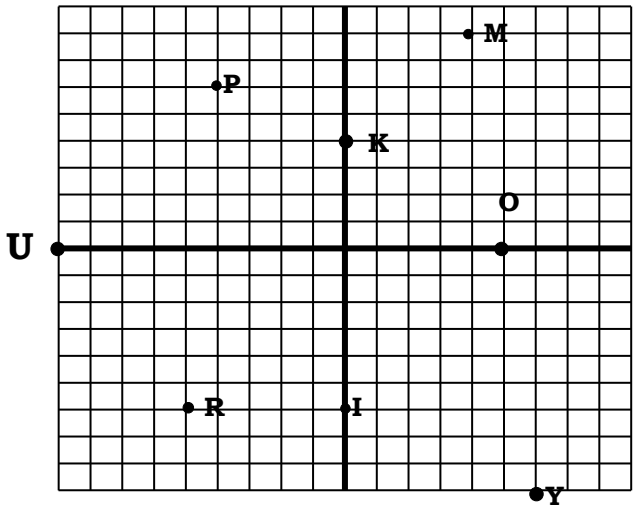
_____ d. **(0 , 4)**

_____ e. **(0 , - 6)**

_____ f. **(-4 , 6)**

_____ g. **(- 9 , 0)**

_____ h. **(- 5 , - 6)**



Systems of Equations: USE ELIMINATION

Name the coordinates of the point of intersection for the following two lines.
[Hint: you will need to solve the system of two equations simultaneously.]

Show working below.

Intersection point is _____ ***13 x + 2 y = 20*** ***9 x – 2 y = 24***

Geometry Name:_____

Foiling and Factoring

Multiply and Express as a single Trinomial **FOIL** $y = (5x + 3)(4x + 7)$	Multiply and Express as a single Trinomial **FOIL** $y = (2x + 3)(3x - 4)$
Factor the Trinomial and Solve for x. $y = x^2 + 6x - 7 = 0$	Factor the Trinomial and Solve for x. $y = x^2 - 5x + 6 = 0$
Factor the Trinomial and Solve for x. **(Bottoms Up)** $y = 6x^2 + 19x - 7 = 0$	Factor the Trinomial and Solve for x. **(Bottoms Up)** $y = 4x^2 + 39x + 27 = 0$
Factor the Trinomial and Solve for x. **(Bottoms Up)** $y = 8x^2 - 22x + 15 = 0$	Factor the Trinomial and Solve for x. **(Bottoms Up)** $y = 6x^2 + 23x - 18 = 0$

Factor this **polynomial** using the **factoring by grouping method**:

$$x^3 + 5x^2 - 4x - 20 = 0$$

The Quadratic Formula says

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

then, given $y = 2x^2 + 7x - 15$

Mimic the Pattern

Special Products Factoring

Binomial Squared :

$(a \pm b)^2 = a^2 \pm 2ab + b^2$

$(3x - 2)^2 =$

Difference of two Squares :

$a^2 - b^2 = (a + b)(a - b)$

$49x^2 - 81 =$

Addition of two Cubes :

$a^3 + b^3 = (a + b)(a^2 - ab + b^2)$

$27x^3 + 64 =$

Difference of two Cubes :

$a^3 - b^3 = (a - b)(a^2 + ab + b^2)$

$8x^3 - 125 =$

Geometry Name:_____

Find the solutions to this **quadratic equation** using the **quadratic formula**.

Geometry Name:_____

Ratios and Proportion

Terminology you should know:

A **Ratio** is a comparison of two **whole numbers** in **fraction** or colon (double dot :) form. Hence, fractions are sometimes called "**rational expressions**." If the sides of two figures have a **common ratio of proportionality**, then we call that ratio the **scale factor** between the two figures.

A **proportion** is a statement that two ratios are equal; an **extended proportion** is a statement that three or more ratios are equal. These statements usually take the form of equations.

We find the **solution to a proportion** by taking the **cross products** and setting them equal to one another. The terms at the ends of a proportion [first and last ones written] are called the **extremes**; the terms in the middle [second and third ones written] are called the **means**.

In order to add or subtract fractions, we must find a **common denominator**, which is the **least common multiple** of the two denominators.

If the same number occurs as the **numerator** of one fraction in a proportion and as the denominator of the other fraction in the proportion, then that number is called the **geometric mean** of the other two numbers. We calculate the geometric mean of two numbers by **taking the square root** of their **product**.

Find x (the geometric mean) in these proportions.

_____ 63 : x = x : 28 _____ 891 : x = x : 44

Solve the following proportions for x. **CROSS MULTIPLY AND DISTRIBUTE Parenthesis**

_____ 95 : 57 = x : 3 (two answers) $\frac{x+6}{9+x} = \frac{-2}{x-1}$ $x =$ _____

$x =$ _____

The perimeter ratio of two triangles is 2 to 3. If the lengths of the sides of the SMALLER triangle are 4 : 10 : 12 , what are the lengths of the sides of the larger triangle?

_____ _____ _____

Conquering Fracnophobia

Perform each indicated operation

13. $\frac{3}{4} + \frac{5}{6} =$

14. $\frac{3}{5} \bullet \frac{7}{12} =$

15. $\dfrac{\frac{32}{24}}{\frac{8}{15}} =$

16. $\frac{8}{9} - \frac{3}{4} =$

17. $\frac{15}{12} \div \frac{5}{16} =$

18. $\frac{2}{x+1} = \frac{4}{x+4}$ solve for x **(Cross Multiply and distribute)**

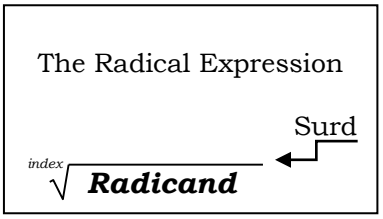
Geometry Name:_____

Operations on Radicals

You should know from memory all of the perfect squares of the numbers from one to forty.

Terminology you should know:

A **radical expression** is any expression that uses a **surd symbol** [also called a radical]. The number under the radical is called the **radicand**. If there is a small raised number in front of the radical, then it is called the **index of the radical** and indicates how many times a number must be multiplied by itself in order to produce the number under the radical. If there is no index stated, then the index is understood to be 2 and the radical is a **square root**.



To simplify a radical expression, one must often perform a **prime factorization** on the radicand.

Perform the indicated operation then simplify the following Radical Expressions.

$10\sqrt{2} + 4\sqrt{2}$	$4\sqrt{27} + 2\sqrt{75}$	$9\sqrt{432} - 4\sqrt{243}$	$6\sqrt{147} - 5\sqrt{12}$
$\sqrt{23} \times \sqrt{23}$	$\sqrt{37} \times \sqrt{37}$	$\sqrt{798421} \times \sqrt{798421}$	$(\sqrt{29})^2$
$11\sqrt{3} \times 4\sqrt{5}$	$12\sqrt{28} \times 5\sqrt{21}$	$14\sqrt{15} \times 3\sqrt{125}$	$8\sqrt{32} \times 3\sqrt{27}$
$\frac{3\sqrt{10}}{4\sqrt{2}}$	$\frac{7\sqrt{12}}{\sqrt{15}}$	$\frac{8\sqrt{6}}{5\sqrt{2}}$	$(4\sqrt{21})^2$
$(11\sqrt{3})^2$	$(8\sqrt{5})^2$	$(7\sqrt{6})^2$	$(19\sqrt{10})^2$

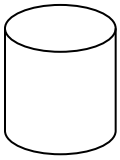
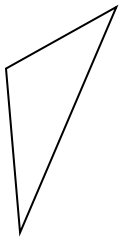
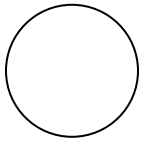
Geometry Name:_____

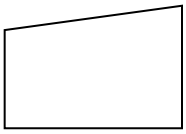
Recognizing and Identifying Shapes

From your earlier work in the Geometry sections of your math class, you should be able to recognize and identify the following shapes by name and at least one distinguishing characteristic.

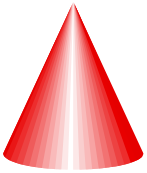
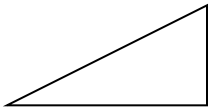
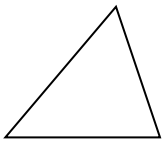
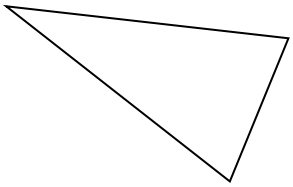
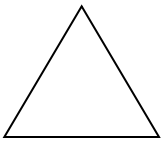
Match each shape with its name below. [note: not all names will be used.]

1. _____ 2. _____ 3. _____ 4. _____ 5. _____

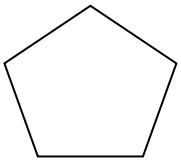




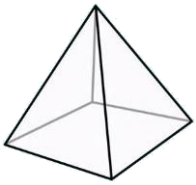
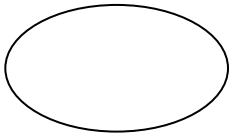


6. _____ 7. _____ 8. _____ 9. _____ 10._____

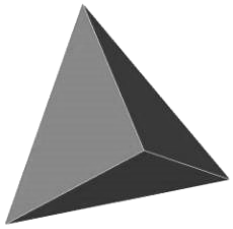
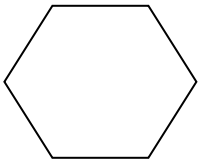
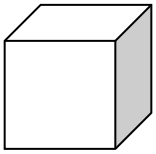






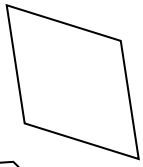
11._____ 12. _____ 13. _____ 14. _____ 15. _____



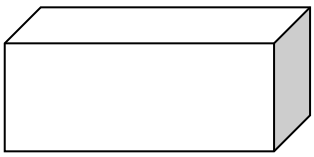




16. _____17._____ 18. _____ 19. _____ 20. _____

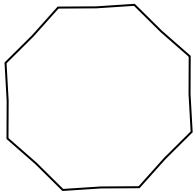






21. _____



22._____



Equilateral Triangle	Acute Triangle	Obtuse Triangle	Right Triangle	Scalene Triangle	Isosceles Triangle
Quadrilateral	Parallelogram	Trapezoid	Rectangle	Square	Rhombus
Pentagon	Hexagon	Octagon	Circle	Ellipse	Sphere

Geometry Name:_____

Cylinder	Cone	Cube	Rectangular Prism	Square Pyramid	Triangular Pyramid

Finding Area and Perimeter

Terminology you should know:

Plane **Area** is the amount of space on a plane enclosed by a **closed plane figure**. Area is always measured in **square units**. From your previous studies in math, you should be able to compute the areas of **squares, rectangles, triangles, parallelograms, trapezoids,** and **circles** (left **in terms of** π).

Perimeter for **polygons** or **Circumference** for circles (left **in terms of** π) is the **distance** around the figure. It is measured in **linear** or **running units**. For polygons, it is simply the **sum** of the **length**s of the sides.

Problem set: Find the Perimeters and Areas of the figures described below.

_____ _____ A square with side length of 7 in

_____ _____ A square with diagonal of 14 feet
USE PYTHAGOREAN THEORM

_____ _____ A rectangle with a length of 12 inches and a width of 9 inches.

_____ _____ A rectangle with diagonal of 17 cm and a length of 15 cm.
USE PYTHAGOREAN THEORM

_____ _____ A circle with radius of 18 inches

_____ _____ A triangle with a base of 24 cm and a height of 15 cm

_____ _____ A right triangle with hypotenuse of 29 cm and leg of 21 cm.

_____ _____ A triangle with side lengths of 13, 14, and 15 units.