Magnet Precalculus/Functions Summer Review Assignment

Dear future Precalculus student,

This assignment should serve as both a chance to learn new math and to review the Algebra and Geometry skills necessary for success in Precalculus. There are two parts to this summer assignment, a math reflection and a set of review problems. Our hope is that this review will keep your mind mathematically active during the summer, identify any weaknesses in Algebra and Geometry, and prepare you for the **fun** and **challenging** year ahead.

Because of the diverse backgrounds of the students coming into the magnet program, some of the problems may be more challenging than others. We expect that you will do your best with this material and **make an attempt** of all the problems.

Directions:
- Answer all questions on a **separate sheet of paper**. This can also be done digitally in a software such as Kami, equatiO, or Jam Board etc.
- Show all of your work. We are much more excited to see how you convey your solutions than whether or not you arrive at the correct answer.
- Carefully and neatly label your problems and solutions, including the original problem.
- If your answer involves radicals or π, give an exact answer and a decimal approximation using a calculator. Round to the nearest thousandth. This assignment will be collected on the first day of school.

Enjoy your summer. See you in August ready to learn!!!

Awesomely,
Mrs. Contreras and Mr. Kirk, the Precalculus A/B Teachers

Reflection Assignment

Do something math related and write a paragraph (or more!) about it. Some ideas include…
- Go to a museum and find something math related
- Fly a kite and learn about the math involved
- Run a mile and calculate your average speed, if you are feeling ambitious then also consider how that varies based on elevation gain
- Research famous (or not famous) mathematicians
- Interview an elder in your life about math and their math experience
- Grow a garden and think about patterns in the plants you are growing
- Watch some educational YouTube videos on math or applied math
- Watch one of these movies: Hidden Figures, Gifted, Stand and Deliver, The Man Who Knew Infinity, Imitation Game, The Theory of Everything, Primer, Mean Girls, Apollo 13
- Learn to cook something and think about the math involved in the process
- Build something like a volcano or drop mentos into diet coke and record your findings
- Something else math related that you are interested in! The possibilities are endless

Review Problems

1. Convert from one kind of units to another:
   a. $159\ cm =$ _____ mm
   b. $3.2\ m =$ _____ km
   c. $18\ inches =$ _____ $feet$
   d. _____ $ft = 4\ miles$
   e. $3.6\ yards =$ _____ $feet$

2. Find the perimeter and area of each of the following figures.

   a.

   95

   32

   47

   b.

   5 m $2\sqrt{29}$
   4m
   13 m
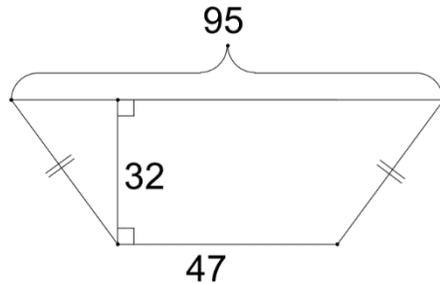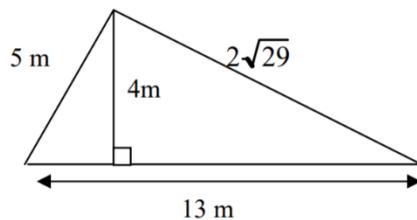
3. For each of the following circles:
   a. If the radius is $5.2\ cm$, find the area and the circumference.
   b. If the circumference is $6\pi\ m$, find the radius and the area.
   c. If the area is $14\pi\ cm^2$, find the circumference and the diameter.

4. Solve for x in each of the following equations:

   a. $\dfrac{5x}{8} = \dfrac{6x-7}{3}$

   b. $\dfrac{6}{x+3} = \dfrac{4}{2x-7}$

   c. $\dfrac{2}{3}x + 4 = 6$

   d. $\dfrac{3}{x+1} = \dfrac{x}{4}$

5. Complete the following:
   a. Give the equation of a line with a slope of zero and a y-intercept of $(0, 12)$. Then sketch the line.
   b. Give the equation of a line that contains the points $A(-2, 3)$ and $B(-6, -5)$. Then sketch the line.
   c. Give the equation of a line with a slope of -3 and a y-intercept of $(0, 5)$. Then sketch the line.
   d. Give the equation of a line perpendicular to $3x - 4y = 2$ and passing through the point $(1, 1)$. Then sketch the line.

6. Multiply/Expand the polynomials.
   a. $(x - 9)(x + 8)$
   b. $(x - 8)^2$
   c. $(x + 2)^3$
   d. $(2x - 1)(x + 5)$
   e. $(x + y - 2)^2$
   f. $(x^2 - 3)(-4 + x - 3x^2)$

7. Solve the following equations for x by factoring:
   a. $x^2 - x - 72 = 0$
   b. $x^2 - 16x + 64 = 0$
   c. $x^3 - 64 = 0$
   d. $x^4 - 13x^2 + 36 = 0$

8. Solve the following equations for x three ways by using the method of factoring, completing the square, and the quadratic formula.
   a. $2x^2 + 9x - 5 = 0$

9. Solve the following system of equations:
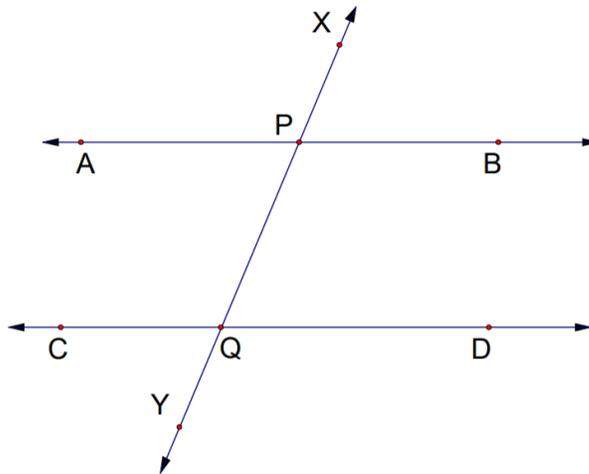   a. $\begin{cases} 5x + 4y = 6 \\ -2x - 3y = -1 \end{cases}$
   b. $\begin{cases} -2x + y = 8 \\ y = -3x - 2 \end{cases}$

10. Solve for x in each of the following equation:
   a. $\sqrt{3x} - 4 = 2$
    b. $2 - \sqrt{x} = 4$

11. Let parallel lines AB and CD be intersected by XY at the points P on AB and Q on CD in such a way that A and C are on one side of XY and B and D are on the other. Answer the following questions using this figure:


   a. If $m\angle APQ = x^2 + x + 1, m\angle QPB = 3x^2 + 7x + 39$, find the measure of each of these angles.
   b. What is the measure of the angle formed by the intersection of the angle bisector of $\angle BPQ$ and the angles bisector of $\angle DQP$?

12. Given circle O with points A, B, C, and D on the circle, answer the following:
    a. If $m\angle AOB = 60°$ and OA is 8, determine the area of sector AOB.
    b. If $m\angle AOB = 30°$ and OA is 10, determine the area of the region formed by chord AB and arc AB.
    c. If $AC = 16$ and $OA = 10$, how far is chord AC from the center O.
    d. From a point P outside of circle O, let PR be tangent to the circle at R and let secant $\overleftrightarrow{PM}$ intersect the circle at M and N (with M between P and N). If $PM = 9$ and $MN = 3$, find PR.
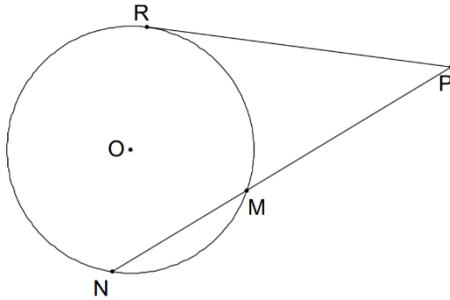
    e. From a point P outside of circle O, let PR be tangent to the circle at R. Find OP if the radius of the circle is 5 and $PR = 13$.
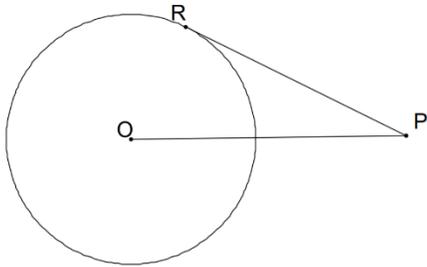
13. Given the indicated measures of angles and lengths of sides, solve the triangles below for the missing parts.
    a. Given right triangle ABC, $m\angle A = 56°$, $a = 42km$, $c = 51km$.
    b. $m\angle B = 43°$, $m\angle C = 36°$, $a = 92cm$.
    c. $a = 21.1m$, $b = 24.6m$, $c = 12.0m$.