Name: _____ PreCal Honors Summer Packet

Date: _____

Topics:

I. Trigonometry II. Algebra

This packet is due on the first day of school. You will be given a test within a few days. Please feel free to reach out to me by email at fletcher.williams@knoxvillecatholic.com if you encounter any issues.

For all problems, you should show work as appropriate! Answers without proper work shown will not receive credit.

I. Trigonometry

For #1 - 8 round lengths to 3 significant digits and angles to the nearest tenth of a degree. Note that these problems use the convention that the names of sides are correlated with the opposite angles so that side *a* is opposite angle A, side *b* is opposite angle B, etc.

1. Solve for side *b* and $\angle A, \angle B$ given a right triangle with $a = 230$, $c = 320$, $\angle C = 90^\circ$.

2. Solve for sides *a* and *b* and $\angle B$ for a right triangle with $c = 68$, $\angle A = 36.2^\circ, \angle C = 90^\circ$.

3. What is the angle of elevation of the sun when a tree 6.25 m tall casts a shadow 10.1 m long?

4. The approach pattern to an airport requires pilots to set an 11° angle of descent (angle of depression) toward the runway. If a plane is flying at an altitude of 9500 m, at what distance (measured along the ground) from the airport must the pilot start the descent?

Using Law of Sines and/or Law of Cosines, solve for the missing sides/angles of the triangles in #5 - 7 given that you know the following:

5. $a = 6,\ b = 7,\ \angle C = 20^\circ$

6. $a = 14,\ \angle A = 25^\circ,\ \angle B = 75^\circ$

7. $a = 13,\ b = 30,\ c = 40$

II. Algebra

Give all answers in simplest radical form. (No decimals!) These calculations should all be done without a calculator.

8. Solve $(3x+1)^2 = 8$

9. Two positive real numbers have a sum of 7 and a product of 11. Find the numbers.

10. Find a quadratic equation with integer coefficients having roots $\frac{1+\sqrt{3}}{4}$, $\frac{1-\sqrt{3}}{4}$.

11. Find a quadratic function $f(x) = ax^2 + bx + c$ having minimum value – 9 and zeros ½ and – 5/2.

12. Solve $y^4 + y^2 = 12$.

13. Solve $3z + 2\sqrt{3z} - 8 = 0.$

14. Suppose $f(x) = 2x - 1,\ g(x) = x^2 + 4.$ Find:

a. $f(g(-2))$

b. $g(f(x))$

15. Suppose that $f(x) = \sqrt[3]{x-1}$ and $g(x) = x^3 + 1.$ Show that f and g are inverse functions.

16. Simplify the following as much as possible:

a. $\sqrt[3]{\sqrt{125y^6}}$

b. $\left(64^{2/3} + 27^{2/3}\right)^{3/2}$