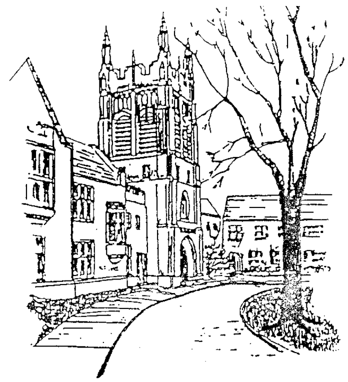

Princeton High School

Mathematics Department

Pre-Calc Summer Assignment (for Calc AB)

PACKET IS OPTIONAL

Summer assignment vision and purpose: The Mathematics Department of Princeton Public Schools aims to build confidence and competence in students as they strengthen their mathematical understanding. As such, students can complete the summer assignment in preparation for the coming school year. Success in mathematics is dependent on comprehending critical concepts. Such concepts will be extended and applied in more challenging contexts in successive years. For this reason, the department is supporting and providing summer assignments for students. These assignments will serve as a reinforcement of previously learned skills.

Directions: Please complete all of the following questions**. *Be sure to show all of your work and attach all completed work on additional pages. All graphs should be completed on graph paper.*** Questions are divided into subgroups based on skill and concept. Some procedures and examples have been provided to help reinforce or remind you of previously covered material. Also, please be sure to complete the following information:

AP Calculus AB Precalculus Review Assignment Name:______________________________ Per:____

1. Express the following as a single fraction without negative exponents.

(a) $3x(2x+5)^{-0.5}+3(2x+5)^{\frac{1}{2}}$ (b) $\dfrac{\dfrac{3}{2(x+h)}-\dfrac{3}{2x}}{h}$

2. Multiply (Expand): $\left(x^{\frac{5}{2}}+\dfrac{3}{\sqrt{2}}\right)^2$

3. Using algebra, no use of a graphing utility, find all points of intersection for the graphs of $y=-x^2+4x$ and $y=x^2$.

4. Find the equation in standard form for the line that passes through the point (-1, 4) and is perpendicular to the line $2x+3y=6$.

5. If $f(x)=3-x^2$, find:

(a) $f(3)$ (b) $f(k)$ (c) $f(2+\Delta x)$

6. If $g(x)=x^2+3x-1$, find: $\dfrac{g(x+\Delta x)-g(x)}{\Delta x}$.

7. If $f(x)=\dfrac{1}{\sqrt{x}}$ and $g(x)=x^2-5$, find (a) $f(g(x))$ and (b) $g(f(x))$.

8. Use algebra, no use of a graphing utility, to find the domain of: $f(x)=\dfrac{3x+1}{\sqrt{x^2+x-2}}$.

9. Solve for *p*.

(a) $hp-1=q+kp+6p$ (b) $3(p+2)^{-1}-\dfrac{4}{p}=0$

10. Write the equation of the circle below in $(x-h)^2+(y-k)^2=r^2$ form and give the coordinates of the center and the length of the radius.

$$5x^2+5y^2-20x+10y+21=0$$

11. Use algebra, no use of a graphing utility, to solve for *x*.

(a) $5^{(x+1)}=125$ (b) $\dfrac{1}{3}=3^{(x+2)}$

12. Use algebra, no use of a graphing utility, to find all real solutions to:
(a) $x^6-16x^4=0$ and (b) $8x^3+27=0$.

13. Use algebra, no use of a graphing utility, solve for *x*. Leave your answer in *exact* form.

(a) $4x^2+12x+3=0$ (b) $\frac{x+1}{x}-\frac{x}{x+1}=0$

14. Use algebra, no use of a graphing calculator, to solve for *x*.

(a) $|5x-2|=8$ (b) $|2x+1|=x+3$

15. Use algebra, no use of a graphing calculator, to:
(a) Find the point of intersection of the lines: $3x-y-7=0$ and $x+5y+8=5$.
(b) Shade the solution set in the *xy*-plane that is described by the inequalities:
$3x-y-7\le 0$ and $x+5y+8\ge 5$.

16. A water tank has the shape of a cone (like an ice cream cone without the ice cream). The tank is 10m high and has a radius of 3m at the top. If the water is 5m deep (in the middle) what is the surface area of the top of the water?

17. The graph of a quadratic function (a parabola) has *x*-intercepts of -1 and 3 and a range consisting of all numbers less than or equal to 4. Write an expression for the function in standard form.

18. Two cars start moving from the same point. One travels south at 100km/hour, the other west at 50km/hour. How far apart are they two hours later?

19. A kite is 100m above the ground. If there is 200m of string out, what is the angle of elevation between the string and the ground? Note: The angle of elevation is not 90 degrees.

20. Answer each of the following without a calculator.

a. $sin\frac{\pi}{6}$ b. $cos\frac{\pi}{2}$ c. $csc\frac{\pi}{4}$

d. $tan\frac{5\pi}{6}$ e. $sin0$ f. $sec\frac{11\pi}{6}$

g. $tan\frac{5\pi}{4}$ h. $cot\frac{4\pi}{3}$ i. $csc\pi$

j. $cos\frac{\pi}{3}$ k. $\cos\pi$ l. $tan\frac{3\pi}{2}$