Welcome to Precalculus Honors!!!!

This packet is for all students enrolled in Precalculus Honors at Herndon High School for the next school year.

The exercises will give you the opportunity to self-assess how prepared you are for Precalculus Honors this year. Success in the school year will depend how well you understand the topics included, so put your best effort into it! Feel free to use old notes and online resources as needed to ensure that you understand the content.

Please complete the work for this packet on a separate piece of paper. Do as many of the problems as you can <u>WITHOUT the use of a calculator.</u> It is important to spend time keeping these skills and concepts fresh in your mind – especially your mental math! Be sure to keep track of sticky spots and ask questions when we return. You are also welcome to reach out to me over the summer; my contact information is below.

Have a great summer – I am looking forward to meeting you in August!
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As you work through the packet, keep track of the following:

Concepts I remember how to do	Concepts I learned, but forget how to do	Concepts I never learned

Use the appropriate procedures to simplify each of the following rational expressions.

1. $\left(\dfrac{x^2+2x-3}{x+2}\right)\left(\dfrac{x^2+2x}{x^2-1}\right)$

2. $\dfrac{3}{1-x}+\dfrac{5}{1+x}$

3. $x^4(-2x)^3(6x^0)^{-2}$

4. $\dfrac{3}{36^{\frac{1}{2}}}$

State whether the relation is a function. Write yes or no. State the domain and range of each function.

5. $\{(-1,2),\ (3,10),\ (-2,20),\ (3,11)\}$

6. $\{\ (0,2),\ (13,6),\ (2,2),\ (3,1)\ \}$

Name all the values of x that are in the domain of the given function. Give the answer in interval notation.

7. $f(x)=\dfrac{x-2}{x+4}$

8. $f(x)=\sqrt{x^2-25}$

9. $f(x)=\dfrac{x^2+3x-10}{x^2-25}$

For problems 10-14, use $f(x)=\dfrac{2}{x+4}$ and $g(x)=x^2-2$ to find each function.

10. $f(-5)$

11. $g^{-1}(x)$

12. $(f-g)x$

13. $(fg)x$

14. $\dfrac{f}{g}(x)$

For problems 15-16, find $(f\circ g)x$ and $(g\circ f)x$. Then decide whether the functions are inverses of each other or not. Write yes or no.

15. $f(x)=\dfrac{x+5}{3}$, $g(x)=3x-5$

16. $f(x)=2x^2-5x+1$, $g(x)=2x-3$

State the inverse of each function. Tell whether the inverse is a function. Write yes or no.

17. $f(x)=3x+7$

18. $f(x)=x^5$

19. $f(x)=x^2+4$

Simplify.

20. $3\sqrt{700} + 2\sqrt{7}$

21. $\sqrt{\dfrac{1}{2}}$

22. $\dfrac{4\sqrt{2}}{5} - \dfrac{3}{\sqrt{2}}$

Factor completely.

23. $4x^2 + 5x - 6$

24. $8x^3 - 27y^6$

25. $3x^3 - 15x + 2x^2y - 10y$

26. $2x^2 - 2x - 84$

Solve for x. Leave your answer in terms of π.

27. $\pi = \dfrac{5\pi}{6} \div x$

28. $\dfrac{180}{\pi} = \dfrac{330}{x}$

Solve each equation algebraically.

29. $\dfrac{x+1}{3} + \dfrac{x+2}{7} = 5$

30. $\sqrt{15 - 2x} = x$

31. $|1 - 4t| = 5$

32. $2(x-3)^2 = 8$

Solve for indicated variable.

33. $S = \dfrac{a}{1-r}$ for r

Find the real solutions, if any, of the equation using the quadratic formula.

34. $x^2 - 4x + 2 = 0$

Solve each inequality algebraically. Use interval notation for the solution. Graph the solution set on a number line.

35. $|1 - 4x| \geq 5$

36. $x^2 + 3x - 4 < 0$

Find an equation for the line with the given properties. Express your answer using slope-intercept form. Graph.

37. x-intercept = 2, y-intercept = -1

38. $2x - 3y = 6$

Graph the following functions and give the domain and range in interval notation. Show all important information (vertex, asymptotes, holes, etc.)

39. $f(x) = |x - 4| + 5$

40. $f(x) = \begin{cases} 2x + 13 & \text{if } x \geq -5 \\ x + \dfrac{1}{2} & \text{if } x < -5 \end{cases}$

41. $f(x) = \dfrac{x+1}{2x-4}$

42. $f(x) = 3^{x-1} + 4$

For problems 43-46, find each of the following giving exact answers (simple radical form – no decimals.)

43. The short leg of a $30° - 60° - 90°$ triangle is 3 inches. Find the measure of the other two sides.

44. The leg of a $45° - 45° - 90°$ triangle is 4 centimeters. Find the measures of the other two sides.

45. The long leg of a $30° - 60° - 90°$ triangle is 3 inches. Find the measure of the other two sides.

46. The hypotenuse of a $45° - 45° - 90°$ triangle is 4 centimeters. Find the measures of the other two sides.