Name: _____ Precalculus teacher: _____ Period: _____

Calculus Prerequisite Assignment

Directions: It is expected that you answer each of these questions without the use of a calculator!

I. <u>Algebraic Manipulation</u>: *Simplify each expression*

1. $x\left(3x+2\left(x-(2x+1)\right)\right)$

2. $\frac{\sqrt{x}}{\sqrt{x}+5}$

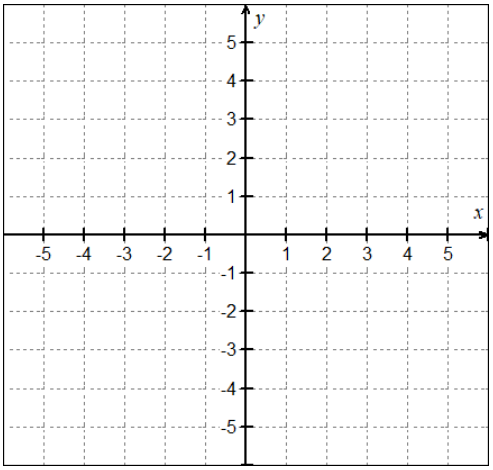
3. $\frac{(9x^2-3x-2)}{(9x^2-4)} \cdot \frac{(3x^2-10x-8)}{(27x^3+1)}$

4. $\frac{x+\frac{1}{y}}{y+\frac{1}{x}}$

II. <u>Solving Equations</u>

5. $1-\frac{4}{x}=\frac{5}{6}$

6. $\frac{x+1}{3x+1}+\frac{2x+1}{3x-2}=-1$

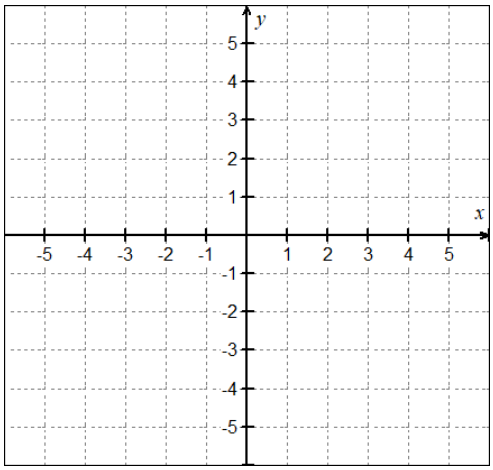
7. $x^4 - 10x^2 + 29 = 8$	8. $x^3 - 5x^2 - 4x + 20 = 0$
III. <u>Exponents and Logarithms</u>	
9. Solve for x: $\log_3(x+1) = 3$	10. Solve for x: $2^x \cdot 2^{x+1} = 16$
11. Evaluate: $2\ \log_2 4 + \frac{1}{2}\log_2 7 - \frac{1}{2}\log_2 28$	12. Graph: $y = \log_2(x+1) - 2$ 

IV. Functions and Graphs

13. If $f(x) = \frac{x}{2-x}$, find $f(x) = \frac{1}{x}$

14. If $f(x) = \frac{x}{2-x}$, find $f(x) = 2 - x$

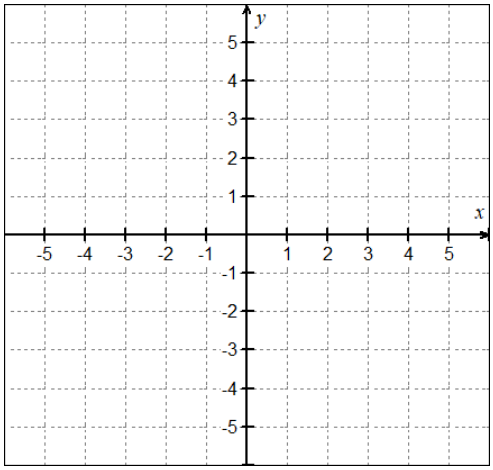
15. Sketch the graph of $y = x^2 + 2x$. State the domain and range.



Domain: _____

Range: _____

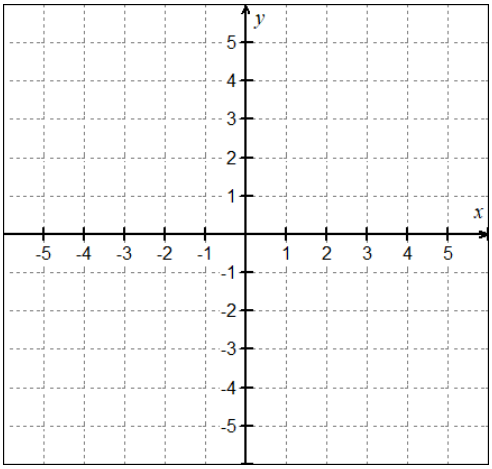
16. Sketch the graph of $y = \frac{2x}{x-1}$. State the domain and range.



Domain: _____

Range: _____

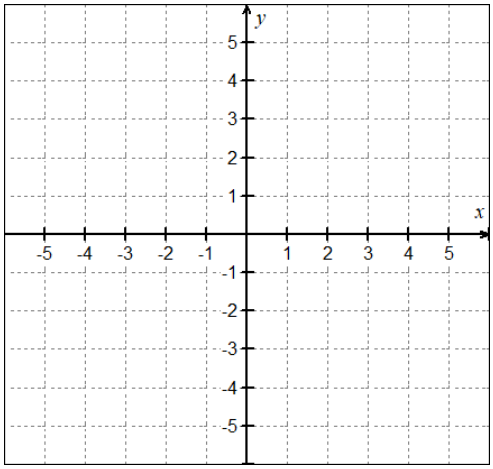
17. Sketch the graph of $g(x) = \ln(x - 2)$. State the domain and range.



Domain: _____

Range: _____

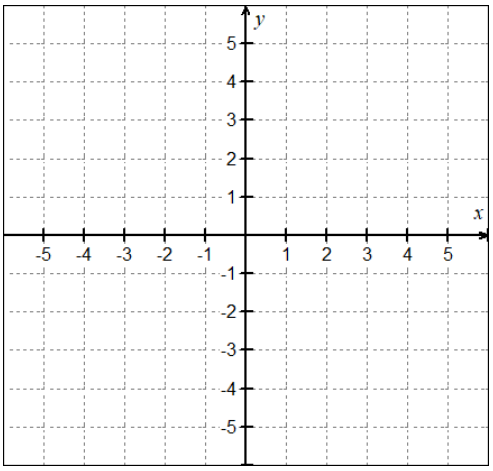
18. Sketch the graph of $2y = \sqrt{36 - 9x^2}$. State the domain and range.



Domain: _____

Range: _____

19. Sketch the graph of $f(x) = e^x$. State the domain and range.

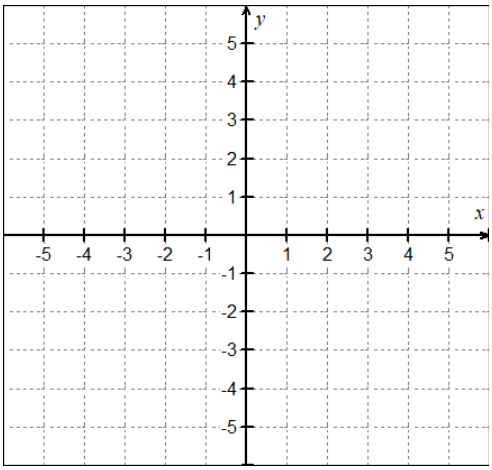


Domain: _____

Range: _____

20. Sketch the piecewise defined function.

$$h(x) = \begin{cases} \sqrt{3-x}, & x < -1 \\ 3x - 1, & -1 \le x < 1 \\ x^2 & x \ge 1 \end{cases}$$



V. <u>Trigonometry</u>

21. Find $\tan\left(\frac{5\pi}{3}\right) =$ _____

22. Find $\sin\left(-\frac{7\pi}{6}\right) =$ _____

23. Solve: $2\sin x = \sqrt{3}$

24. Solve: $\tan x = 2\sin x$

VI. <u>Limits</u>: Evaluate each limit.

25. $\lim\limits_{x \to 2} \frac{x-3}{x+4}$

26. $\lim\limits_{x \to \pi} \frac{\cos x}{\cos 2x}$

27. $\lim\limits_{x \to -3} \frac{x+3}{x^2-2x-15}$

28. $\lim\limits_{x \to \infty} \frac{x^2-2}{x^3+2x-3}$