AP Calculus Summer Assignment   Name _____
Bixler/Smith

This assignment is to be completed without a calculator unless otherwise noted. All concepts on this worksheet are prerequisite knowledge and you are expected to know them on the first day of class. Due to missing school the last quarter and the pandemic, you missed some of the lessons that normally come at the end of the year in Pre Calculus. This means we will have to cover even more. Please be sure you are very comfortable with the topics on this worksheet as we will not have time to revisit them.

Sketch the graph

1. $y = \sqrt{x-1}$ 2. $y = \sqrt{9-x^2}$ 3. $y = \frac{|x|}{x}$ 4. $y = \sin x$ 5. $y = \cos x$

6. $y = \tan x$ 7. $y = \cot x$ 8. $y = \sec x$ 9. $y = \csc x$ 10. $y = e^x$

11. $y = \ln x$ 12. $y = \begin{cases} -1, & x \le -1 \\ 3x + 2, & |x| < 1 \\ 7 - 2x, & x \ge 1 \end{cases}$

Find horizontal, vertical and slant asymptotes, symmetry and intercepts. Sketch the graph.

13. $y = \frac{2(x^2-9)}{x^2-4}$ 14. $y = \frac{x^2-2x+4}{x-1}$

Solve

15. $x^2 - x - 12 > 0$ 16. $\frac{3x-2}{x+4} \le 0$

Evaluate

17. $\cos\frac{5\pi}{6}$ 18. $\sin\frac{3\pi}{2}$ 19. $\tan\frac{5\pi}{4}$ 20. $\sec\frac{4\pi}{3}$ 21. $\csc\frac{\pi}{4}$ 22. $\cot\frac{2\pi}{3}$

23. $\tan(\cos^{-1}(-\frac{\sqrt{3}}{2}))$ 24. $\sec(\arcsin(-\frac{\sqrt{2}}{2}))$ 25. $\cos(\sin^{-1}(2x))$

Solve where $0 \le x \le 2\pi$

26. $2\cos^2 x + 3\cos x - 2 = 0$ 27. $2\sin^2 x - \cos x = 1$ 28. $\sin(2x) = \cos x$

29. $2\cos\left(\frac{x}{3}\right) - \sqrt{3} = 0$ 30. $2\sin(3x) - \sqrt{3} = 0$

Solve using a calculator. Round to three decimal places

31. $e^{2x+3} = 37$ 32. $e^x - 12e^{-x} - 1 = 0$ 33. $\ln(5x - 1) = 3$

34. $\log_2(x + 3) + \log_2(x - 1) = \log_2 12$ 35. $\log_8(x + 5) - \log_8(x - 2) = 1$

36. Exponential growth is modeled by $n = n_o e^{kt}$. A culture contains 500 bacteria when $t = 0$.

After an hour, the number of bacteria is 1200.

a) How many bacteria are there after four hours?

b) After how many hours will there be 8000 bacteria?

Evaluate the limits (this is endbehavior)

37. $\lim\limits_{x\to\infty} \dfrac{3x-5x^2}{4x^2+1}$

38. $\lim\limits_{x\to-\infty} \dfrac{x^2+3x-4}{4x^3+x}$

39. $\lim\limits_{x\to\infty} \dfrac{x^3+5x^2-3x+10}{x^4-100}$

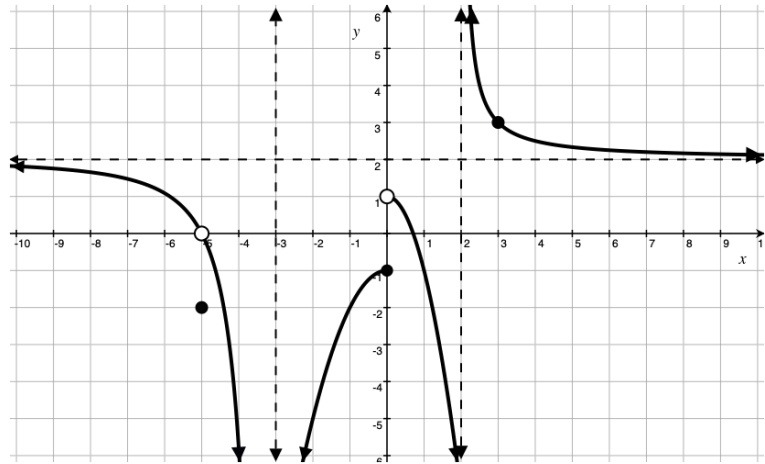**Evaluate the limits using the graph**

40. $\lim\limits_{x\to 3} f(x)$

41. $\lim\limits_{x\to\infty} f(x)$

42. $\lim\limits_{x\to 2^+} f(x)$

43. $\lim\limits_{x\to 0} f(x)$

44. $\lim\limits_{x\to -5} f(x)$

45. $\lim\limits_{x\to 0^-} f(x)$

Find the partial fraction decomposition

46. $\dfrac{5x-4}{x^2-x-2}$

47. $\dfrac{x^2+4}{3x^3+4x^2-4x}$

Use long division

48. $\dfrac{x^2+2x-7}{x-2}$

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

Use log properties to rewrite as a single log term. Simplify as much as possible.

50. $\ln x + 2\ln(x+2) - \dfrac{1}{5}\ln(x-3)$

51. $3\ln 2 + \ln 5 - \dfrac{1}{2}\ln 4$