Summer Review Packet 2018

This packet is intended for students who have already taken Calculus with Applications or AB Calculus and are entering BC Calculus

Your name: _____

The problems in this packet are designed to help you review topics that are important to your success in calculus. The skills and knowledge required for these problems are considered prerequisites. We will not reteach these concepts.

If the topics are unfamiliar to you, you need to do work on your own over the summer to catch up. Here are some tips if you are in need of help:

- Topics to enter into an Internet search engine are **bolded** at the start of each section of problems.
- Kahn Academy has excellent video tutorials.
- Purple math is another site that is very useful

In general, you must know how to do all these problems WITHOUT a calculator.

How will this packet be graded?

- **You will have a quiz on the concepts included in these problems at the end of the first week of school.**

- **This packet is due on the day of the quiz and will count as a homework grade.**

Not doing this packet means you will not be prepared for the first quiz.

Section 1 Simplify. Show the work that leads to your answer.

1. $\dfrac{x^3-125}{x^2-7x+10}$

2. $\dfrac{6-x}{x^2-4x-12}$

Section 2 Simplify each expression in order to obtain a single fraction.

3. $\dfrac{6}{h}-\dfrac{6}{x+h}$

4. $\dfrac{\dfrac{x^2-y^2}{xy}}{\dfrac{x+y}{y}}$

Section 3 Solve the rational equation. State answers in interval notation if necessary. Also remove extraneous answers when necessary.

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

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

7. $\sin(2x) = \frac{1}{2}$ $where\ 0 \leq x < 2\pi$

Section 4 Trig Identities

8. $\sin^2 x + \cos^2 x =$ _____ 9. $\tan^2 x + 1 =$ _____ 10. $\cot^2 x + 1 =$ _____

11. $\sin 2x =$ _____ 12. $\cos 2x =$ _____ or

_____ or

_____

Section 5 Solving with Trig Identities

13. $\cos^2 x = \cos x,\ 0 \le x \le 2\pi$ 14. $2\sin x + \sqrt{3} = 0,\ 0 \le x \le 2\pi$

15. $\dfrac{1-\sin^2 x}{\sin\left(\frac{\pi}{2}-x\right)(\cot(-x))} = \dfrac{\sqrt{3}}{2}$ *where* $0 \le x < 2\pi$

Section 6 Find the value of the limit if possible. If the limit goes to +∞ or -∞, specify which one.

13. $\lim_{x\to 0}\frac{\sin x}{x} =$

14. $\lim_{x\to 0^+}\ln x =$

15. $\lim_{x\to -2}\frac{x^2-2x-8}{x+2}$

16. $\lim_{x\to 3^-}\frac{5x+2}{x-3} =$

Section 6 Simplify. Do not leave any negative exponents in an answer.

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

18. $\frac{\sqrt[5]{x^2} + x^{7/3}}{x^2}$

19. $e^{4\ln(3x)}$

20. $e^{5+\ln x}$

Section 7 Miscellaneous. Follow the directions for each problem.

21. If $f(x) = 5x^2 - 3x + 7$, evaluate $f(x+h)$

22. Expand and simplify: $\sum_{n=1}^{4}\left((-1)^n\left(\frac{x^n}{n!}\right)\right)$

23. An even function is symmetric about the _____.

An odd function is symmetric about the _____.

Section 8 Equations of Lines Write the equation of the line in point-slope form, $y - y_1 = m(x - x_1)$

24. slope of $-\frac{3}{7}$, containing the point (5, -9)

25. containing the points (-11, 5) and (7, 3)

26. slope of 0, passing through the point (23, -17)

Section 8 (con't) Equations of Lines Write the equation of the line in point-slope form, $y - y_1 = m(x - x_1)$

27. undefined slope, passing through the point (-19, -3)

28. perpendicular to the line $3x - 5y = 8$, passing through (-1,3)

Section 9 Find the domain of the following functions.

29. $f(x) = \dfrac{3x-2}{(4x+1)(x-3)}$

30. $f(x) = \dfrac{x^2-3x-4}{x^2-x-12}$

31. $f(x) = \dfrac{\sqrt[3]{x-3}}{\sqrt{x^2-x-6}}$

32. $f(x) = \log(15-3x)$

Section 10 Find the equation(s) of the horizontal and vertical asymptotes for each equation.

33. $y = \dfrac{4x^2}{3x^2-x}$

34. $y = \dfrac{x^2-16}{2x^2-13x+20}$

Section 11 Trigonometry. Determine the exact value of each expression.

35. $\sin\frac{5\pi}{3}$

36. $\cos\frac{11\pi}{6}$

37. $\tan 180°$

38. $\cot 3\pi$

39. $\csc 135°$

40. $\sec\frac{5\pi}{4}$

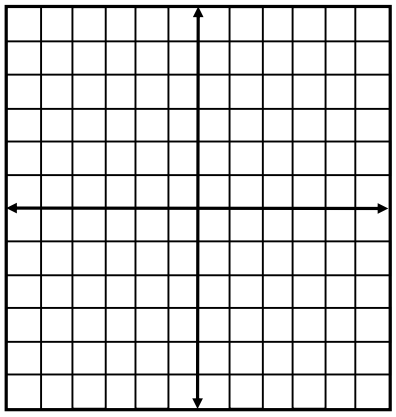
41. $Arc\sin\left(-\frac{\sqrt{3}}{2}\right)$

42. $Arc\tan\left(-\frac{1}{\sqrt{3}}\right)$

43. $Arc\cos\left(-\frac{\sqrt{2}}{2}\right)$

Section 12 Graphs. The following are graphs you will need to know in calculus without a calculator. Sketch the graph of each function and state its domain and range. Determine and label an appropriate scale for each graph.

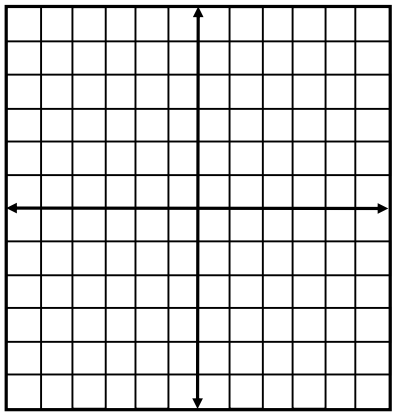
44. $y = \sin x$



Domain _____

Range _____

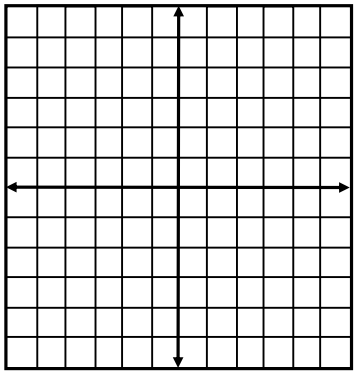
45. $y = \cos x$



Domain _____

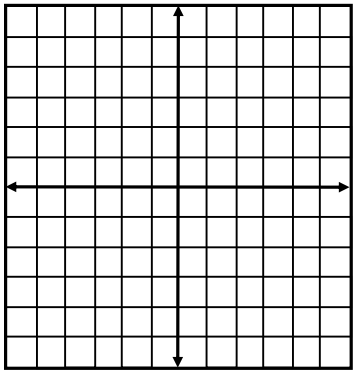
Range _____

46. $y = \sqrt{x}$



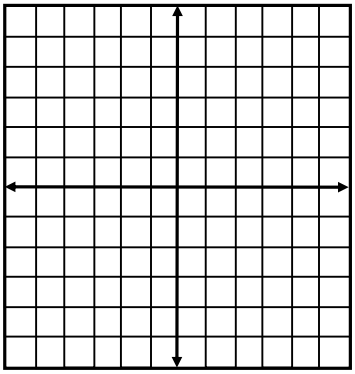
Domain _____ Range : _____

47. $y = e^x$



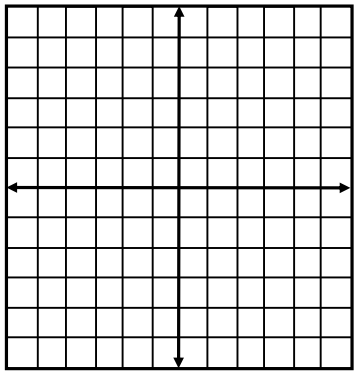
Domain _____ Range : _____

48. $y = \ln x$



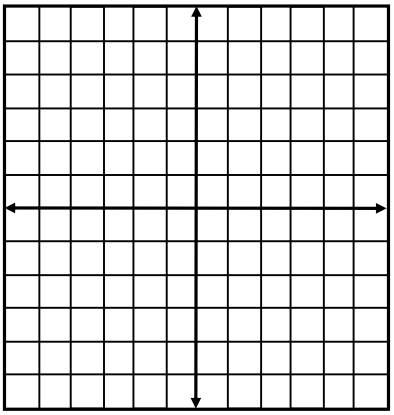
Domain _____ Range : _____

49. $y = \dfrac{1}{x}$



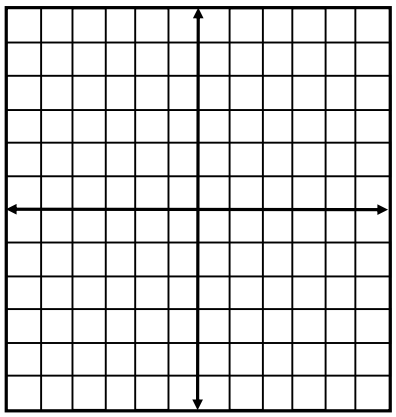
Domain _____ Range : _____

50. $y = Arc\tan x$



Domain _____ Range : _____

51. $y = \begin{cases} x, & x < -3 \\ 2x^2 - 5, & -1 \le x < 2 \\ 3, & 2 < x \le 5 \end{cases}$



Domain _____ Range : _____

Section 13: Derivatives. Show the work to find the derivative of the function, in general or at the specified point.

53. a) $f(x) = 12x^2 - 3x + 12$, so find $f'(x)$. b) Find $f'(-1)$.

54. a) $g(x) = 5\sin x$, so find $g'(x)$ b) Find $g'(\pi)$.

55. a) $h(x) = 3\cos^2 x$, so find $h'(x)$ b) Find $h'(\frac{3\pi}{4})$.

56. a) $k(x) = \sqrt{3x+4}$, so find $k'(x)$ b) Find $k'(4)$.