

OVERVIEW:

The following assignment contains concepts that are previously covered in prior math courses that are relevant to your up-coming Calculus school year!

This assignment will NOT be collected nor graded. The assignment should be used as a tool to recall past concepts and to stay fresh with the accurate steps to a successful year in Calculus!

There WILL be an assessment within the first 2 weeks of returning to school on the concepts you will find throughout this assignment with limited classroom time devoted to re-teaching these concepts.

If you are in need of a review of certain topics, please consult the websites dedicated to the Khan Academy and Regents Prep.

Regents Prep

<http://www.regentsprep.org/Regents/math/algtrig/math-algtrig.htm>

Khan Academy

<http://www.khanacademy.org/math/trigonometry>

The Organic Chemistry Tutor (navigate around- lots of playlists)

https://www.youtube.com/playlist?list=PL0o_zxa4K1BWYThyV4T2Allw6zY0jEumv

Solve each equation. Remember to check for extraneous solutions.

1. $x^2 - 6x = 16$

2. $81x^2 - 169 = 0$

3. $5n^2 - 10n + 7 = 3n$

4. $\frac{12}{t} + t - 8 = 0$

5. $\frac{9}{b+5} = \frac{3}{b-3}$

6. $\frac{t+4}{t} + \frac{3}{t-4} = \frac{-16}{t^2-4t}$

Simplify each function as much as possible. State any restrictions on the domain.

7. $f(x) = \frac{6x^5 - 9x^3 + 12x^2}{15x^4 - 3x^3}$

8. $f(x) = \frac{3x^2 + 5x - 2}{x^3 - 4x}$

9. $f(x) = \frac{x^2 + 10x + 9}{x^2 - 81}$

Expand each expression by writing as a polynomial in standard form.

10. $(x + 4)^3$

11. $(x - 2)^4$

Factor each expression completely.

12. $2x^2 - 20x + 48$

13. $2x^2 - x - 36$

14. $12x^2 + 32x + 5$

15. $x^4 + 3x^3 - 25x^2 - 75x$

16. $3x^3 - 8x^2 + 21x - 56$

17. $3x^5y(x - 1) + 2x^2y^2(x - 1)$

18. $3x^4 + 25x^2 - 18$

19. $7x^4 - 140x^2 + 700$

20. $x^4 - 1$

21. $x + 3 \sin \sin x + 2$

22. $3x - 4 \tan \tan x + 1$

23. $2x \csc \csc x - \csc \csc x$

AP/Honors Calculus Summer Assignment

Evaluate each expression based on the unit circle. All answers should be exact. (Some expressions will be undefined.)

24. $\tan \tan 2\pi$

25. $\cos \cos \frac{\pi}{6}$

26. $\sin \sin \frac{5\pi}{4}$

27. $\tan \tan \frac{4\pi}{3}$

28. $\cos \cos 0$

29. $\sec \sec \frac{5\pi}{3}$

30. $\csc \csc \pi$

31. $\cot \cot \frac{7\pi}{4}$

32. $\csc \csc \frac{11\pi}{6}$

33. $\sin \sin \frac{3\pi}{2}$

34. $\sin \sin \frac{13\pi}{3}$

35. $\cos \cos \frac{7\pi}{2}$

36. $\tan \tan \frac{15\pi}{4}$

37. $\cos \cos \frac{23\pi}{6}$

38. $\csc \csc 15\pi$

39. $\cos \cos \left(-\frac{11\pi}{4}\right)$

40. $\tan \tan \left(-\frac{19\pi}{3}\right)$

41. $\sin \sin \left(-\frac{9\pi}{2}\right)$

42. $\tan \tan \left(-\frac{21\pi}{6}\right)$

43. $\sec \sec \left(-\frac{7\pi}{6}\right)$

Simplify each expression using trigonometric identities (Pythagorean, reciprocal, quotient, and double-angle identities).

44. $\frac{\sec \sec x}{\tan \tan x}$

45. $\frac{\cot \cot \theta}{\cos \cos \theta}$

46. $\frac{\sin \sin (x+2\pi)}{\cos \cos x}$

47. $(1 + \cos \cos \theta)(\csc \csc \theta - \cot \cot \theta)$

48. $\sin \sin \beta \cos \cos \beta \sec \sec \beta \cot \cot \beta$

49. $(1 - \alpha) \sec \sec \alpha$

50. $\tan \tan x x - \tan \tan x$

51. $x(x - 1) + x(x - 1)$

52. $\frac{\sin \sin 2x}{\sin \sin x}$

53. $2 \sin \sin \theta \cos \cos \theta + 5 \sin \sin 2\theta$

Use properties of exponents and logarithms to simplify each expression.

54. $\ln \ln 1$

55. $\ln \ln e^{3x-8}$

56. $\ln \ln 5x - \ln \ln 3x$

57. $\frac{1}{4} \ln \ln 16x^4$

58. $81^{1/2}$

59. $\left((3x^2y^{-4}z)^{-3}\right)^0$

60. $\frac{12a^4b^{1/3}}{3a^{-2}b^{2/5}}$

61. $\left(64^{\frac{1}{3}}\right)^{\frac{1}{2}}$

62. $\left((x^2 + y^2)^3\right)^{1/6}$

63. $\ln \ln \frac{x}{5} + 2 \ln \ln 5x$

64. $\sqrt{27x^3y^4} + y^2x\sqrt{75x}$

65. $\ln \ln 2x - \ln \ln x$

Use a graphing calculator to answer the following questions.

66. $f(x) = 3x^5 - 19x^3 + 12x^2 - 7$

- Find the x-intercepts of the function.
- Find all maxima and minima of the function.
- For what value(s) of x does $f(x) = 7000$?

67. $f(x) = 5x^3 - 194x^2 - 244x + 160$

- Find the x-intercepts of the function.
- Find all maxima and minima of the function.
- For what value(s) of x does $f(x) = 3$?

68. Find all values of x for which $\ln \ln (7x - 3) + 2 = \sqrt{x^2 + 9}$

69. Find all values of x for which $\sqrt[3]{x} = \cos \cos x$

Write the equation of each line using point-slope formula.

70. $m = \frac{2}{3}$, through $(7, -2)$

71. through $(-2, 3)$ and $(1, 9)$

72. $m = -\frac{5}{4}$, $f(3) = -1$

Set up and simplify the difference quotient for each function.

$$\text{difference quotient of } f(x) = \frac{f(x+h)-f(x)}{h}$$

73. $f(x) = 3x - 5$

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

75. $f(x) = 3x^2 - 8x$

76. $f(x) = x^2 + 6x - 2$

77. $f(x) = x^3 + 7x$

Use the given functions to evaluate each function composition.

$f(x) = \sqrt{x - 3}$

$g(x) = x^2 - 7x + 3$

$h(x) = 2x + 11$

78. $f(g(x))$

78. $g(h(x))$

79. $h(g(x))$

80. $h(f(12))$