Welcome

to

AP Calculus BC

Complete the problems over the summer. Do <u>not</u> use a calculator until the last three problems. The problems come from material that covered in Algebra 2 and Pre-calculus. Completion of the packet this summer will contribute greatly to your success next year. We can spend only about one or two days reviewing next fall before we jump into calculus. If there are any topics that you do not understand, you are expected to get help on your own.

The first quiz will include the summer packet material.

If you lose your review packet over the summer, check the Walter Johnson High School website.

I look forward to meeting each of you.

Have a great summer.

Mr. Choi

CALCULUS--SUMMER REVIEW ASSIGNMENT   NAME : _____
NO CALCULATORS!!!!!

Simplify, if possible.

1. $\dfrac{\dfrac{1}{x+h} + \dfrac{1}{x}}{x}$

2. $\dfrac{3x}{3x+y}$

Factor each expression.

3. $x^3 + 27$

4. $4x^3 - 19x^2 - 5x$

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

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

Solve the following equations for x.

7. $x^3 - 2x^2 - 5x + 6 = 0$

8. $(2x-1)^2 (x-5)^2 + (2x-1)^3 (x-5) = 0$

9. $\log_5 x = 2$

10. $\log_3 \dfrac{1}{81} = x$

11. $\log_{81} x = -\dfrac{1}{3}$

12. $\ln e^x = 4$

Rationalize the denominator.

13. $\dfrac{x-y}{\sqrt{x} + \sqrt{y}}$

Rationalize the <u>numerator</u>.

14. $\dfrac{\sqrt{x+h}-\sqrt{x}}{h}$

Simplify.

15. $\log 8 - \log 2$

16. $\log_2 5 + \log_2 \dfrac{1}{5}$

17. $4\log xy - 2\log x$

18. $\ln e^3 + \ln 1$

<u>NO</u> CALCULATORS!!!

Sketch the following graphs on graph paper. Find the limit when $x \to \infty$.

19. $y = x^2$

20. $y = x^3$

21. $y = \sqrt{x}$

22. $y = 3^x$

23. $y = e^x$

24. $y = \log x$

25. $y = \ln x$

26. $y = |x|$

27. $x^2 + y^2 = 9$

28. $y = x^2 + 2x - 3$

29. $y = |x+3| - 2$

30. $y = \begin{cases} x+1 & \text{for } x < 1 \\ x^2 & \text{for } x \geq 1 \end{cases}$

31. $y = \sin x$

32. $y = \cos x$

33. $y = \tan x$

34. $y = \cot x$

35. $y = \sec x$

36. $y = \csc x$

Simplify the following.

37. $x^3 x^2$

38. $\left(x^3\right)^2$

39. $8^{-\frac{2}{3}}$

40. $\dfrac{7^{24}}{7^{22}}$

Find the inverse of each function and its domain.

41. $f(x) = x + 3$ 42. $f(x) = \sqrt{x}$

43. $f(x) = \dfrac{x}{x+2}$ 44. $f(x) = 3^x$

Complete the following trigonometric identities.

45. $1 - \cos^2 x =$ 46. $\sec^2 x - 1 =$

47. $1 + \cot^2 x =$ 48. $\sin 2x =$

49. $\dfrac{\sin x}{\cos x} =$ 50. $2\cos^2 x - 1$

51. $\sin(-x) =$ 52. $\cos(-x) =$

53. $\dfrac{1}{\cos x} =$ 54. $\sin(x + y) =$

Give the period of each function.

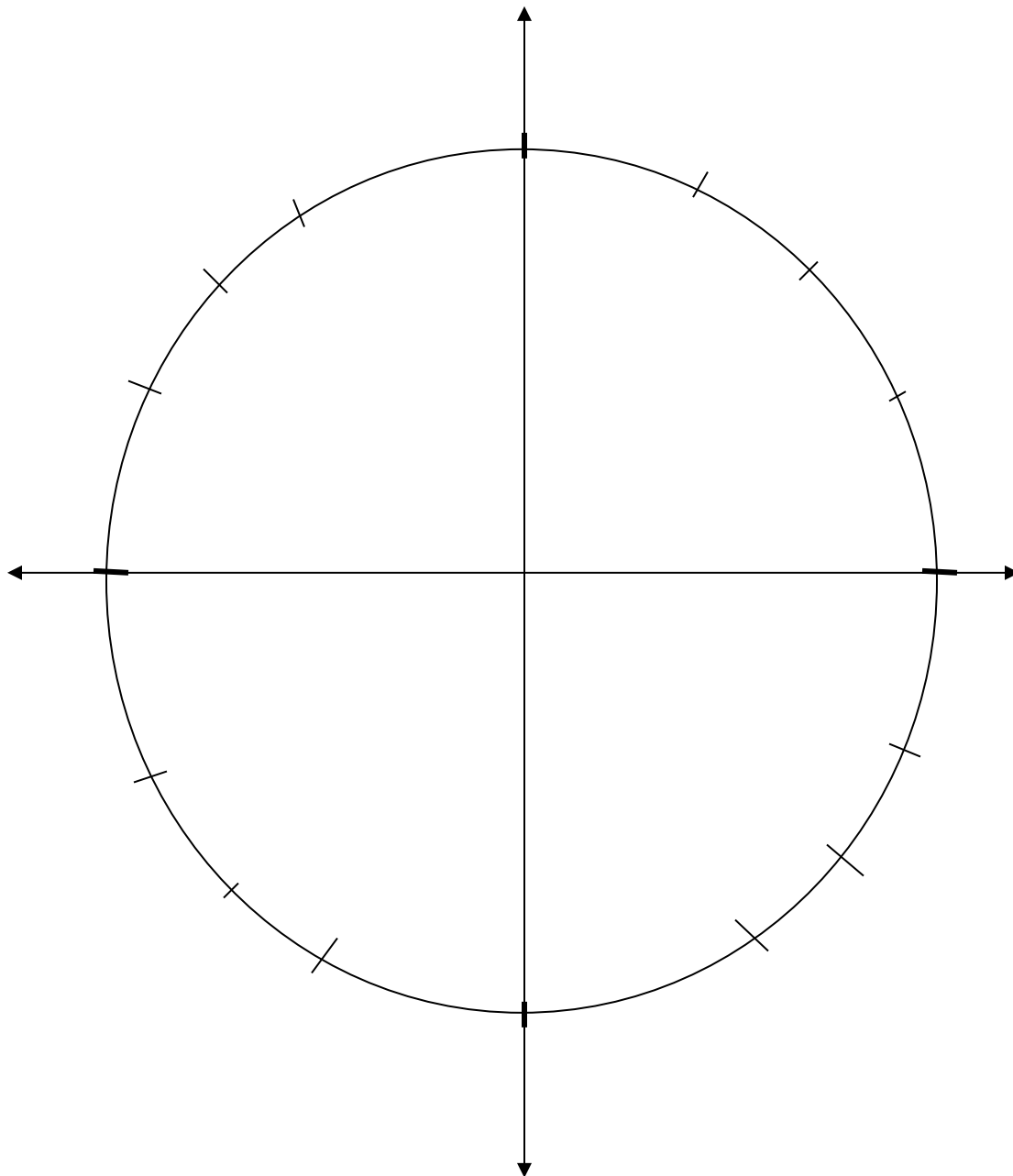55. $y = 4\sin(2x) + 1$ 56. $y = -3\tan(\pi x)$

Solve each equation for [0, 2π).

57. $\sin x = \cos x$ 58. $\sin^2 x + \sin x = 0$

Label x and y coordinates and angle measures in radians on the unit circle.

59.

NO CALCULATORS!!!

Give the exact value of each of the following.

60. $\csc\left(-\dfrac{5\pi}{6}\right)$ 　　　　　61. $\sec\pi$ 　　　　　62. $\cot\left(-\dfrac{\pi}{2}\right)$

63. $\tan\dfrac{\pi}{2}$ 　　　　　64. $\sin\dfrac{5\pi}{6}$ 　　　　　65. $\cot\dfrac{2\pi}{3}$

66. $\sin\dfrac{\pi}{2}$ 　　　　　67. $\sec\dfrac{3\pi}{4}$ 　　　　　68. $\csc\pi$

69. $\sec\dfrac{11\pi}{6}$ 　　　　　70. $\cot\dfrac{4\pi}{3}$ 　　　　　71. $\cos^{-1}\dfrac{\sqrt{3}}{2}$

72. $\cot^{-1}\left(-1\right)$ 　　　　　73. $\tan^{-1}\left(-1\right)$ 　　　　　74. $\sin^{-1}\left(-\dfrac{1}{2}\right)$

75. $\sin\left(\csc^{-1}(-2)\right)$ 　　　　　76. $\cos^{-1}\left(\cos\left(-\dfrac{\pi}{6}\right)\right)$ 　　　　　77. $\sin\dfrac{\pi}{6}$

78. $\tan\dfrac{7\pi}{6}$ 　　　　　79. $\cos 0$ 　　　　　80. $\cos\dfrac{\pi}{4}$

Find the following if $f(x) = x^3 + 1$, $g(x) = x^2 - 2$, **and** $h(x) = x + 3$.
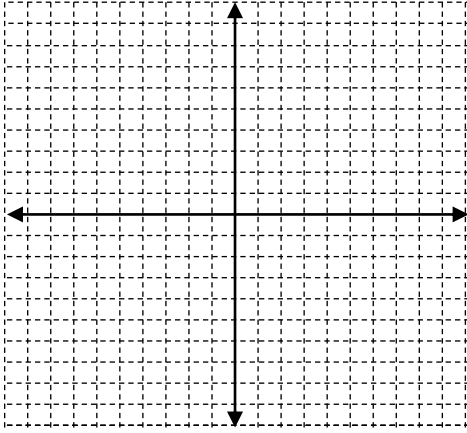
81. $f(g(2))$ 　　　　　82. $g(h(x))$

83. $f(x + h)$ 　　　　　84. $\dfrac{g(t + h) - g(t)}{h}$

Answer the following.

85. Find the points of intersection between $f(x) = x + 7$ and $g(x) = x^2 + 2x + 5$. Sketch a graph of the functions and shade the region bounded by their graphs.

86. Water is dripping out of a tank that shaped like an inverted cone with a diameter of 8 feet and a height of 12 feet. When the depth of the water is 8 inches, what is the radius of the water?

An <u>even function</u> is a function where $f(-x) = f(x)$ and an <u>odd function</u> is a function where $f(-x) = -f(x)$. **Tell whether the function is even, odd, or neither.**

87. $f(x) = x^2$

88. $f(x) = x^3$

89. $f(x) = \cos(x)$

90. $f(x) = \sin(x)$

91. $f(x) = \tan(x)$

92. $f(x) = |x|$

93. $f(x) = x^2 + 2x$

94. $f(x) = x^3 + x$

95. $f(x) = |x + 1|$

Discuss the symmetry of the graph of:

96. an even function

97. an odd function

Simplify

98. $\dfrac{2x}{x^2-6x+9} - \dfrac{1}{x+1} - \dfrac{8}{x-2x-3}$

99. $\displaystyle\sum_{n=0}^{n=4} \dfrac{n^2}{2}$

100. $\displaystyle\sum_{n=1}^{3} \dfrac{1}{n^3}$

Given the vectors v = -2i + 5j and w = 3i + 4j, determine

101. $\dfrac{1}{2}\mathbf{v}$

102. $\mathbf{w} - \mathbf{v}$

103. $|\mathbf{v}|$

104. Unit vector for $\mathbf{v}$

Graph each polar graph

105. $r = \cos\theta$

106. $r = 1 + \sin\theta$

107. $r = 2\cos 3\theta$

Now you may use a calculator!!
Find the points of intersection of the following graphs correct to three decimal places.

108. $f(x) = e^{-x^2}$ $g(x) = 1 - \cos x$

109. $f(x) = x$ $g(x) = \cos x$

110. $f(x) = 2 - x^3$ $g(x) = \tan x$