This assignment is optional. However, it is recommended that you complete the assignment in order to be fully prepared for the first day of class.

There will be no formal grade given for this assignment. However, your first test will be based on the concepts contained in the assignment. The first test will be given during the second week of school.
#1 – 68: Find the exact value of each trig function without a calculator.

1. $\cos 45^\circ$
2. $\sin 240^\circ$
3. $\tan 150^\circ$
4. $\cos 120^\circ$
5. $\sin 225^\circ$
6. $\tan 300^\circ$
7. $\sin 360^\circ$
8. $\cos 90^\circ$
9. $\sin 270^\circ$
10. $\tan 225^\circ$
11. $\sin 45^\circ$
12. $\cos 300^\circ$
13. $\cos 150^\circ$
14. $\tan 90^\circ$
15. $\sin 360^\circ$
16. $\cos 240^\circ$
17. $\tan 270^\circ$
18. $\tan 120^\circ$
19. $\tan 240^\circ$
20. \( \cos 225^\circ \)
21. \( \sin 120^\circ \)
22. \( \cos 360^\circ \)
23. \( \sin 90^\circ \)
24. \( \tan 45^\circ \)
25. \( \cos 270^\circ \)
26. \( \sin 150^\circ \)
27. \( \sin 30^\circ \)
28. \( \sin 300^\circ \)
29. \( \tan 360^\circ \)
30. \( \tan 60^\circ \)
31. \( \sin 135^\circ \)
32. \( \cos 135^\circ \)
33. \( \cos 315^\circ \)
34. \( \tan 30^\circ \)
35. \( \tan 180^\circ \)
36. \( \cos 270^\circ \)
37. \( \sin 180^\circ \)
38. \( \cos 180^\circ \)
39. \( \tan 315^\circ \)
40. \( \tan 270^\circ \)
41. \( \cos 30^\circ \)
42. \( \sin 270^\circ \)
43. \( \cos 60^\circ \) 

44. \( \tan 135^\circ \) 

45. \( \sin 60^\circ \) 

46. \( \sin 315^\circ \) 

47. \( \cos \frac{\pi}{2} \) 

48. \( \cos \frac{\pi}{6} \) 

49. \( \sin \frac{5\pi}{6} \) 

50. \( \sin \frac{\pi}{3} \) 

51. \( \tan \frac{\pi}{4} \) 

52. \( \cos \frac{11\pi}{6} \) 

53. \( \tan \frac{5\pi}{4} \) 

54. \( \sin \frac{3\pi}{4} \) 

55. \( \tan \frac{7\pi}{6} \) 

56. \( \tan \frac{\pi}{3} \) 

57. \( \cos \frac{7\pi}{6} \) 

58. \( \cos \frac{3\pi}{4} \) 

59. \( \tan \frac{10\pi}{3} \) 

60. \( \sin \frac{2\pi}{3} \) 

61. \( \sin \frac{\pi}{6} \) 

62. \( \sin \frac{\pi}{6} \)
63. \( \cos \frac{5\pi}{4} \)
64. \( \cos \frac{10\pi}{3} \)
65. \( \sin \frac{5\pi}{4} \)
66. \( \sin \frac{8\pi}{3} \)
67. \( \sin \frac{5\pi}{6} \)
68. \( \tan \frac{11\pi}{6} \)

**#69 – 78: State the formula for the geometric concept then use the information given to find each value. Leave answers in exact terms of \( \pi \) where applicable.**

69. Area of a circle; radius = 6 cm.
70. Area of a square; side length = 10 in.
71. Area of a rectangle; length = 5 m, height = 4.2 m.
72. Area of a triangle; base = 3 un, height = 16 un
73. Area of a trapezoid; bases = 6 and 11 in, height = 5 in
74. Circumference of a circle; radius = 9 cm
75. Volume of a sphere; radius = 4 in
76. Volume of a cube; edge length = 2.4 cm
77. Volume of right cone; radius of base = 3 un, height = 7 un
78. Volume of a cylinder; radius of base = 22 ft, height = 60 ft

79. State the standard form of the equation of a circle with center \((0, 0)\). Solve this equation for the \(y\).

80. Expand \((2x + 7)^2\)
81. Factor the expression $x^2 - 8x + 15$

82. Factor the expression $2xe^{2x} - e^{2x}$

83. Solve the equation $y = -16t^2 - 9t + 6$ using the quadratic formula.

84. Simplify the expression below as sums and differences of fractions.
\[
\frac{x^3 + 2x - 8}{4x}
\]

85. If $f(x) = x^2$ and $g(x) = \cos(x)$, find $f(g(x))$ and $g(f(x))$.

86 and 87: Write the equation of the line through the two points in point-slope form and slope-intercept form.

86. (3, -8) and (-7, -11)

87. (9, 2) and (18, 13)

88 and 89: Find the average rate of change of each function over the interval.

88. $f(x) = x^2$ over [2,5]

89. $h(x) = (x^3 + 2)/3$ over [-3,0]

90 – 92: Solve each equation.

90. $5x - 9 = 28 + 7x$
91. $3x^3 + 7x^2 - 20x = 0$ by factoring.

92. $s' = 42$

**#93 and 94: Rewrite each expression using properties of $e^x$ and $ln x$.**

93. $e^{\ln y}$

94. $\ln e^x$

95. What is a limit of a function? Translate the mathematical expression below into words:

$$\lim_{{x \to \infty}} f(x) = 0$$

96. Give an example of a function $f(x)$ for which

$$\lim_{{x \to \infty}} f(x) = 0.$$ 

97. Explain how asymptotes, both horizontal and vertical, become a part of a graph of a function.

98. A car travels 60 mph for 2.5 hours. How far did the car travel?

99. Which function will increase at a greater rate as the value of the variable in the function gets larger: a power function or an exponential function? Explain your reasoning.

100. Explain in terms of the unit circle and geometry why the trig identity $\cos^2 x + \sin^2 x = 1$ holds true for all values of $x$.

101. Prove algebraically the trig identity $\cot^2 x + 1 = \csc^2 x$

102. Find the numerical derivative of $f(x) = 5x^3 - 12x^2 + 3x - 10$ at $x = 4$. 

103. For the following functions: a) **Using graph paper**, sketch a graph of each function over the domain \([-2\pi, 2\pi]\) with interval length \(\pi/2\). Use an appropriate scale for y based on the behavior of the function. b) If any exist, indicate asymptotes with a dotted line and write their equations. c) State the domain and range of each function.

a. \(f(x) = \sin x\)
b. \(f(x) = \cos x\)
c. \(f(x) = \tan x\)
d. \(f(x) = \csc x\)
e. \(f(x) = \sec x\)
f. \(f(x) = \cot x\)

104. For the following functions: a) **Using graph paper**, sketch a graph of each function over the domain \([-5, 5]\) with interval length 1. Use an appropriate scale for y based on the behavior of the function. b) If any exist, write the equations of any asymptotes the function has. c) State the domain and range of each function.

a. \(f(x) = |x|\)
b. \(f(x) = x^2\)
c. \(f(x) = x^3\)
d. \(f(x) = \text{int } x\)
e. \(f(x) = 3^x\)
f. \(f(x) = e^x\)
g. \(f(x) = \log x\)
h. \(f(x) = \ln x\)