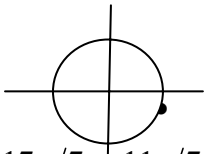
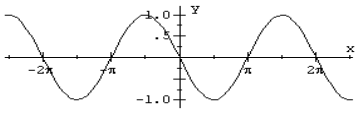
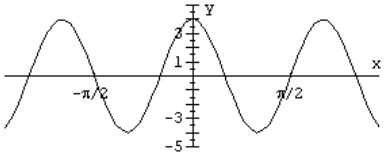
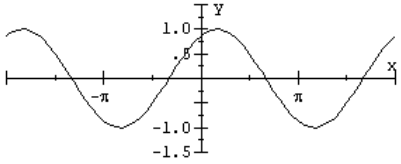
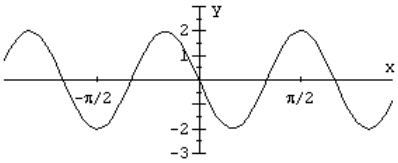
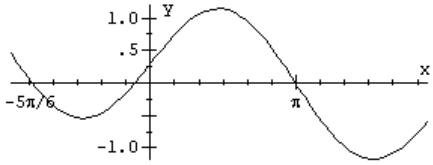
MATH122
Final Exam Review Answers

1. $A=19°,\ b=17.43,\ c=18.43$
2. $\sin\theta=\sqrt{55}/8$
3a. 24.294; b. 49°15'14"
4a. 49.93°; b. 78.46°
5a. 0.96; b. 0.93
6. sec, sin
7. yes
8. 91.58 ft
9. 51.32 km
10. 597°, −123°, or others
11. $\begin{cases}\sin\theta=-3\sqrt{10}/10,\ \csc\theta=-\sqrt{10}/3\\ \cos\theta=\sqrt{10}/10,\ \sec\theta=\sqrt{10}\\ \tan\theta=-3,\ \cot\theta=-1/3\end{cases}$
12. $-2\sqrt{53}/53$
13. 298.43°
14. $\cos 45°=\sqrt{2}/2,\ \tan 150°=-\sqrt{3}/3$
15. 0.9945, -1.1924
16. 698.81 mi
17. 
18. $17\pi/7$, $-11\pi/7$, or others
19. $\pi/10,\ 3\pi/5$
20. 135°, 3.42 radians
21. 1120.45 rev/min
22a. $\sqrt{3}/3$ b. $-\sqrt{2}$ c. undefined
23. -0.76, -1.03
24. 
25. $2,\ 2\pi/3,\ -\pi/6$
26a 
b. 
c 
27. $y=0.5\sin\left(2x+\pi/3\right)$
28. 
29. $\sin 135°=\sqrt{2}/2$
30a. $\sqrt{\sin 2x}/\cos x$ b. $\sqrt{1+\cos x}$
31. $5\left|\cos\theta\right|$
32. $\dfrac{\sqrt{2}\left(1-\sqrt{3}\right)}{4}$
33. $\dfrac{3\sqrt{21}-4}{5\sqrt{13}}$
34a. $-4\sqrt{2}/9$ b. $-\sqrt{2/3}$ or $-\sqrt{6}/3$
35. $1-\sin\theta$
36. $\sec^4 x-\tan^4 x=1+2\tan^2 x$

$\left(\sec^2 x+\tan^2 x\right)\underbrace{\left(\sec^2 x-\tan^2 x\right)}_{=1}=$

$1+\tan^2 x+\tan^2 x=$

$1+2\tan^2 x=$

37. $-\pi/6$
38a. $-\pi/2$ b. $\sqrt{5}/3$
39a. $\dfrac{\sqrt{4-b^2}}{b}$ b. $\dfrac{2a+7\sqrt{5}}{3\sqrt{a^2+49}}$
40a $\pm\dfrac{5\pi}{6}+2k\pi,\ k$ an integer
b. $\dfrac{7\pi}{6}+2k\pi,\ \dfrac{11\pi}{6}+2k\pi,\dfrac{\pi}{2}+2k\pi;k$ an integer
c. $2k\pi,\ \dfrac{\pi}{2}+k\pi;k$ an integer
41. ± 1.02
42a. $A=51°,\ b=2.34,\ c=5.03$
b. $A_1=49.17°,\ C_1=103.83°,c_1=12.83$
$A_2=130.83°,\ C_2=22.17°,c_2=4.99$

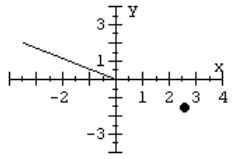
43. 111,874 feet (about 21.2 mi) measured from plane to end of runway through the air
106871 feet (about 20.2 mi) measured along the ground

44. $A = 47.38°,\ B = 96.55°,\ C = 36.07°$

45. 18.31 mi

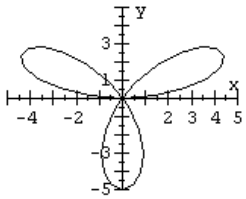
46. $\left(-\frac{3}{2}, -\frac{3\sqrt{3}}{2}\right)$

47. $\left(2\sqrt{2}, -\frac{\pi}{4}\right)$

48. 

49. $x^2 + y^2 = 6y$

50. $r = 10\sin\theta$

51. 

52. 35.10, 31.53°

53. 103.52°

54. $\langle -4, 11\rangle$

55. $\langle -10, -13\rangle$

56. $\frac{3}{5}\mathbf{i} - \frac{4}{5}\mathbf{j}$

57. 126.87°

58. 67.13°

59. 98.30°, 118.45 mi

60. (3,-5)

61. 10 % solution: $43\frac{1}{3}$ ml
40 % solution: $56\frac{2}{3}$ ml

62. (1,-2,4)

63. 5 touchdowns, 4 extra point kicks, and 2 field goals

64. (2.5,7.4,-3.8)

65.a $\left(\frac{3}{4} - \frac{1}{4}c, -\frac{1}{4} + \frac{7}{4}c, c\right)$, c any real number b. no soln

66. $\frac{1}{3}, \frac{2}{5}, \frac{3}{7}, \frac{4}{9}$

67. $a_n = \frac{n+1}{n^2+1}$

68a. 90 b. 90

69. $\sum_{k=1}^{5} \frac{2k+1}{k+1}$

70. 3, 7, 15, 31, 63

71. 82

72. 91

73. 575/3

74. 3456

75. 59049/128

76. $24(-0.5)^{n-1}$

77. 12285/256

78. 48

79. 4111/990

80. $1,317,081.10

81a. 990 b. 5040

82 1320

83a. 15 b. 56

84. 15,890,700

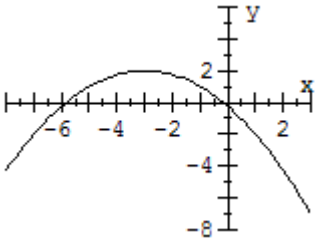
85a. $32x^5 - 240x^4 + 720x^3 - 1080x^2 + 810x - 243$

b. $\frac{1}{x^4} + \frac{8}{x^3} + \frac{24}{x^2} + \frac{32}{x} + 16$

86. $-\frac{12155}{x^7}$

87. 0.2076

88. $V(-3,2),\ F(-3,1),$
$y = 3$



89. a. $x^2 = 60y$
b. 15 in.

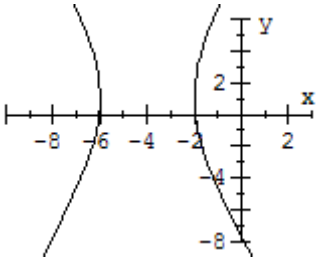
90. $C(-1,1);\ 2$

91. $V(\pm 3, 0),\ F\left(\pm\sqrt{5}, 0\right)$

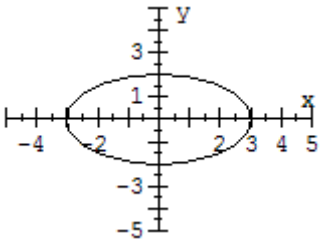
92. $\frac{x^2}{16} + \frac{y^2}{25} = 1$

93. $C(-4,1), V(-4 \pm 2, 1), F\left(-4 \pm \sqrt{29}, 1\right)$

$\frac{y-1}{5} = \pm\frac{x+4}{2}$



94.



$$\frac{x^2}{9}+\frac{y^2}{4}=1$$

95. a. 83.95 ft
    b. 266.2 ft