

Math 104 Answers to Final Review

1. $\cos \theta = -\frac{3}{4}$ $\sin \theta = \frac{\sqrt{7}}{4}$ $\tan \theta = -\frac{\sqrt{7}}{3}$ $\sec \theta = -\frac{4}{3}$ $\csc \theta = \frac{4}{\sqrt{7}}$ $\cot \theta = -\frac{3}{\sqrt{7}}$
2. $\cos \theta = \frac{1}{\sqrt{5}}$ $\sin \theta = -\frac{2}{\sqrt{5}}$
3. $\cos \theta = -\frac{2\sqrt{2}}{3}$ $\sin \theta = \frac{1}{3}$ $\tan \theta = -\frac{1}{2\sqrt{2}}$ $\sec \theta = -\frac{3}{2\sqrt{2}}$ $\csc \theta = 3$ $\cot \theta = -2\sqrt{2}$
4. a. $\sin \theta$ b. $\sin^2 \theta$
5. $\cos \theta (\sec \theta + \tan \theta) = \cos \theta \left(\frac{1}{\cos \theta} + \frac{\sin \theta}{\cos \theta} \right) = 1 + \sin \theta$
6. $3|\cos \theta|$
7. $\cos \theta = \frac{\sqrt{a^2-1}}{a}$ $\csc \theta = a$ $\cot \theta = \sqrt{a-1}$
8. II
9. a. $a \approx 3.067$ b. $\angle A \approx 39.8^\circ$ c. $\angle B \approx 50.2^\circ$
10. a. $c = \frac{24}{\sqrt{3}}$ b. $\frac{12}{\sqrt{3}}$
11. a. 2.0352 b. $\approx 58.67^\circ$
12. ≈ 22.6 feet
13. 28,000 feet
14. a. $\frac{\sqrt{3}}{2}$ b. $\frac{-4}{\sqrt{2}}$ c. 2
15. a. $\sqrt{2}$ b. $\frac{2}{\sqrt{3}}$ c. $\frac{5}{4}$
16. $\cot -\theta = \frac{\cos -\theta}{\sin -\theta} = \frac{\cos \theta}{-\sin \theta} = -\frac{\cos \theta}{\sin \theta} = -\cot \theta$
17. a. $-\frac{2\pi}{3}$ b. $\frac{25\pi}{18}$
18. a. 240° b. 105°
19. a. $\hat{\theta} = 79^\circ 40'$ b. $\hat{\theta} = 22.5^\circ$ c. $\hat{\theta} = \frac{\pi}{12}$
20. a. 241.5° b. $\approx 310^\circ$
21. $\frac{3}{8}$
22. 10.8 cm^2
23. $\frac{6\pi}{5}$
24. a. $a = \sqrt{3}$, $p = 8$, $p.s. = 2$
b. $a = 5$, $p = 6\pi$, $p.s. = \frac{-\pi}{2}$
25. see graphs
26. a. $y = \cos(4x - \pi)$ b. $y = -8 \sin(\pi x)$ c. $y = 6 - 4 \sin(2x)$
27. $[0, 2]$ etc.
28. $[\sqrt{2}, 6 + \sqrt{3}]$
29. a. $\frac{1}{2}$ b. $\frac{\pi}{4}$ c. $\frac{\pi}{3}$
30. a. $\pi - \frac{\pi}{19}$ b. $\pi - \frac{\pi}{19}$
31. a. $\frac{-\pi}{2}$ b. $\frac{2\pi}{3}$ c. $\frac{\sqrt{5}}{3}$ d. $\frac{-2}{5\sqrt{5}}$
32. $\sqrt{1-x^2}$
33. $\frac{16}{65}$

34. a. $\tan(A-B) = \frac{\sin(A-B)}{\cos(A-B)} = \frac{\sin A \cos B - \cos A \sin B}{\cos A \cos B + \sin A \sin B} \cdot \frac{\frac{1}{\cos A \cos B}}{\frac{1}{\cos A \cos B}} = \frac{\frac{\sin A}{\cos A} - \frac{\sin B}{\cos B}}{1 + \frac{\sin A}{\cos A} \cdot \frac{\sin B}{\cos B}} = \frac{\tan A - \tan B}{1 + \tan A \tan B}$
- b. $\frac{\tan A - \frac{1}{3}}{1 + \frac{1}{3} \tan A} = 9 \implies \tan A - \frac{1}{3} = 9 + 3 \tan A \implies 2 \tan A = \frac{-28}{3} \implies \tan A = \frac{-14}{3}$
35. a. $1 - 2x^2$ b. $\frac{\sqrt{1-9x^2}}{3x}$
36. a. $\sqrt{\frac{2-\sqrt{2}}{4}}$ b. $2 - \sqrt{3}$ c. $2 + \sqrt{3}$
37. a. $\frac{63}{65}$ b. $\frac{-56}{65}$ c. $\frac{1}{\sqrt{10}}$
39. $a \cos \theta$
40. 1
41. $60^\circ, 120^\circ$
42. $60^\circ, 300^\circ$
43. $\frac{\pi}{6}, \frac{5\pi}{6}, \frac{\pi}{2}$
44. $150^\circ, 210^\circ$
45. $\frac{11\pi}{6}, \frac{\pi}{2}$
46. $0.1\pi + \frac{\pi}{2}k, 0.4\pi + \frac{\pi}{2}k$
47. $\angle A = 92^\circ, b \approx 6.13, c \approx 3.8$
48. 2717 ft.
49. none.
50. 34° or 146°
51. 29°
52. 296 miles
53. $\frac{7}{41} - \frac{19}{41}i$
54. $x = 4, x = -2, y = 1$
55. $4\sqrt{5}(\cos 296.6^\circ + i \sin 296.6^\circ)$
56. $-1 - i$
57. $-64\sqrt{3} - 64i$
58. $\frac{-2\sqrt{2}}{5} + \frac{2\sqrt{2}}{5}i$
59. $3i, \pm \frac{3}{2}\sqrt{3} - \frac{3}{2}i$
60. $\cos \frac{\theta+2\pi k}{5} + i \sin \frac{\theta+2\pi k}{5}$, for $k = 0, 1, 2, 3, 4$
61. $|V_x| = 817.07, |V_y| = 234.29$
62. $V = \langle 15, 3 \rangle$
63. $(x+2)^2 + (y-3)^2 = 1$
64. circle with center at $(4, 1)$ and radius of 1.
65. $-8i - 2j$
66. $\frac{-1}{\sqrt{26}}$
67. $(x^2 + y^2)^2 = 12xy$
68. $(4, 210^\circ)$

69. a

70. cardioid like on p. A-88 in your text, # 20, reflected in the y -axis.