

Math 1511 Final Exam Review ANSWERS

1. a) 75.908
b) -145.005

2. a) $3^{\circ}30'0''$
b) $-0^{\circ}32'6''$

3. a) 240°
b) 150°

4. a) 54.45 in
b) 3 m

5. a) 117.81 in^2
b) 4.42 ft^2

6. 592 mi

7. $(13, 13\sqrt{3})$

8. a) 445.2 meters
b) 323.3 meters

9. $\sin \theta = -\frac{2}{\sqrt{53}}$
 $\cos \theta = -\frac{7}{\sqrt{53}}$

$\tan \theta = \frac{2}{7}$

$\csc \theta = -\frac{\sqrt{53}}{2}$

$\sec \theta = -\frac{\sqrt{53}}{7}$

$\cot \theta = \frac{7}{2}$

10. $\sin \theta = -\frac{3}{5}$

$\cos \theta = \frac{4}{5}$

$\tan \theta = -\frac{3}{4}$

$\csc \theta = -\frac{5}{3}$

$\sec \theta = \frac{5}{4}$

$\cot \theta = -\frac{4}{3}$

11. a) $\sin \theta = -\frac{\sqrt{3}}{2}$, $\cos \theta = \frac{1}{2}$, $\tan \theta = -\sqrt{3}$

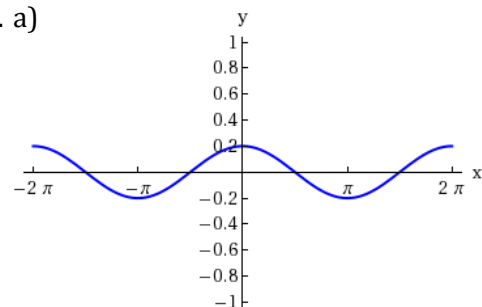
b) $\sin \theta = \frac{1}{2}$, $\cos \theta = -\frac{\sqrt{3}}{2}$, $\tan \theta = -\frac{1}{\sqrt{3}}$

12. a) $(-\frac{\sqrt{3}}{2}, -\frac{1}{2})$

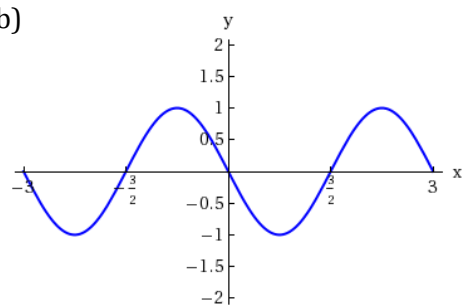
b) $(-\frac{1}{2}, \frac{\sqrt{3}}{2})$

c) $(0, -1)$

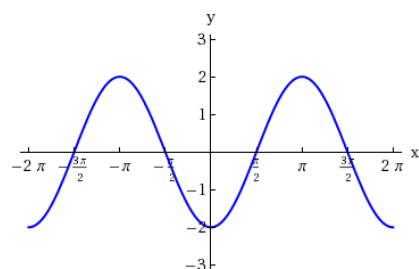
13. a)



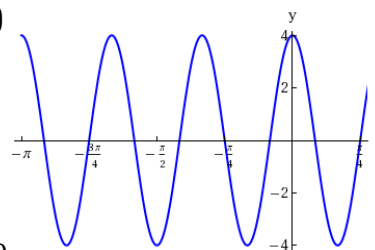
b)



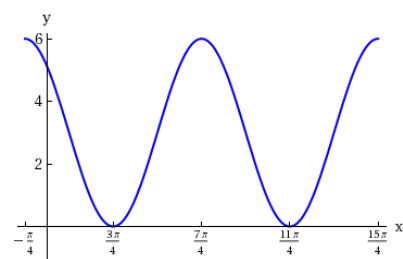
c)

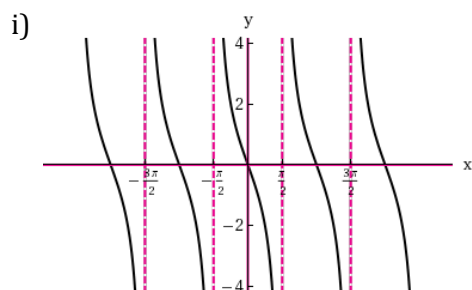
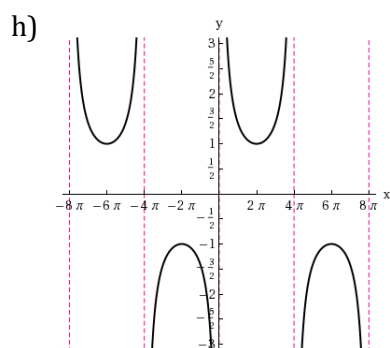
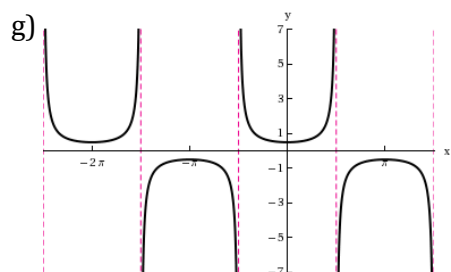
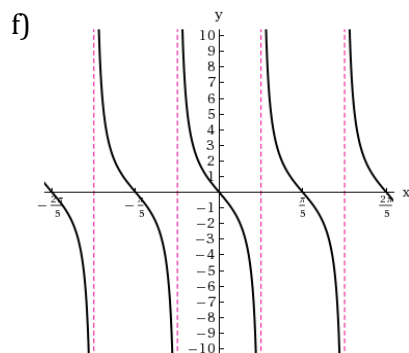


d)



e)





14. a) $\frac{\pi}{6}$ b) $-\frac{\pi}{4}$ c) $-\frac{\pi}{3}$

15. a) $\frac{5}{3}$ b) $\frac{\sqrt{5}}{5}$

16. a) $\theta = 35.5^\circ, \beta = 54.5^\circ, x = 7$
b) $\theta = 66.8^\circ, \beta = 23.1^\circ, x = 7.6$

17. 46.0 nautical miles north and 38.6 nautical miles east

18. 309.3°

19. 214.45 ft

20. 19.3 km

21. 53.6°

22. 2.82°

23. 52.0 ft

24. $\sin x = \frac{20}{29}$

$\cos x = \frac{21}{29}$

$\tan x = \frac{20}{21}$

$\csc x = \frac{29}{20}$

$\sec x = \frac{29}{21}$

$\cot x = \frac{21}{20}$

25. $\sin \theta = -\frac{1}{4}$

$\cos \theta = -\frac{\sqrt{15}}{4}$

$\tan \theta = \frac{1}{\sqrt{15}}$

$\csc \theta = -4$

$\sec \theta = -\frac{4}{\sqrt{15}}$

$\cot \theta = \sqrt{15}$

26. a) $-4 \sin(x)$

b) $9 \cos^2(\theta)$

c) $5 \tan(x)$

27. $5 \sin(\theta)$

28. *Answers vary*

29. a) $\pi n + \frac{2\pi}{3}$

b) $2\pi n + \frac{2\pi}{3}, 2\pi n + \frac{4\pi}{3}$

c) $\pi n + \frac{\pi}{3}, \pi n + \frac{2\pi}{3}$

d) $\frac{\pi n}{4} + \frac{\pi}{8}$

e) $\pi n + \frac{\pi}{6}, \pi n + \frac{5\pi}{6}$

f) $6\pi n + \frac{3\pi}{4}, 6\pi n + \frac{21\pi}{4}$

g) $0, \pi$

30. a) $\frac{\pi}{2}, \frac{2\pi}{3}, \frac{4\pi}{3}, \frac{3\pi}{2}$
 b) NO SOLUTION
 c) $\frac{7\pi}{6}, \frac{3\pi}{2}, \frac{11\pi}{6}$

31. a) $\frac{1}{\sqrt{2}}$ b) $\frac{\sqrt{6}-\sqrt{2}}{4}$

32. $-\frac{117}{125}$

33. a) $\frac{\pi}{4}, \frac{\pi}{2}, \frac{3\pi}{4}, \frac{5\pi}{4}, \frac{3\pi}{2}, \frac{7\pi}{4}$
 b) $\frac{\pi}{2}, \frac{7\pi}{6}, \frac{11\pi}{6}$

34. $\sin 2u = -\frac{24}{25}, \cos 2u = -\frac{7}{25}$
 $\sin \frac{u}{2} = \sqrt{\frac{2}{10}}, \cos \frac{u}{2} = -\sqrt{\frac{8}{10}}$

35. $\frac{7}{8}(4 \cos(2x) + \cos(4x) + 3)$

36. $|\sin(5x)|$

37. a) $A = 31^\circ, a = 12.38, c = 23.33$
 b) $C = 68^\circ, a = 19.32, b = 30.17$
 c) $A = 16.34^\circ, C = 151.16^\circ, c = 22.29$

38. a) $B = 43.67^\circ, C = 19.33^\circ, c = 44.58$
 b) *Impossible*
 c) Case 1: $B = 63.03^\circ, C = 65.97^\circ, c = 12.81$
 Case 2: $B = 116.97^\circ, C = 12.03^\circ, c = 2.92$

39. a) $a = 23.55, B = 23.79^\circ, C = 126.21^\circ$
 b) $A = 34.09^\circ, B = 39.84^\circ, C = 106.07^\circ$
 c) $B = 37.47^\circ, C = 42.53^\circ, a = 14.57$

40. 26.5 m

41. Leg 1: N 52.5° E
 Leg 2: S 70.4° E

42. 85 m

43. 522.1 m

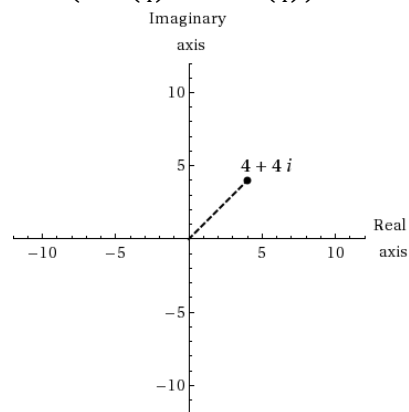
44. $\mathbf{v} = \langle 3, 5 \rangle, \|\mathbf{v}\| = \sqrt{34}$

45. $\langle -21, 72 \rangle$

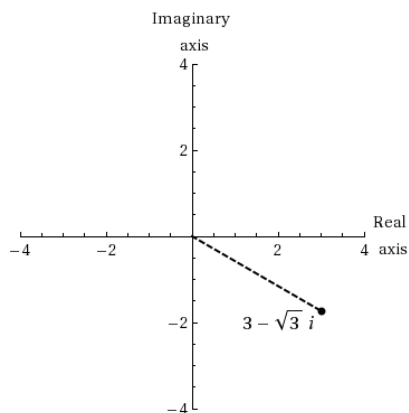
46. a) $\langle \frac{2\sqrt{2}}{2}, \frac{2\sqrt{2}}{2} \rangle$, b) $\langle -\frac{9\sqrt{3}}{16}, \frac{9}{16} \rangle$

47. Magnitude 433.17 Newtons, direction 15.14°

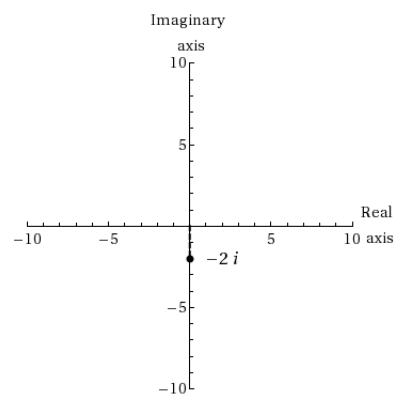
48. a) $4\sqrt{2} \left(\cos \left(\frac{\pi}{4} \right) + i \sin \left(\frac{\pi}{4} \right) \right)$



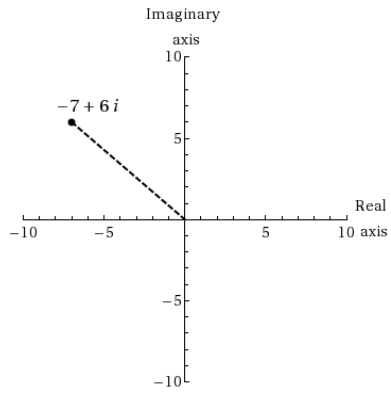
b) $2\sqrt{3} \left(\cos \left(\frac{11\pi}{6} \right) + i \sin \left(\frac{11\pi}{6} \right) \right)$



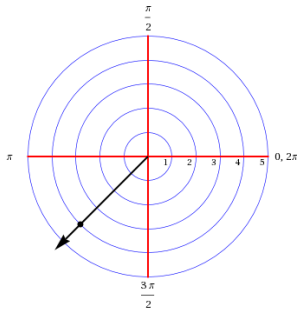
c) $2 \left(\cos \left(\frac{3\pi}{2} \right) + i \sin \left(\frac{3\pi}{2} \right) \right)$



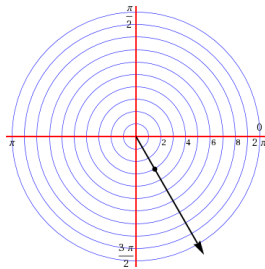
d) $\sqrt{85}(\cos 2.43 + i \sin 2.43)$



49. a)



b)



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

51. $\left(3\sqrt{2}, \frac{5\pi}{4}\right)$