Precalculus Unit 6 Review

Name _____ date_____ Period _____

Part I: No Calculator

Find the exact value of each expression, in radians.

1. $\tan^{-1}(0)$
2. $\arcsin\left(\frac{\sqrt{3}}{2}\right)$
3. $\sec^{-1}\left(-\sqrt{2}\right)$
4. $\arctan\left(-\sqrt{3}\right)$
5. $\sec^{-1}\left(\frac{2\sqrt{3}}{3}\right)$
6. $\cos^{-1}(-1)$
7. $\cot^{-1}(0)$
8. $\arcsin\left(\frac{-\sqrt{2}}{2}\right)$
9. $\operatorname{arccsc}(-2)$

Find the exact value of each expression, in degrees.

10. $\cos^{-1}\left(-\frac{1}{2}\right)$
11. $\arctan(1)$
12. $\cot^{-1}\left(-\sqrt{3}\right)$
13. $\arcsin\left(\frac{1}{2}\right)$
14. $\operatorname{arcsec}(2)$
15. $\cos^{-1}(1)$
16. $\arctan\left(\frac{-\sqrt{3}}{3}\right)$
17. $\csc^{-1}\left(-\sqrt{2}\right)$
18. $\arcsin(-1)$

Find the exact value of each composition.

19. $\arccos\left(\cos\left(\frac{11\pi}{6}\right)\right)$

20. $\tan^{-1}\left(\sin\left(\frac{\pi}{2}\right)\right)$

21. $\cot\left(\sec^{-1}(-2)\right)$

22. $\tan\left(\cos^{-1}\left(\frac{8}{17}\right)\right)$

23. $\sin\left(\operatorname{arccot}\left(\frac{-12}{5}\right)\right)$

Write an equivalent algebraic expression for each composition.

24. $\csc\left(\tan^{-1}(x)\right)$

25. $\sec\left(\arcsin\left(\frac{x}{2}\right)\right)$

26. $\cos\left(\sin^{-1}(4x)\right)$

Find all real number solutions to each equation.

27. $2\cos\theta - 1 = 0$

28. $2\cos^2\theta + \cos(2\theta) = 0$

Find all angles in degrees that satisfy each equation.

29. $\tan(\theta/4) = \sqrt{3}/3$

30. $\sin\theta\tan\theta - \sin\theta = 0$

31. $3\cos x = 2\cos^2 x + 1$

Find all real number solutions to each equation in the interval $[0, 2\pi)$.

32. $\sqrt{3}\sin\theta = \sin(2\theta)$

33. $1+\sin x = -\cos x$

34. $\sin x\cos(\pi/3) - \cos x\sin(\pi/3) = 1/2$

Find all angles in the interval $[0°, 360°)$ that are solutions to each equation.

35. $\cos(3\theta) = \sqrt{3}\sin(3\theta)$

36. $0 = \sin(2x) - \sin^2(2x) + \cos^2(2x)$

Part II: Calculator

Answer the question in complete sentences.

37. Explain how to determine how many triangles can be made when you are given the lengths of two sides and the measure of an angle that is not between the two sides. (SSA).

Determine the number of triangles with the given parts. Do not solve the triangles.

38. $\gamma = 41°,\ b = 25,\ c = 17$

39. $\beta = 102°,\ b = 34,\ c = 31$

40. $\alpha = 130°,\ a = 25,\ c = 28$

41. $\gamma = 82°,\ b = 33,\ c = 37$

42. $\alpha = 79°,\ c = 31,\ a = 24$

43. $\beta = 21°,\ a = 27,\ b = 16$

44. $\gamma = 70°,\ c = 29,\ b = 26$

45. $\alpha = 84°,\ a = 30,\ c = 35$

Solve all possible triangles with the given parts. Round to the nearest tenth.

46. $a = 18.4,\ \beta = 44.4°,\ c = 29.1$

47. $\alpha = 27.8°,\ \gamma = 95.1°,\ b = 18.3$

48. $\gamma = 31°,\ b = 31,\ c = 25$

49. $a = 11,\ b = 10,\ c = 17$

Solve all possible triangles with the given parts. Round to the nearest tenth.

50. $\beta = 149°,\ a = 10,\ b = 33$

Find the area of each triangle.

51. $a = 9,\ b = 12,\ \gamma = 121°$

52. $\alpha = 30°,\ \beta = 123°,\ b = 5$

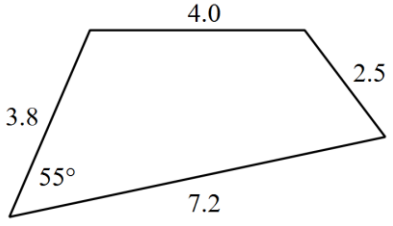
53. $\gamma = 66°,\ b = 6,\ c = 8.7$

54. $a = 4,\ b = 8,\ c = 10$

55. $a = 4.5,\ b = 6,\ c = 8.7$

Find the area of the figure below.

56.



Solve. Round answers to the nearest tenth.

57. A canoe travels 3 miles from the coast to an island along a course with a bearing of 310°. It then turns and travels for some distance on a new course with a bearing of 60°, and finally returns back to its starting point on a course with a bearing of 200°. How far did the canoe travel on the final leg of its journey?

58. A surveyor locating the corners of a triangular piece of property started at one corner and walked 320 ft in the direction S25°E to reach the next corner. The surveyor turned and walked S55°W to get to the next corner of the property. Finally, the surveyor walked in the direction N10°E to get back to the starting point. Find the perimeter and the area of the property.

59. To find the distance between two small towns, an electronic distance measuring (EDM) instrument is placed on a hill from which both towns are visible. If the distance from the EDM to the towns is 3.6 miles and 5.7 miles and the angle between the two lines of sight is 53°, what is the distance between the towns?

60. A tourist spots a rock climber quite high up at Devil's Tower in Wyoming. The angle of elevation of the climber is 36°. From a point that is 100 ft. closer to the climber, the angle of elevation is 44°. What is the height of the climber, to the nearest foot?