Precalculus
Q3 Cumulative Review
*Problems marked with ** are calculator OK.*

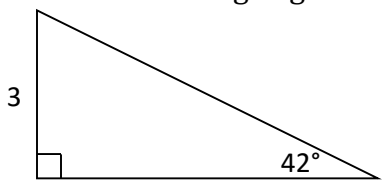
Name:
Period:

PART I: 4.1-4.3, 5.5, 5.6 *(Right Angle Trig, Unit Circle, Law of Sines & Cosines)*

(#1-6) Without using a calculator, find the exact values of each:

1. $\cos 135°$
2. $\cot \frac{7\pi}{6}$
3. $\csc 240°$
4. $\sin \pi$
5. $\sec 90°$
6. $\tan \frac{5\pi}{3}$

7. Solve for the missing angles and sides of the triangle. **



8. Convert 37 degrees to radians.**
9. Convert 2 radians to degrees.**

10. Assume the angle θ is an acute angle. Find the other five trig. functions if:
    a. $\cos\theta = \frac{5}{9}$
    b. $\csc\theta = \frac{13}{5}$

11. Evaluate the six trig. functions if point P (-4, -6) is on the terminal side of an angle θ.

12. Find $\sin\theta$ and $\tan\theta$ if $\cos\theta = \frac{2}{5}$ and $\cot\theta < 0$.

13. Determine if the triangle has 0, 1, or 2 possible triangles. **

a. a = 3, b = 4, A = 102°

b. a = 4, b = 3, B = 24°

14. Solve the triangle and find the area of the triangle. **

a. A = 33°, b = 2, c = 4

b. A = 31°, a = 4, c = 5

PART II: 4.4, 4.5, 4.7 *(Trig Graphs, Inverse Trig, Solving Trig Equations)*

(#15-18) Sketch two periods of the graph of the trig function. Make sure to include your scale and critical values on each axis.

15. $y = 4\cos 3\left(x - \frac{\pi}{3}\right) + 1$

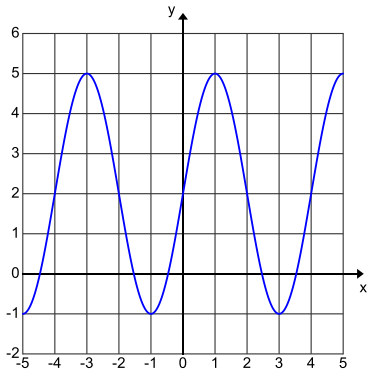
16. $y = -2\sin \pi x + 5$

17. $y = 4\tan 2x$

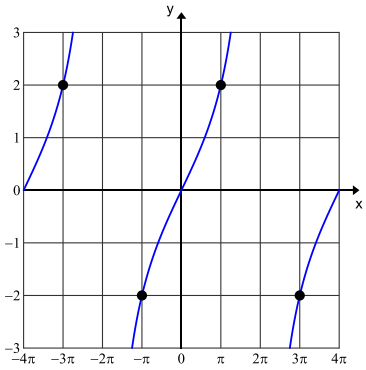
18. $y = 3\csc 6x - 1$

(#19-20) Write the equation of the each graph shown below. (4 points each)

19.



20.



(#21-25) Solve the trig equation over the interval $[0, 2\pi]$.

21. $\cos x = -\dfrac{\sqrt{2}}{2}$

22. $\cot x = -\sqrt{3}$

23. $\sec x = -\sqrt{2}; [-\pi, \pi]$

24. $\sin x = 0.73$ **

25. $\sec x = -1.92$ **

(#26-30) evaluate the inverse trig function. *Reminder: inverse trig functions have restricted domains!*

26. $\sin^{-1}(1)$

27. $\cos^{-1}\left(-\frac{1}{2}\right)$

28. $\sec^{-1}\left(\sqrt{2}\right)$

29. $\tan^{-1}(-1)$

30. $\cos\left(\tan^{-1}\left(\frac{\sqrt{3}}{3}\right)\right)$

31. Write the equation of a sine graph that has an amplitude of 4, a period of length 3π, a phase shift of $\frac{\pi}{4}$ to the left, and a vertical shift down 2.

32. At Hilton Head Island on June 10, high tide measured 12.8 feet on a pier at 9:21 am. The next low tide measured 6.6 feet at 3:33 pm. Write a sinusoidal equation modeling the behavior of the tide. What is the first time on June 10 that the tide measures 11 feet? **

33. The Ferris wheel at a local amusement park has a diameter of 40 feet and reaches a maximum height of 48 feet above the ground. One ride is three revolutions, which takes 2 minutes to complete.**
    a. Draw a sketch of the graph and create an equation to model the height of a rider in terms of time **(in seconds)** on the Ferris wheel if they get on the ride at the bottom.

    b. How high is the ride after 20 seconds? After 1 minute?

    c. At what time(s) during the full ride does the rider reach a height of 25 feet?

PART III: Chapter 5 *(Trig Identities)*

(#34-37) Simplify using trig identities:

34. $\cos^3 x + \cos x \sin^2 x$

35. $\dfrac{\cos^2 u + \cot^2 u + \sin^2 u}{\csc u}$

36. $\dfrac{1}{\sin^2 x} + \dfrac{\sec^2 x}{\tan^2 x}$

37. $\dfrac{1+\cot\theta}{1+\tan\theta}$

(#38-41) Find all solutions in the interval $[0,2\pi)$.

38. $\sqrt{2}\cot x \sin x - \cot x = 0$

39. $3\cos t = 2\sin^2 t$

40. $\sin 2x - 2\sin x = 0$

41. $\cos 2x = \sin x$

(#42-45) Prove the following:

42. $\cos x + \sec x = \dfrac{2 - \sin^2 x}{\cos x}$

43. $1 + \tan^2 x = \dfrac{1}{1 - \sin^2 x}$

44. $\dfrac{1}{1 - \cos t} = \dfrac{1 + \cos t}{\sin^2 t}$

45. $\cos\left(x - \dfrac{3\pi}{2}\right) = -\sin x$

(#46-49) Evaluate the following without a calculator, using either the Sum/Difference or Half-Angle identities.

46. $\sin 105°$

47. $\cos(-75°)$

48. $\tan\left(\dfrac{\pi}{12}\right)$

49. $\sin\left(\dfrac{5\pi}{8}\right)$