Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Unit B Practice Exam**Answer the following questions to the best of your ability. Unless indicated otherwise, leave your answer in terms of π. Round to the second decimal place when necessary. Put a box around each answer to avoid losing credit. (60 points)

A. Convert from degrees into radians: (3)

1. 175° 2. -212° 3. 1050°

B. Convert from radians into degrees: (3)

4. $\frac{7π}{10}$ 5. $\frac{11π}{5}$ 6. -$ \frac{5π}{16}$

C. Find the exact value of each of the following without using a calculator. (6)

7. cos ($\frac{5π}{3})$ 8. tan ($\frac{7π}{6})$ 9. sin 330°

10. csc ($-\frac{3π}{4})$ 11. sec (-45°) 12. cot (120°)

D. Solve each problem. Leave answers in terms of π where appropriate. Assume the radius of the Earth is 6400km where appropriate.

13. The radius of a circle is 10.5cm. Find the length of the arc on the circle intercepted by an angle of 40°. (2)

14. Find the distance in kilometers between cities on a north-south line that are on latitudes 71°N and 42°N. (2)

15. Find the latitude of London if the city is located 5,708km from the equator. (3)

16. If Athens, Greece has a latitude of 38°N and Capetown, South Africa is located at 34°S, how long will a plane take to travel between the two cities if the plane flies on a north-south line at an average speed of 2700km/hr. (4)

17. Find the area of a sector of a circle intercepted by a central angle of 67° in a circle of radius 15.2m. (3)

18. Two gears are adjusted so that the smaller gear drives the larger one. If the radii of the gears are 3.6 in. and 5.4 in., and the smaller gear rotates through 150°, through how many degrees will the larger gear rotate? (3)

E. Use a calculator to find each function value. (Reread the exam directions) (6)

19. cos 8.34 20. tan 0.476 21. sin (-3.56)

22. cot 1.11 23. csc 2.32 24. sec (-0.567)

F. (Calculator) Find the value of ө in the interval [0, $\frac{π}{2}$] that makes each statement true. (6)

25. sin ө = 0.357 26. cos ө = (-0.881) 27. cot ө = 0.576

G. Find the exact value of ө (in radians) in the given interval that has the given function value. Do not use a calculator for this section. Use your knowledge of the unit circle. (6)

28. [$\frac{π}{2}, π$]; sin ө = $\frac{\sqrt{3}}{2}$ 29. [$π, \frac{3π}{2}$]; cos ө = - $\frac{\sqrt{3}}{2}$ 30. [$\frac{3π}{2}, 2π$]; tan ө = - $\frac{\sqrt{3}}{3}$

H. Solve each problem. Use the formulas listed:

 s = rө ѡ = $\frac{ө}{t}$ v = $\frac{rө}{t}$ v = rѡ

31. Find t if ө = $\frac{3π}{4}$ and w = $\frac{12π}{13}$. (2)

32. Find w if s = $\frac{25π}{10} $ft, r = $\frac{3}{5 } $ft, and t = 10 seconds. (2)

33. What is the angular velocity of a point on the tread of an 18-inch diameter tire which is on a Volkswagen Passat traveling at 63mph. (3)

34. What is linear velocity of a satellite orbiting Earth at a radius of 3100 miles if the satellite completes one orbit every 38 hours? (3)

35. A gear is driven by a chain that travels 75m/min. Find the radius of the gear if it makes 44 revolutions per minute. (3)