Assessment Instructions:

- The Assessment 5 is 10 problems and is worth 40 points. Each numbered problem will earn you a score of 1-4 based on your set up of the function, your use of course methods to solve and prove your solution and your statement of the solution.
- You will have 1 hour to complete AS-5.
- The AS-5 is closed book and closed notes.
- **Calculators are not allowed** on the Assessment.

6.4

1. Use the properties of logarithms to expand the following expressions as much as possible.
   (a) $\log_9(9xy^{-3})$
   (b) $\log_2\left(\dfrac{y^2+z}{16x^4}\right)$

2. Use the properties of logarithms to condense the following expressions as much as possible.
   (a) $2\log a^2b - \log(1/b) + \log(1/a)$
   (b) $3\log_4(x^2) + \log_4(x^6)$

3. Evaluate the following logarithmic expressions.
   (a) $\log_2 0.01$
   (b) $\log_6 3^4$

6.5

4. Solve the following exponential and logarithmic equations.
   (a) $10^{2x+5} = e$
   (b) $81^x = 3^{2x+16}$
   (c) $\log_4(x-3) + \log_4 2 = 3$
   (d) $\log_2 x = 4$

7.1

5. Convert the radian measure to degrees.

   (a) $\dfrac{7\pi}{20}$

   (b) $\dfrac{-9\pi}{4}$

6. Convert the degree measure to radians.

   (a) 154°

   (b) 480°

   (c) -144°

7. Given a circle of radius 22.5 cm, find the length of the arc subtended by a central angle of 5π.

8. Find the area of the sector of a circle of radius 7 cm with a central angle of 70°.

7.2

9. Problems 1-14 (textbook, pp.527-528).

10. Convert the expression from degrees, minutes, seconds notation to decimal notation.

$$6^\circ 8' 50''$$

11. Find $\cos\theta$ if $\sec\theta = -7/4$.

7.3

12. Determine the point (x, y) on the unit circle associated with each real number s.

   (a) $s = \dfrac{\pi}{6}$

   (b) $s = -120^\circ$

13. Determine all real numbers s associated with each point (x, y) on the unit circle.

(a) $(x, y) = (1/2, -\sqrt{3}/2)$

14. Determine the values of the six trigonometric functions of the given angle θ.

(a) $\theta = \dfrac{5\pi}{2}$

15. Determine the reference angle associated with the given angle.

(a) $\theta = \dfrac{5\pi}{4}$

16. Given that $\cot\theta = \dfrac{3}{4}$ and $\sin\theta$ is negative, determine $\sec\theta$.

7.4

17. Determine the amplitude, period, frequency, and phase shift of the following functions.

(a) $f(x) = -3\cos(x + 7)$

(b) $0.5\sin(8x + 1)$

18. Sketch the graph of each of the following functions.

(a) $f(x) = 2\sin(x - \pi/4)$

(b) $g(x) = 2 - \cos(2\pi x)$

7.5

19. Sketch the graph of the following functions

(a) $f(x) = \dfrac{1}{3}\csc(2x)$

(b) $g(x) = 1 - \cot(x - \pi/2)$

7.6

20. Evaluate each of the following expressions without the use of a calculator.

(a) $\cos^{-1}(\sqrt{2}/2)$

(b) $\cot^{-1}(-\sqrt{3})$

21. Find the value of each of the following expressions without using a calculator.

    (a) $\sin(\arctan(\sqrt{3}))$

    (b) $\sec(\arcsin(-1/2))$

8.1

22. Use trigonometric identities to simplify the expressions.

    (a) $\sin(-x)\tan x$

    (b) $\cot^2 x - \cot^2 x \cos^2 x$

    (c) $\dfrac{1}{\cos x \csc(-x)}$

8.2

23. Use the sum and difference identities to determine the exact value of each of the following expressions.

    (a) $\sin\left(\dfrac{2\pi}{3} + \dfrac{\pi}{4}\right)$

    (b) $\tan 75^\circ$

24. Use the sum and difference identities to rewrite each of the following expressions as a trigonometric function of one angle, and then evaluate the result.

    (a) $\sin 15^\circ \cos 30^\circ + \cos 15^\circ \sin 30^\circ$