Math 1060
Test 1 Review

The following is a comprehensive review of what we have covered in Chapter 4. Make sure you are able to do problems similar to the ones listed here. The test will be comprised of problems very similar to the ones on this review sheet.

1. Determine the quadrant in which each angle lies.
   (a) \( \frac{9\pi}{8} \)
   (b) 2.25
   (c) \( -\frac{12\pi}{7} \)
   (d) \( \frac{23\pi}{6} \)

2. What are two coterminal angles to \( \theta = \frac{7\pi}{6} \)?

3. What are the complement and supplement of \( \frac{\pi}{4} \)?

4. Convert the following radian measures to degree measures without the use of a calculator, and specify which quadrant each angle lies in.
   (a) \( -\frac{7\pi}{12} \)
   (b) \( \frac{\pi}{9} \)
   (c) \( \frac{11\pi}{6} \)
   (d) \( \frac{34\pi}{15} \)

5. Convert the following degree measures to radian measures without the use of a calculator, and specify which quadrant each angle lies in.
   (a) 345°
   (b) 0.54°
   (c) -48°
   (d) 200°

6. Find the length of the arc on a circle of radius 20 centimeters intercepted by a central angle of \( \frac{\pi}{4} \) radian.

7. The radius of the magnetic disk in a 3.5-inch diskette is 1.68 inches. Find the linear speed of a point on the circumference of the disk if it is rotating at a speed of 360 revolutions per minute.

8. What are the values of the six trigonometric functions of the following angles (without the use of a calculator)
   (a) \( \frac{\pi}{4} \)
   (b) \( \frac{7\pi}{6} \)
   (c) 0
9. Evaluate the following without the use of a calculator

(a) \( \cos(-\frac{8\pi}{3}) \)
(b) \( \sin(\frac{9\pi}{4}) \)

10. If \( \sin \theta = \frac{5}{7} \), what is \( \tan \theta \) and \( \cos \theta \)?

11. Given that \( \sec \theta = 5 \) and \( \tan \theta = 2\sqrt{6} \), find the following

(a) \( \cos \theta \)
(b) \( \cot \theta \)
(c) \( \cot(90^\circ - \theta) \)
(d) \( \sin \theta \)

12. Find the value of \( \theta \) in radians \((0 \leq \theta \leq \frac{\pi}{2})\) without a calculator.

(a) \( \cos \theta = \frac{\sqrt{2}}{2} \)
(b) \( \tan \theta = \sqrt{3} \)
(c) \( \tan \theta = 1 \)
(d) \( \cos \theta = \frac{1}{2} \)
(e) \( \sec \theta = \sqrt{2} \)
(f) \( \cot \theta = \frac{\sqrt{3}}{3} \)

13. A 6 foot person standing 20 feet from a streetlight casts a 10 foot shadow. What is the height of the streetlight?

14. If the point \((3\frac{1}{2}, -7\frac{2}{3})\) is on the terminal side of an angle in standard position, determine the exact values of the six trigonometric functions of the angle.

15. Given that \( \csc \theta = 4 \) and \( \cot \theta < 0 \), what are the values of the six trigonometric functions of \( \theta \)?

16. Sketch the graphs of the following functions and give the period and amplitude of each function.

(a) \( y = -3 \sin \frac{\pi x}{2} \)
(b) \( y = -3 + 5 \cos \frac{\pi}{12} x \)
(c) \( y = -2 \sec 4x + 2 \)
(d) \( y = 3 \cot \frac{5\pi}{2} \)
(e) \( y = \tan(x + \pi) \)

17. Evaluate the following without the use of a calculator.
(a) \( \arctan(-1) \)
(b) \( \arcsin(-\frac{\sqrt{2}}{2}) \)
(c) \( \arccos(1) \)
(d) \( \sin(\arccos \frac{\sqrt{5}}{5}) \)
(e) \( \csc \left[ \arctan(-\frac{5}{12}) \right] \)

18. Write an algebraic expression for \( \cos(\arcsin(x - 4)) \).

19. Write an algebraic expression for \( \sin(\cos^{-1} \left( \frac{x}{8} \right)) \).

20. A plane flies at an altitude of 6 miles toward a point directly over an observer. Let \( \theta \) be the angle of elevation from the ground to the plane, and \( x \) the horizontal ground distance from the person to the plane. Write \( \theta \) as a function of \( x \), and find \( \theta \) when \( x = 7 \) miles and \( x = 1 \) mile.

21. If the sun is 20° above the horizon, find the length of a shadow cast by a building that is 600 feet tall.

22. You are standing 100 feet from the base of a platform from which people are bungee jumping. The angle of elevation from your position to the top of the platform from which they jump is 51°. From what height are the people jumping?

23. The height of an outdoor basketball backboard is 12.5 feet, and the backboard casts a shadow 17 \( \frac{3}{4} \) feet long. Find the angle of elevation of the sun.

Also review all the homework.