This is not intended to be a comprehensive review for the final exam. Make sure to go over homework problems, problems from old exams, and the extra practice problems listed on the course website. The final exam will be approximately half trigonometry.

1. Suppose \( \pi < x < 2\pi \) and \( \tan x = -3 \). Evaluate \( \sin(x) \) and \( \cos(x) \).

2. If \( \log M = 3.1 \), how many digits does \( M^3 \) have?

3. Imagine we did the following (fun) activity. Lying on the ground 55 feet away from AP&M, the top of the building is at an angle of 64°. How tall is AP&M?

4. Solve the following system of equations

\[
\begin{align*}
    x + 2y + 3z &= 4 \\
    4x + 5y + 6z &= 7 \\
    7x + 8y - 9z &= 1
\end{align*}
\]

5. Graph the lines \( x + 2y = 5 \) and \( 2x - 4y = 6 \). How many solutions does the following system have?

\[
\begin{align*}
    x + 2y &= 5 \\
    2x - 4y &= 6
\end{align*}
\]

6. Find the vertex and roots of the parabola \( y = 3x^2 - 3x - 2 \).

7. Find a polynomial \( p(x) \) with \( p(-1) = 0 \), \( p(2) = 0 \) and \( p(1) = 3 \).

8. Compute the following

\[
\begin{align*}
    (a) & \quad \cos(\frac{15\pi}{6}) \\
    (b) & \quad \csc(\frac{-5\pi}{4}) \\
    (c) & \quad \tan(\frac{-\pi}{3}) \\
    (d) & \quad \sec(\frac{-3\pi}{4}) \\
    (e) & \quad \cos^{-1}(\frac{-\sqrt{3}}{2}) \\
    (f) & \quad \sin^{-1}(\frac{-\sqrt{3}}{2})
\end{align*}
\]

9. Let \( h(x) = 3 + 2\ln(3x - 4) \). Compute \( h^{-1}(x) \). What is the range of \( h^{-1}(x) \)?
10. Compute the following
   (a) $\cos(\sin^{-1}(-\frac{1}{2}))$
   (b) $\cos^{-1}(\sin(\frac{1}{2}))$
   (c) $\tan(\sin^{-1}(\frac{\sqrt{3}}{2}))$
   (d) $\sec(\tan^{-1}(2))$
   (e) $\tan^{-1}(\cos(\pi))$

11. What are the domain and range of $e^x - 2$?

12. Solve for $x$:
   $$3\sin^2 x - 4\sin x + 1 = 0$$

13. Find a number $x$ such that $e^{3x+1} = 7$

14. Suppose you put $3,000 into an account with 2% annual interest compounded continuously. In how many years will there be $4,500 in your account?

15. Find all points where the line through the origin with slope 4 intersects the unit circle.

16. Find all roots of the function $f(x) = e^{\sin x} - 1$.

17. Write the formula for a trigonometric function with amplitude 4 and period $2\pi/3$.

18. Give the equation of a line $\ell$ through the points (1, 4) and (−2, 7). Give the equation of a line parallel to $\ell$ through the origin. Give the equation of a line perpendicular to $\ell$ with $y$-intercept 5.

19. What is the range of the function $3\cos(\frac{\pi}{2}x) + 5$?

20. What are the domain and range of the function $3x^2 - 5$?