1. (4 points) Evaluate $\log_9\left(\sqrt{3}\right)$ and simplify completely.
2. (4 points) Find an angle between $0°$ and $360°$ that is coterminal with $-320°$.
3. (4 points) Evaluate $\cos\left(\frac{19\pi}{6}\right)$.
4. (4 points) Find the radius r of a circle if an arc of length 5m on the circle subtends a central angle of $\frac{\pi}{2}$.
5. (4 points) Perform the division $\frac{x^2-x-42}{x^2+6x} \div \frac{x^2-x-7}{x^3+x^2}$ as one reduced fraction.
6. (4 points) Determine the net change and the average rate of change of the function $f(t) = 3t - t^2$ between $t = 2$ and $t = 7$.
7. (4 points) Perform the addition and subtraction $\frac{7}{x^2} + \frac{6}{x^2+2x}$ and simplify as one fraction.
8. (4 points) The angle of elevation of the top of the Empire State Building in New York is found to be $11°$ from the ground at a distance 1 mi from its base. Using this information, find the height of the Empire State Building. You may leave $\sin, \cos$, or $\tan$ in your final answer.
9. (4 points) Sketch the graph of the function $f(x) = x^2 - 10x + 15$. State the domain and range. Label at least three points on your graph.
10. (5 points) Find an equation of the line passing through the point $(1, -2)$ and having $y-$intercept 4.
11. (5 points) Solve the following system or show it has no solutions. $\begin{cases} 8x - 3y = -3 \\ 5x - 2y = -1. \end{cases}$
12. (5 points) Perform the subtraction $\frac{2}{\frac{2}{3}} - \frac{\frac{2}{3}}{2}$ and simplify.
13. (5 points) Solve the equation $V = \frac{1}{3}\pi r^2 h$ for r.
14. (5 points) Sketch the graph of the function $f(x) = 1 + 2^{(x+3)}$ Label all intercepts and asymptotes on your graph and state the end behavior.
15. (5 points) Simplify the rational expressions completely.
    (a) $\frac{5(x^2-64)}{15(x+6)(x-8)}$
    (b) $\frac{y^2+y}{y^2-1}$.
16. (5 points) Find all real solutions of $\sqrt{2x+1} + 1 = x$.
17. (5 points) Let $f(x) = 1 - x^2$ and $g(x) = 2x + 1$. Evaluate and simplify $g(f(\frac{1}{2})) - f(g(\frac{1}{2}))$.
18. (6 points) Solve the inequality $3 - 3x \leq -(1 + 7x)$. Express the solution using interval notation.
19. (6 points) Perform the indicated operations and simplify. Eliminate negative exponents.
    (a) $(100)^{-\frac{1}{2}}$
    (b) $\left(\frac{ab}{3a^{-4}b^3}\right)^2$.
20. (6 points) Find all real solutions x in each of the following. If there is no solution, write NO SOLUTION.
    (a) $\frac{1}{x} = \frac{5}{4x} + 1$.
    (b) $2x^2 + 2x = 40$.
21. (6 points) (a) Find the domain of $f(x) = \log_2(x + 8)$.
    (b) Find an equation of the circle with center $(-2, 4)$ and passing through the point $(-5, 8)$.