

Math 150 Help Session Interview Questions

- Determine the center and radius of the circle $4x^2 + 4y^2 - 24x + 40y + 135 = 0$.
- Determine the exact half-life of a sample that decayed 5% in three years.
- Sketch the basic shape of the graph of $f(x) = \frac{x^2 - 4x + 4}{x^2 - 4}$, labeling the coordinates of any intercepts and holes and the equations of any asymptotes.
- Determine all of the solutions on $[0, 2\pi)$ of the equation $(\sin x + 1)(2 \cos x + 1) = 0$
- Solve the following equations for x and state the exact solution.
 - $8^{5x} = 16^{3x+2}$
 - $3^{x+5} = 4^{2x}$
- State the domain of $f(x) = \frac{\sqrt{x^2 - x - 6}}{x^3 - 9x}$ using interval notation.
- Fully simplify $\sqrt{9x^4y^2z^7}$. If needed, use the square-root symbol in your answer.
- Find all solutions for $(x^2 - 2)^2 - 3(x^2 - 2) - 18 = 0$,
 - Over the set of all real numbers.
 - Over the set of all complex numbers.
- If $f(x) = 2x^2 - 3x + 4$ and $g(x) = 5x - 4$, find and fully simplify $(f \circ g)(x)$.
- If $\log_b 2 = m$, $\log_b 3 = n$, $\log_b 5 = p$, and $\log_b 7 = q$, find and simplify $\log_b \left(\frac{72}{175} \right)$ in terms of m, n, p , and q .
- Given $\sin x = \frac{5}{13}$ where $0 < x < \frac{\pi}{2}$, and $\cos y = -\frac{3}{5}$ where $\pi < y < \frac{3\pi}{2}$, find and simplify $\sin(x + y)$.
- Using identities, simplify the following expression to a single term:

$$(\csc x)(\csc x - \sin x) + \frac{\sin x - \cos x}{\sin x} + \cot x$$
- Solve the following for x : $\frac{x + 3}{3 - x} \geq 8$

14. If $f(x) = \frac{x-4}{2x+5}$, find and simplify $f^{-1}(x)$.

15. Algebraically solve the following system of equations:

$$(x+5)^2 = 2y - 3$$

$$4y = 9 - (x+5)^2$$

16. Solve the following for x : $\log_4(2x+4) + \log_4 x = 2$