

## Math 150 Questions for Help Session Candidates

- Solve the following equations for  $x$  and state the exact solution.
  - $8^{5x} = 16^{3x+2}$
  - $3^{x+5} = 4^{2x}$
- Fully simplify:  $(2 - \sqrt{-25})(3i + 9)$ .
- Find the exact angle between the two vectors  $\langle -3, -2 \rangle$  and  $2\langle 4, -1 \rangle$ .
- What is the domain in interval notation of  $f(x) = \frac{\sqrt{x^2 - x - 6}}{x^3 - 9x}$ ?
- Find the value(s) of  $w$  such that the point  $(w, -3)$  is seven units away from the origin.
- 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  $(g \circ f)(x)$ .
- If  $\log_b 2 = m$ ,  $\log_b 3 = n$ ,  $\log_b 5 = p$ , and  $\log_b 7 = q$ , find and simplify  $\log_b \frac{72}{175}$  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:
$$(\csc x)(\csc x - \sin x) + \frac{\sin x - \cos x}{\sin x} + \cot x$$
- Identify the domain in interval notation, asymptote(s), hole(s), and intercept(s) of the function
$$f(x) = \frac{2x^3 - 8x^2 - 18x + 72}{(3-x)(-x^2 - 6x - 5)}$$
- Solve for  $x$ :  $\frac{x+3}{3-x} \geq 8$
- If  $f(x) = \frac{x-4}{2x+5}$ , find and simplify  $f^{-1}(x)$ .
- Algebraically solve the system of equations:
$$\begin{aligned}(x+5)^2 &= 2y - 3 \\ 4y &= 9 - (x+5)^2\end{aligned}$$