

Ms. Nguyen Calculus 101A
Sample Test Chapter 0

1. Find the domain of the following functions:

a) $f(x) = \frac{3}{2x^2 - x - 1}$ b) $g(x) = \sqrt{3x^2 + 5x - 2}$

2. Find all zeros for: $y = 2x^4 + x^3 - 21x^2 - 9x + 27$.

3. Write the equation for the line through $(-2, -1)$ that is perpendicular to the line $2x + 3y = 4$ in slope-intercept form.

4. Let $f(x) = \sqrt{x^2 - 6x}$. Find an interval on which it is one-to-one. Find the inverse of the function restricted to that interval.

5. Show that $f(x) = 2x^3 + 6$ and $g(x) = \sqrt[3]{\frac{x-6}{2}}$ are inverse of each other.

6. Given $f(x) = \frac{x-2}{x^2-1}$. Find all the intercepts and asymptotes, then graph this function.

7. Verify that the following are identities:

a) $(1 + \sin t)(1 - \sin t) = \frac{1}{\sec^2 t}$

b) $\sec x - \sin x \tan x = \cos x$

c) $\cos 3x = 4 \cos^3 x - 3 \cos x$

8. Use a triangle to simplify each expression.

a) $\tan(\sin^{-1} x)$ b) $\csc\left(\sin^{-1} \frac{2}{3}\right)$

9. Given the formula $\tan(x + y) = \frac{\tan x + \tan y}{1 - \tan x \tan y}$, show that $\frac{\pi}{4} = 3 \tan^{-1}\left(\frac{1}{4}\right) + \tan^{-1}\left(\frac{5}{99}\right)$

10. Solve:

a) $x^2 2^x - 2^x = 0$

b) $\log_2(x^2 - x - 2) = 2$

11. For what value of x is the following true? Justify your answer.

$(\log x)^3 = 3 \log x$

12. The velocity of a sky diver t seconds after jumping is given by $v(t) = 80(e^{-0.2t} - 1)$. After how many seconds is the velocity 70 ft/s?