

MATH 101 FINAL EXAM

1) Find the slope of the line described by the equation $-3x + 4y = -16$. Find the x -intercept and the y -intercept of this line. Find the equations of the lines parallel and perpendicular to $-3x + 4y = -6$ passing through the origin.

2) Find the domain of the function

$$f(x) = \frac{12 - x}{x^2 + 4x + 4} + \sqrt{x + 10}.$$

3) Find the inverse of $f(x) = \frac{12-x}{4x+4}$. Find the domain and range of f .

4) Complete the square in the following quadratic expression

$$y = x^2 - 10x + 18.$$

5) Divide

$$\frac{4x^2 - 3x - 5}{x + 1}.$$

6) Suppose I invested \$15000 in 1999 at an annual interest rate of 10% compounded quarterly. Write an expression for $P(t)$, the value of that investment t years after I deposited the money.

7) Do the same as the previous problem assuming the interest to be compounded continuously.

8) If it takes ten years for half of a radioactive substance to decay and the initial amount present is m , write an expression $m(t)$ describing the amount of the substance at time t .

9) Write as a single logarithm: $4 \log_4 x + 4 \log_4 y^2$.

10) Break up: $\log_4 \left[\frac{x^4 y^3}{5z^3} \right]^7$.

11) Solve the systems

$$\begin{cases} 2x - 3y = -2 \\ 3x + 2y = 7 \end{cases}$$

$$\begin{cases} y = x^2 - 4 \\ x + y = 8 \end{cases}$$

12) Show that the point $P = \left(-\frac{1}{2}, \frac{\sqrt{3}}{2}\right)$ lies in the unit circle. Find the angle that the line passing through the origin and P makes with the x -axis.

13) Sketch the graph of $f(x) = 2 \sin(x)$.