

MATH100 SAMPLE FINAL

Please write your name on your blue book. For full credit, show your work and give justifications for your answers. You may use a graphing calculator and both sides of an 8 1/2 by 11 sheet of notes on this exam. You may not use a cell phone or computer. Try not to spend too much time on any single problem; if you get stuck on a problem leave a partial answer and move on to the next. If you have time left over at the end of the exam, try to check your work.

- (1) The graphs of two functions, $f(x)$ and $g(x)$, are shown above.
 - a) (5 pts) For what values of x does $f(x) = g(x)$?
 - b) (5 pts) For what values of x is $f(x) < g(x)$?
- (2) (10 pts) Simplify: $\frac{\sqrt{xy^2}}{y^{-1}}$.
- (3) (10 pts) What is the domain of the function $h(x) = \frac{\sqrt{x}}{x-1}$?
- (4) (10 pts) Sketch the graph of the function $f(x) = \begin{cases} 2x + 1 & \text{if } x < 0 \\ x - 1 & \text{if } x \geq 0 \end{cases}$
- (5) (10 pts) Suppose $g(x) = x^2 + 2x - 3$. For what values of x does $g(x) = -3$?
- (6) (10 pts) If $h(x) = 3x + 7$, find $h^{-1}(x)$.
- (7) Suppose $f(x) = x^2 + 4x + 1$.
 - a) (5 pts) What are the coordinates of the vertex of the graph of $f(x)$?
 - b) (5 pts) What are the x -intercepts of this parabola?
- (8) (10 pts) Sketch the graph of the function $g(x) = \log_3(x - 1)$.
- (9) (10 pts) Solve for x : $\log_3(x) = 4$.
- (10) (10 pts) The velocity of a ski diver t seconds after jumping is given by $v(t) = 80(1 - e^{-0.2t})$. After how many seconds is her velocity 70 ft/s?