

PRACTICE EXAM 2 - MATH 140

DATE: Tuesday, October 19

INSTRUCTOR: George Voutsadakis

Read each problem very carefully before starting to solve it. Each question is worth 3 points. It is necessary to show your work. Correct answers without explanations are worth 0 points.

GOOD LUCK!!

1. Graph the piece-wise defined function $f(x) = \begin{cases} \sqrt{1-x} & \text{if } x < 1 \\ (x-2)^3 + 2 & \text{if } x \geq 1 \end{cases}$ making sure to label some of the critical points in your graph. Then find the domain and the range of f .
2. Use the sign table method to make a rough sketch of the graph of the function $f(x) = (x+3)(x-1)^2(x-4)$. Then find the solution set of the inequality $(x+3)(x-1)^2(x-4) \leq 0$.
3. Solve the rational inequality $\frac{3x^2+2x-1}{x+2} \geq 0$.
4. An open box with a square base is to be made from a square piece of cardboard 24 inches on a side by cutting out a square from each corner and turning up the sides. Express the volume V of the box as a function of the length x of the side of the square cut from each corner.
5. Let $f(x) = \frac{1}{x+3}$ and $g(x) = \frac{-5}{x}$. Find a formula for the composite $f \circ g$ and then determine its domain.
6. The function $f(x) = \frac{2x+3}{x-5}$, $x \neq 5$ is one-to-one. Find its inverse and then determine the domain and the range of f .