

FALL 2021 - MATH 260 (18164) - TEST 1

NO GRAPHING CALCULATORS, NO NOTES, NO BOOKS.

Show ALL your work and BOX your final answers.

No points will be given for answers without supporting work.

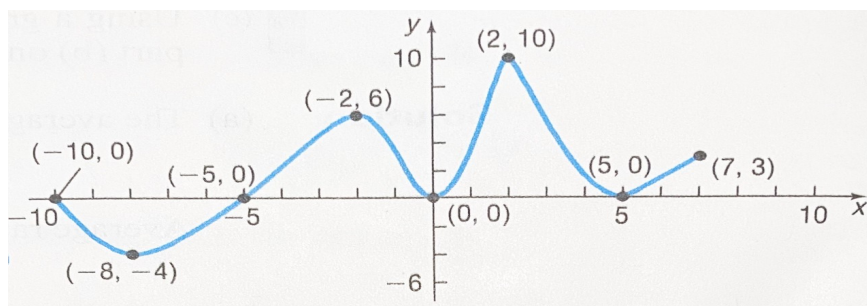
Problem 1 (12 points) Given $f(x) = \begin{cases} x^2 - 3x & \text{if } x \leq 0 \\ \sqrt{x} & \text{if } 0 < x \leq 15 \\ -1 & \text{if } x > 15 \end{cases}$

Evaluate:

- a) $f(-8)$
- b) $f(9)$
- c) $f(100)$

Problem 2 (18 points) A graph of a function f is given below. Use the graph to find:

- a) All the local maximum and the value of x at which each occurs.
- b) All the local minimum and the value of x at which each occurs.
- c) The intervals on which the function is increasing and on which the function is decreasing.



Problem 3 (16 points) Find the domain of each function.

- a) $g(x) = \frac{x+2}{x^2 - 2x - 35}$
- b) $f(x) = \frac{x^2}{\sqrt{8-2x}}$

Problem 4 (13 points) Find the difference quotient $\frac{f(a+h) - f(a)}{h}$ of $f(x) = x^2 + 3x - 1$

Problem 5 (16 points) Given the one-to-one function $f(x) = \frac{x^5 - 3}{2}$. Find the inverse function of f .

Make sure to check your answer by verifying $f(f^{-1}(x)) = x$ or $f^{-1}(f(x)) = x$.

Problem 6 (30 points) Sketch the graph of the function $f(x) = -2(x-1)^2 + 3$ by starting with the graph of the standard function $f(x) = x^2$ and applying transformations.

Make sure to sketch all graphs and label at least 3 key points for each graph.

Problem 7 (35 points) Sketch the graph of $f(x) = x^2(x-2)(x+2)$.

Make sure to label x-intercept, y-intercept, and additional points.