

YOUR NAME: _____

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Read each problem **very carefully** before starting to solve it. Each problem is worth 10 points. It is necessary to show **all** your work. Correct answers without explanations are worth 0 points. GOOD LUCK!!

1. Graph carefully the following functions. Your **graphs have to be neat and you have to label a few points**; otherwise you will receive reduced or no credit:

$$(a) \quad f(x) = x^3 - 2. \quad (b) \quad g(x) = -(x-3)^2 + 4. \quad (c) \quad h(x) = \begin{cases} x^3 - 2, & \text{if } x < 2 \\ 4, & \text{if } x = 2 \\ -(x-3)^2 + 4, & \text{if } x > 2 \end{cases}$$

2. Perform the second difference test to tell whether the following data are quadratic:

x	-1	0	1	2	3
y	6	1	0	3	10

If yes find a quadratic model **manually**. If not, use power regression to find the best fitting power model.

3. Let $f(x) = \sqrt{3x-1}$ and $g(x) = 2x - 7$.

(a) Find $(g \circ f)(x)$ and its domain. (b) Do the same with $(f \circ g)(x)$.

4. Solve the equation $\sqrt{3x-2} + 2 = x$ **manually** showing all your steps.

5. Use the sign table method to solve the quadratic inequality $11x - x^2 \leq 8x - 10$ and leave your answer in interval notation.