Name: _____ Mark: _____

Mini-math Div 3/4: Monday, December 14, 2020 (12 minutes)

1. (2 points) There is a function $f(x)$ such that $f'(x) = 0$ if and only if $x = -1, 2$, and whose **second derivative** is given by $f''(x) = \dfrac{2x^3 - 3x^2 + 5}{(x-1)^2}$. What does the Second Derivative Test tell you about the critical points $x = -1$ and $x = 2$?

2. Consider the continuous function whose **second derivative** is

$$f''(x) = (x-2)^3 \left(x - \frac{3}{5}\right)^2 (x+1)(x-1)^{1/3}$$

   (a) (3 points) Find the interval(s) on which the original function f is concave up.

   (b) (2 points) Find the points of inflection of f.

3. (2 points) Which of the following graphs of f could satisfy $f > 0$, $f' < 0$, and $f'' > 0$ for all points on its domain? Indicate **ALL** possibilities. You do not need to show your work for this question.