

Name: _____

Mark: _____

Mini-math Div 3/4: Friday, January 14, 2022 (20 minutes)

1. Consider the continuous function whose derivative is $f'(x) = \frac{(x+4)^5(x-3)^2(x-\frac{1}{7})}{(x-1)^{1/3}}$
- (a) (3 points) Find the interval(s) on which the original function f is increasing.

- (b) (2 points) Find and classify the local extrema of f .

2. (3 points) Find the global maximum and minimum of $f(x) = 2x^3 - 9x^2 - 10$ on $[1, 4]$.

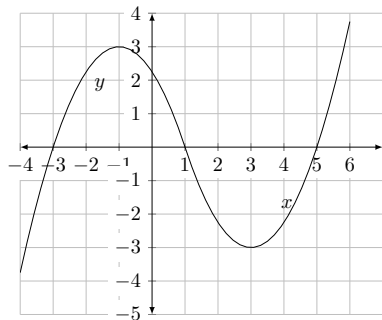
3. (3 points) Consider the function

$$f(x) = \frac{3}{5}x^5 + 4x^4 + 8x^3 + 12x + 10.$$

Find the interval(s) on which f is concave down.

4. (2 points) Suppose there is a function $f(x)$ such that $f'(x) = 0$ if and only if $x = 0, 1$, and whose **second derivative** is given by $f''(x) = \frac{x^3 + x^2 - x}{(x+1)^2}$. What would the Second Derivative Test tell you about the critical points $x = 0$ and $x = 1$?

5. (2 points) Assume f is a continuous function such that the following is a graph of f' . Find the points of inflection of f .



6. (1 point) (AP) Which of the following functions does not satisfy the conditions of the Mean Value Theorem on the interval specified?

(A) $f(x) = \frac{1}{x}$ on $[1, 4]$

(C) $f(x) = \sqrt[3]{x}$ on $[-1, 1]$

(B) $f(x) = \sqrt{x}$ on $[0, 2]$

(D) $f(x) = x^2 - 1$ on $[-2, 2]$

7. (1 point) (AP) Given the curve $y3^y = \sin x$, for what value of y , if any, does the derivative of y with respect to x not exist?