

Num. _____ Name. _____

(1)(15%) Find the absolute maximum and absolute minimum values of the function $f(x) = 2x^4 - \frac{8}{3}x^3 - 8x^2 + 12$ on $[-2, 3]$

Answer:

f has an absolute maximum value _____ at _____ and
 f has an absolute minimum value _____ at _____

(2)(15%) Use the Mean Value Theorem to prove that

$$|\sin a - \sin b| \leq |a - b|$$

for all real numbers a and b

(3) (15%)(a) Find the intervals on which $f(x) = -x^4 + 2x^2 + 1$ is increasing or decreasing, and (b) use the First Derivative Test to find the relative maxima and relative minima of f .

Answer:

(a) f is increasing on _____ and f is decreasing on _____
(b) f has a relative maximum value _____ at _____ and
 f has a relative minimum value _____ at _____

(4) (15%)(a) Find the intervals on which $f(x) = 2x^3 - 3x^2 - 12x + 12$ is concave up or down, and (b) find the point of inflection, and (c) use the Second Derivative Test to find the relative maxima and relative minima of f .

Answer:

(a) f is concave up on _____ and f is concave down on _____
(b) point of inflection is _____
(c) f has a relative maximum value _____ at _____ and
 f has a relative minimum value _____ at _____

(5)(10%) Find the vertical asymptotes of the graph of $f(x) = \frac{x}{x^2 - x - 2}$

(6)(10%) Find the horizontal asymptotes of the graph of $f(x) = \frac{3x}{\sqrt{x^2 + 1}}$

(7)(10%) Find the indefinite integral $\int \frac{dx}{1 - \sin x}$

(8)(10%) Find the indefinite integral $\int (x + 1)\sqrt{2x - 1} dx$