Finding Extrema Analytically

- Find the extrema for $y = e^{-x}$ on the interval $-1 \leq x \leq 1$:
- Both endpoints are included in the interval, so include them in table.
- $y' = -e^{-}x$ exists for every x in interval, is never 0.
-

x	y
-1	$-e$
1	$-\frac{1}{e}$

Notes

Finding Extrema Analytically

- Find the extrema for $y = \frac{1}{x^2-1}$ on the interval $-4 \leq x < 4$:
- Left endpoint only is included in interval.
- Rewrite $y = (x^2-1)^{-1}$
  $y' = -1(x^2-1)^{-2}(2x) = -\frac{2x}{(x^2-1)^2}$
- $y' = 0$ at $x = 0$, and y' does not exist at $x = \pm 1$
-

x	y
-4	1/15
-1	DNE
0	0
1	DNE

Notes

Finding Extrema Analytically

- Find the extrema for $y = \frac{3}{2}x^4 + 4x^3 - 9x^2 + 10$:
- y is defined everywhere, so domain is $(-\infty, \infty)$. Any extrema will be critical points.
- $y' = 6x^3 + 12x^2 - 18x = 6x(x^2 + 2x - 3) = 6x(x+3)(x-1)$
- $y' = 0$ at $x = -3, 0, 1$
-

x	y
-3	-57.5
0	10
1	6.5

Notes