

Review Ex, Ch 4

#8

Consider $f(x) = \frac{1}{3}x^3 - x + 1$.

We find the critical values by determining where $f'(x) = 0$.

$f'(x) = x^2 - 1$. So, $f'(x) = 0$ if $x^2 - 1 = 0$.

Hence, $x = -1$ and $x = 1$ are our critical values.

Now, we examine the sign of $f'(x)$ on those intervals bounded by the critical values.

	$x < -1$	$x = -1$	$-1 < x < 1$	$x = 1$	$x > 1$
$f(x)$	↑	$\frac{5}{3}$	↓	$\frac{1}{3}$	↑
$f'(x)$	+	0	-	0	+

Hence, f is increasing on $(-\infty, -1)$ and $(1, +\infty)$.

f is decreasing on $(-1, 1)$.

f has a relative maximum value of $\frac{5}{3}$ at $x = -1$, and
 f has a relative minimum value of $\frac{1}{3}$ at $x = 1$.

