Increasing/Decreasing Functions

p. 278 - 286 (4.3) # 43

Let f be a function defined on an interval I and let x_1 and x_2 be any two points in I, then:

a) f increases on I if $x_1 < x_2$ and $f(x_1) < f(x_2)$.

b) f decreases on I if $x_1 < x_2$ and $f(x_1) > f(x_2)$.

Let f be continuous on [a, b] and differentiable on (a, b).

1. If $f'(x) > 0$ (a, b), then f is increasing for all x in [a, b].
2. If $f'(x) < 0$ (a, b), then f is decreasing for all x in [a, b].

**1. The derivative g' of a function g is continuous and has 2 zeros. Selected values of g' are given in the table below. If the domain of g is the set of all real numbers, then g is decreasing on which intervals?

x	-4	-3	-2	-1	0	1	2	3	4
$g'(x)$	2	3	0	-3	-2	-1	0	3	2

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g is decreasing on $(-2, 2)$ since $g' < 0$ on that interval

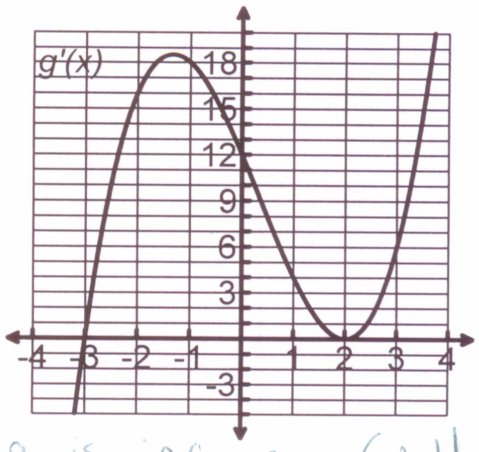
For 2 - 3, identify the intervals on which $g(x)$ is increasing and/or decreasing. Justify your answer.

2. Graph $g(x) = x^4 - 8x^2 + 1$ and g' simultaneously on the calculator.

g is increasing on $(-2, 0)$ and $(2, \infty)$

g is decreasing on $(-\infty, -2)$, $(0, 2)$

3.



g is inc on $(-3, 2)$ and $(2, \infty)$ since $g' > 0$

and g is dec. on $(-\infty, -3)$ since $g' < 0$.