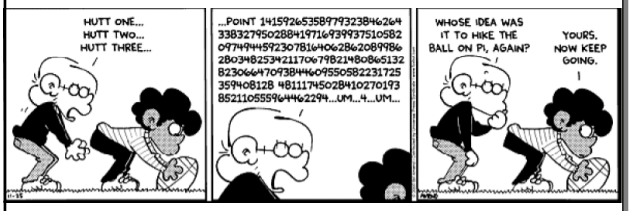
Graphs of Functions

Aug 20-10:08 AM



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The following equation and table represents the temperature y (in degrees Fahrenheit) of a certain city and x represents the time of day.

Time (x),	Temperature (y)
0	34
2	50
4	60
8	64
10	63
12	53
14	46
16	40
18	36
20	34
22	37
24	45

$y = .026x^3 - 1.03x^2 + 10.2x + 34$

Aug 20-10:35 AM

Now look at the graph!

Aug 23-8:20 AM

"Big ideas" about graphing:

-Is it a function?
-What is the domain and range?
-How do I graph?
-Is it symmetric (even/odd)?
-What are the intercepts?
-What are the zeros?
-What are the max/min values?-Is the function increasing or decreasing?

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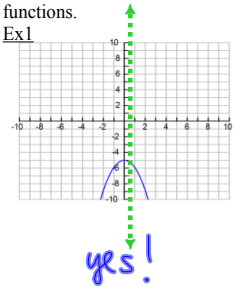
Vertical Line Test-

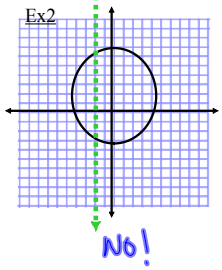
Use the Vertical Line Test to decide whether the graphs represent functions.

Ex1



yes!

Ex2



No!

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Domain? input
independent value
horizontal axis

Range?
output
dependent value
vertical axis

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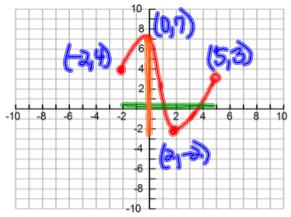
Use the graph to determine the domain and range.



Domain:
$-2 \leq x < 5$
or
$[-2, 5)$

Range:
$-2 \leq y \leq 7$
or
$[-2, 7]$

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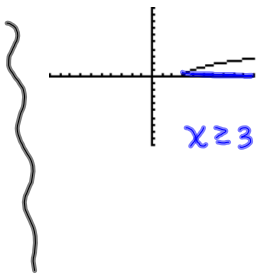
Find the domain of $f(x) = \sqrt{x-3}$
Algebraically and Graphically

$x - 3 \geq 0$
$x \geq 3$
all $\mathbb{R}$'s,
$x \geq 3$



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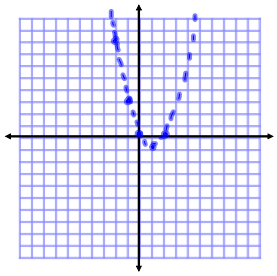
Sketch the graph of:

$y = x^2 - 2x$

x	y
0	0
1	-1
2	0
-1	3
-2	8



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You can ALWAYS graph by making a table!!

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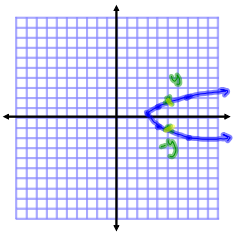
Symmetry:

A graph is symmetric with respect to the x-axis if, whenever (x, y) is on the graph, (x, -y) is also on the graph.

$x - 3 = y^2$



Test: replace y with -y and see if it yields an equivalent equations

$x - 3 = (-y)^2$

$x - 3 = y^2$ *same equation

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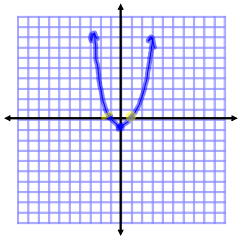
Symmetry:

*EVEN

A graph is symmetric with respect to the y-axis if, whenever (x, y) is on the graph, (-x, y) is also on the graph

$x^2 - y = 1$



Test: replace x with -x and see if it yields an equivalent equation

$(-x)^2 - y = 1$

$x^2 - y = 1$ * same equation

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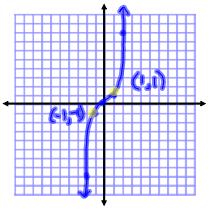
Symmetry:

*ODD

A graph is symmetric with respect to the origin if, whenever (x, y) is on the graph, (-x, -y) is also on the graph.

$y = x^3$



Test: replace x with -x and y with -y and see if it yields an equivalent equation

$-y = (-x)^3$

$-y = -x^3$

$y = x^3$ * same equation

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Even and Odd Functions

If:

$f(-x) = f(x) \Rightarrow$ even

$f(x) = x^2$

$f(-x) = (-x)^2 \Rightarrow f(-x) = x^2$

* y-axis symmetric

If:

$f(-x) = -f(x) \Rightarrow$ ODD

$f(x) = x^3$

$f(-x) = (-x)^3 \Rightarrow f(-x) = -x^3$

* origin symmetric

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$f(x) = x^4 - x$ Determine whether the function is even, odd, or neither

$f(-x) = (-x)^4 - (-x)$

$= x^4 + x$ NOT original equation ⇒ NOT even!

$-f(x) = -(x^4 - x)$

$= -x^4 + x$ NOT $f(-x) = x^4 + x$ ⇒ NOT odd

* Neither!

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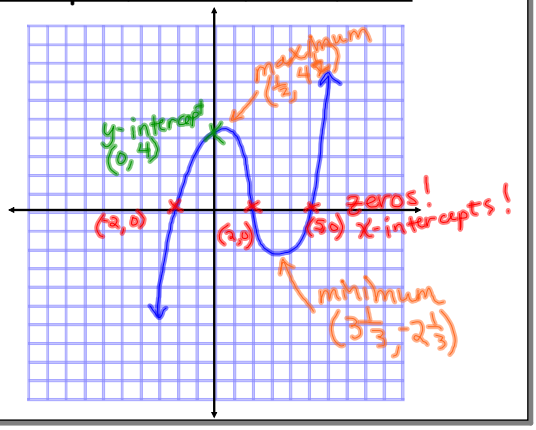
Intercepts, zeros, max, min



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Find the zeros of:

$$\frac{x^2 - 9x + 14}{4x}$$ → when numerator is zero!

$x^2 - 9x + 14 = 0$

$(x-7)(x-2) = 0$

$x = 7, 2$

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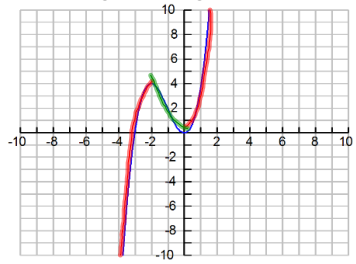
Determine the intervals the function is increasing, decrasing, or constant.



* look at y-values, list x-values

Increasing:
$(-\infty, -2)$
$(0, \infty)$

decreasing
$(-2, 0)$

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HW:

Pg 86 #8,14,18,41,65

Pg 210 #3,6,10,29,33,72

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