1.2:
- #15-29odd (determining if a relation is a function; determining function values)
- #40,41,42,45,48 (determining domain of a function)
- #59-70all (determining if a graph is a function; domain & range from graph)

1.4:
- #35-47odd; 53-63odd (determining equations of lines; parallel v. perpendicular)

1.5:
- #1-16all (determining characteristics of functions from graphs)
- #47-61odd (determining function values of & graphing piecewise functions)
- #69-74all (finding domain, range & equation given graph of a piecewise function)

1.6: #23,29,31; 45, 49, 51; 63, 71,75; 81, 83 (algebra of functions)

1.7: #9,11,21,23; 39-47odd (symmetry tests)

#59-69odd; 77-83 odd; 93-101odd; 115-121odd (graphing with transformations)

2.4: #1,2; 15-22all; 23-27odd (parabolas)

2.4: #3-13 odd

1.3/1.4 - Linear functions (taken from http://mathemartiste.com/precal/PrecalculusNotes.pdf)

A linear function is one of the form $f(x) = mx + b$, where m is the slope of the line and b is the y-intercept. $y = mx + b$ is called the slope-intercept form of the equation of a line.

The slope of a linear function can be found by taking the ratio of change in y-values over the change in x-values.

$m = \frac{y_2 - y_1}{x_2 - x_1} = "\frac{rise}{run}"$

Given the slope m and a point (x_1, y_1) on a line, the slop-intercept form can be easily found by plugging these values into the point-slope equation: $y - y_1 = m(x - x_1)$.

Lines with a 0-slope are called horizontal lines and are of the form $y = k$ for some constant k. Vertical lines are said to have "no slope" and are of the form $x = k$.

Two lines in a plane are parallel if they never intersect. Two lines are perpendicular if their intersection forms a 90° angle.

Let l_1 be the graph of $f_1(x) = m_1x + b_1$ and let l_2 be the graph of $f_2(x) = m_2x + b_2$. l_1 and l_2 are parallel if $m_1 = m_2$. This is denoted $l_1 \parallel l_2$. l_1 and l_2 are perpendicular if $m_1 = -\frac{1}{m_2}$. This is denoted $l_1 \perp l_2$.

slope-intercept form	Slope	horizontal lines	Parallel
$y = mx + b$	$m = \frac{y_2 - y_1}{x_2 - x_1}$	$y = k$ for some constant k (0 slope)	$m_1 = m_2$
point-slope equation		vertical lines	Perpendicular
$y - y_1 = m(x - x_1)$		$x = k$ (no slope)	$m_1 = -\frac{1}{m_2}$

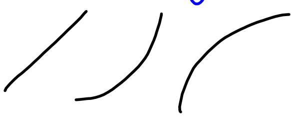
1.5 More on Functions

Topics to cover in this section:

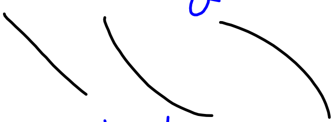
- identifying intervals on which a function is increasing, decreasing, constant
- identifying relative maxima and minima
- graphing piecewise functions
- greatest integer function

i.e. LOTS OF GRAPHING!

increasing

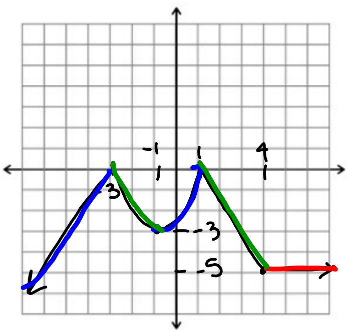


decreasing



constant

↑ horizontal



domain: $(-\infty, \infty)$

$\mathbb{R}$

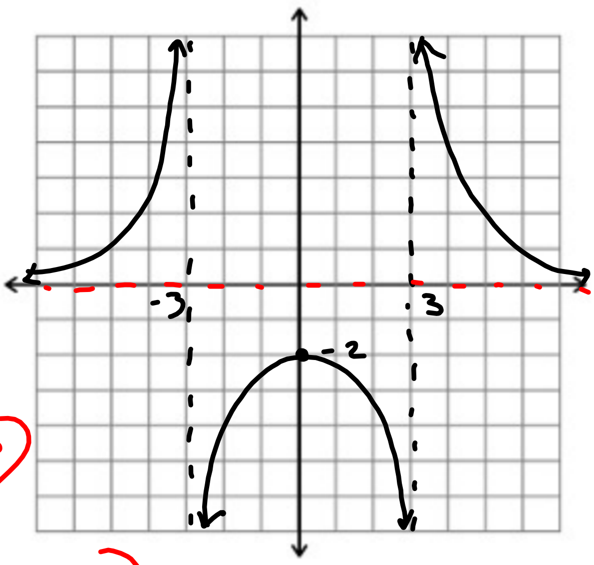
range: $(-\infty, 0]$

constant: $(4, \infty)$

increasing: $(-\infty, -3) \cup (-1, 1)$

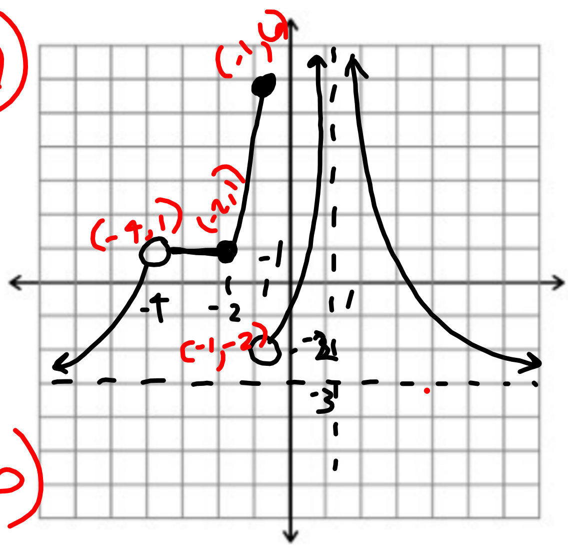
decreasing: $(-3, -1) \cup (1, 4)$

increasing:
$(-\infty,-3)\cup(-3,0)$
decreasing:
$(0,3)\cup(3,\infty)$
constant:
N/A
domain: $\{x \mid x \neq -3, 3\}$
$(-\infty,-3)\cup(-3,3)\cup(3,\infty)$
range: $(-\infty,-2]\cup(0,\infty)$
$\{x \mid x \leq -2 \text{ or } x > 0\}$



increasing:
$(-\infty,-4)\cup(-2,-1)\cup(-1,1)$
decreasing:
$(1,\infty)$
constant: $(-4,-2)$

domain: $\{x \mid x \neq -4, 1\}$
$(-\infty,-4)\cup(-4,1)\cup(1,\infty)$
range:
$(-3,\infty)$



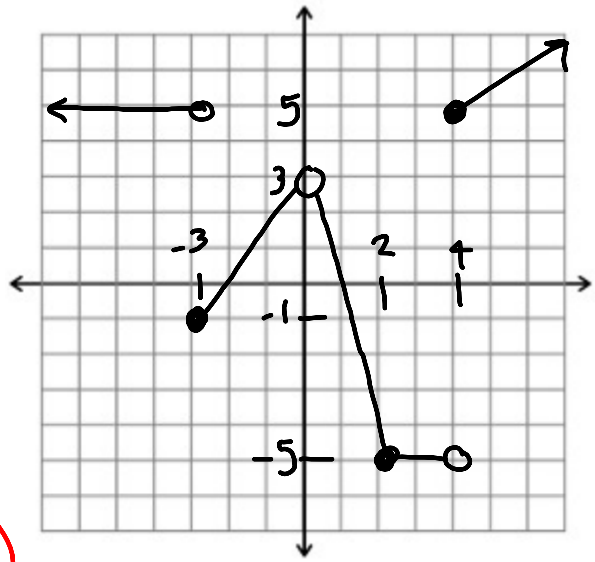
increasing:
$(-3, 0) \cup (4, \infty)$

decreasing:
$(0, 2)$

constant:
$(-\infty, -3) \cup (2, 4)$

domain: $\{x \mid x \neq 0\}$
$(-\infty, 0) \cup (0, \infty)$

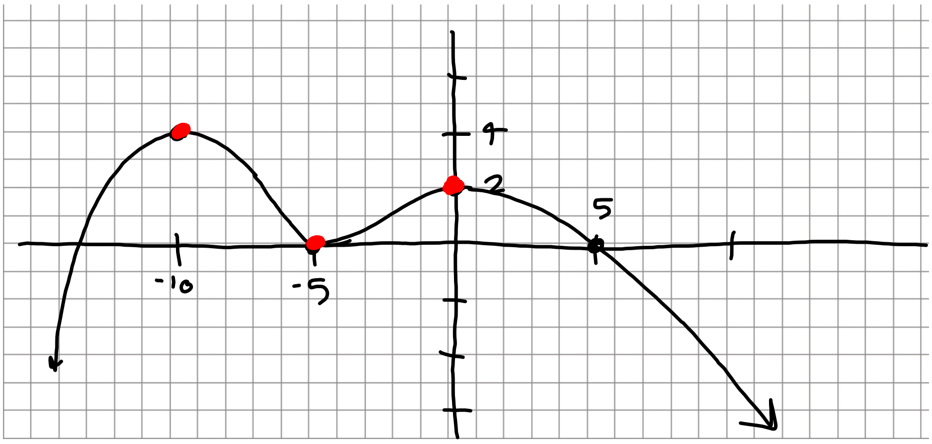
range: $[-5, 3) \cup [5, \infty)$



Maxima & Minima =
Extrema of a Function

Absolute max/min refer to single highest or lowest values on the graph (if they exist)

Relative max/min refer to highest & lowest values in small intervals

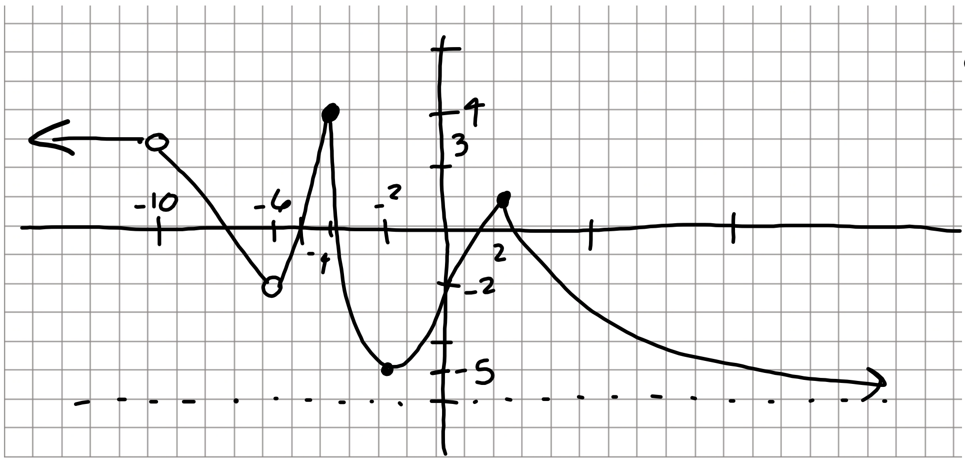


relative max:
(-10, 4) & (0, 2)

relative min:
(-5, 0)

absolute max:
4 @ x = -10

absolute min:
none



domain:
$(-\infty, -10) \cup (-10, -6) \cup (-6, \infty)$

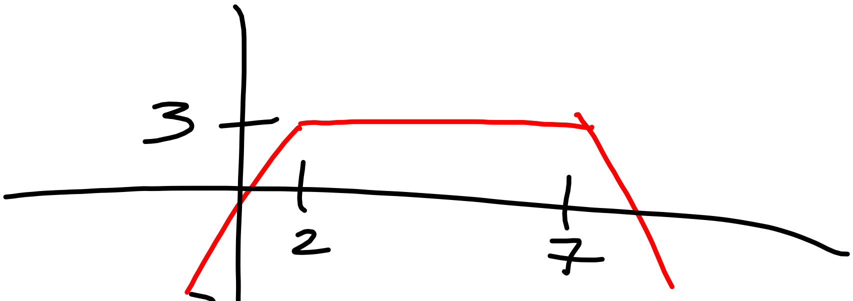
range:
$(-6, 4]$

relative min:
(-2, -5)

relative max: (-4, 4), (2, 1)

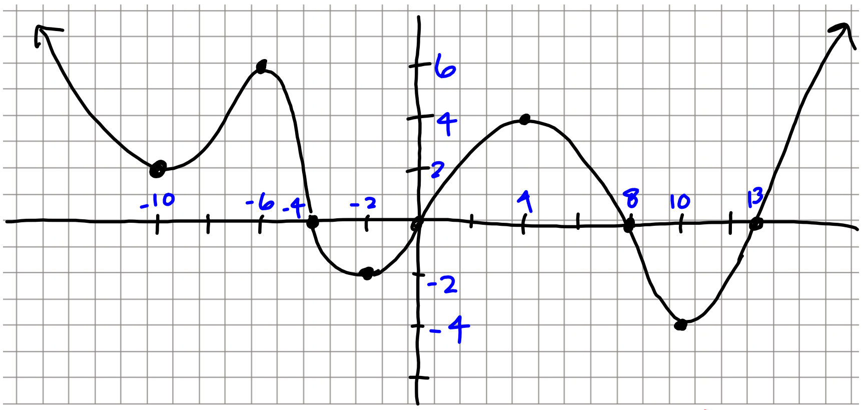
absolute min:
none

absolute max: 4 @ x = -4



abs max: 3

$@\ 2 \le x \le 7$



relative max:
$(-6,6), (4,4)$

relative min:
$(-10,2), (-2,-2),$
$(10,-4)$

abs. max:
none

abs. min:
$-4\ @\ x=10$

domain:
$(-\infty,\infty)$

range:
$[-4,\infty)$

increasing: $(-10,-6) \cup (-2,4) \cup (10,\infty)$

decreasing: $(-\infty,-10) \cup (-6,-2) \cup (4,10)$