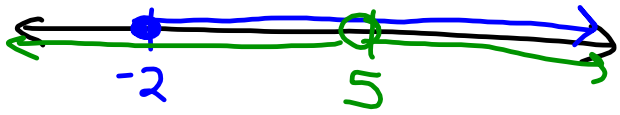
$$f(x)=\frac{\sqrt{x+2}}{x-5}$$

$\{x \mid x+2 \geq 0\}$ $\cap$ and $\{x \mid x-5 \neq 0\}$

$x \geq -2$ and $x \neq 5$



Domain:

$[-2,5) \cup (5,\infty)$

Find the function value

$$f(x)=2x^2-5$$

$f(3)=2(3)^2-5=\boxed{13}$

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

$f(-2)=-(-2)^3-(-2)^2=-(-8)-4=8-4=\boxed{4}$

$$f(x) = 5x^2 - 4x$$

$$f(x+h) \neq 5x^2 - 4x + h = f(x) + h$$

$$= 5(x+h)^2 - 4(x+h)$$

$$= 5(x^2 + 2xh + h^2) - 4x - 4h$$

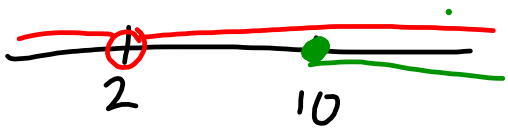
$$= 5x^2 + 10xh + 5h^2 - 4x - 4h$$

$$f(x) = \frac{\sqrt{x-3}}{x+5}$$

$$f(x-7) = \frac{\sqrt{(x-7)-3}}{(x-7)+5} = \frac{\sqrt{x-10}}{x-2}$$

$x - 2 \neq 0$ and $x - 10 \geq 0$

$x \neq 2$ $\quad x \geq 10$



domain of $f(x-7)$: $[10, \infty)$

1.3/1.4 - Linear functions (taken from http://www.asms.net/brewer/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

$y = mx + b$

point-slope equation

$y - y_1 = m(x - x_1)$

Slope

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

horizontal lines

$y = k$ for some constant k (0 slope)

vertical lines

$x = k$ (no slope)

Parallel

$m_1 = m_2$

Perpendicular

$m_1 = -\frac{1}{m_2}$

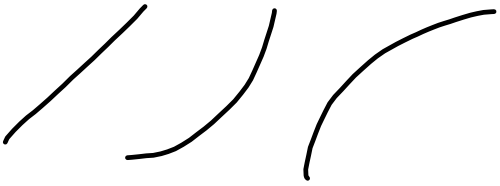
1.5 More on Functions

Topics to cover in this section:

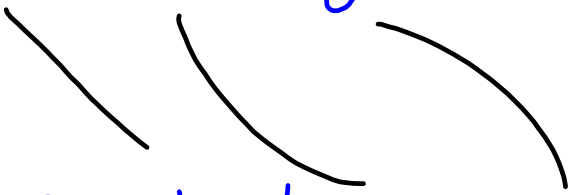
- identifying intervals on which a function is increasing, decreasing, constant
- identifying relative maxima and minima
- graphing piecewise functions
- greatest integer function

i.e. LOTS OF GRAPHING!

increasing



decreasing

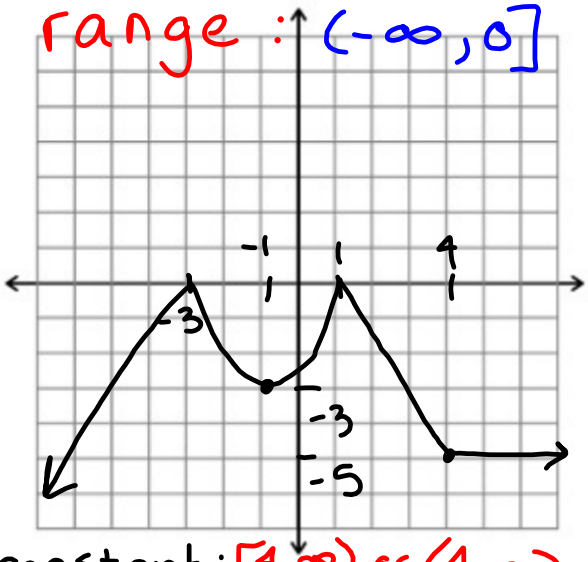


constant

↑ horizontal

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

range: $(-\infty,0]$



constant: $[4,\infty)$ or $(4,\infty)$

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

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

increasing:

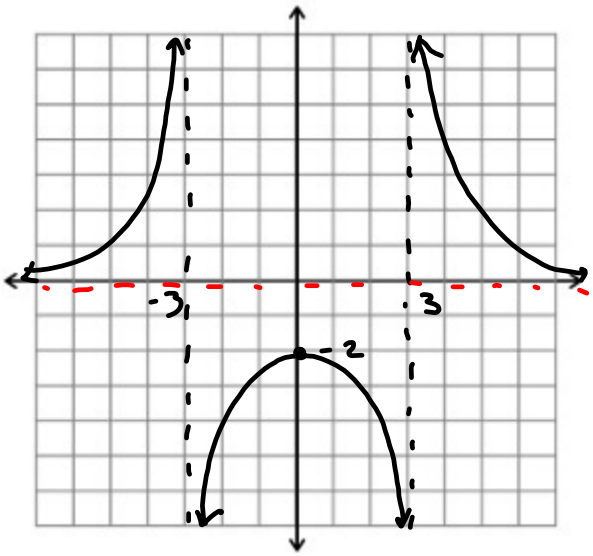
$(-\infty,-3)\cup(-3,0)$

decreasing:

$(0,3)\cup(3,\infty)$

constant:

N/A



domain:

$(-\infty,-3)\cup(-3,3)\cup(3,\infty)$

range:

$(-\infty,-2]\cup(0,\infty)$

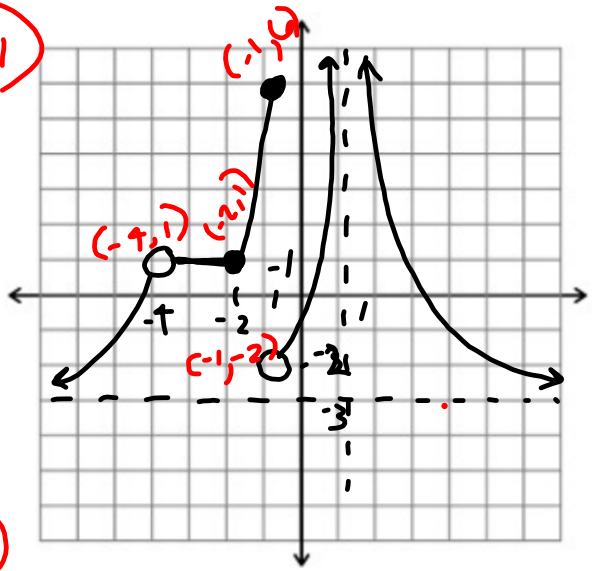
increasing:
$(-\infty,-4)\cup(-2,-1)\cup(-1,1)$

decreasing:
$(1,\infty)$

constant:
$(-4,-2)$

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

range:
$(-3,\infty)$



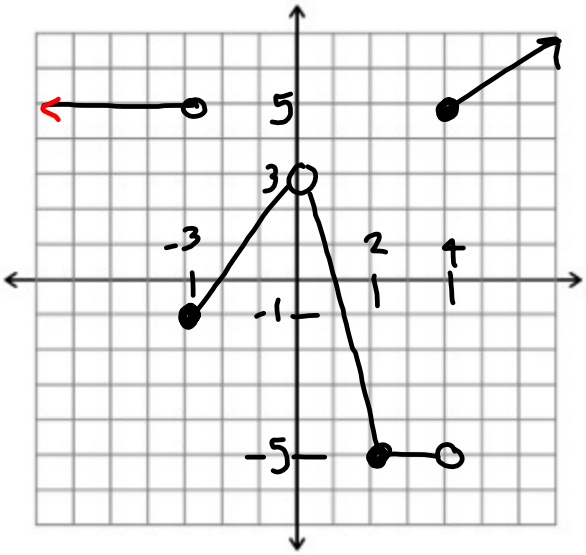
increasing:
$(-3,0)\cup(4,\infty)$

decreasing:
$(0,2)$

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

domain:
$(-\infty,0)\cup(0,\infty)$

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



Homework #1 (due Friday, 08/15):

- 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)