week Number 1 problem N8

Find the domain of the fn-tion:

1) $g(x) = 2\sqrt{x-4}$ assume that $g(x)$ is y

So that $y = 2\sqrt{x-4}$

$y = 2\sqrt{x-4}$ $y \cdot \frac{1}{2} = \sqrt{x-4}$

$\left(\frac{y}{2}\right)^2 + 4 = x$ $\frac{y^2}{4} + 4 = x$ $\frac{y^2}{4} + \frac{16}{4} = x$

$\frac{y^2 + 16}{4} = x$ $\frac{y^2 + 4^2}{4} = x$

2) assume that $x = 1$

$f(1) = 2\sqrt{1-4} = 2\sqrt{-3}$ Not.

$f(4) = 2\sqrt{4-4} = 2 \cdot 0 = 0.$

$f(6) = 2\sqrt{6-4} = 4$

$f(8) = 2\sqrt{8-4} = 2\sqrt{4} = 4$

$f(5) = 2\sqrt{5-4} = 2.$

$\sqrt{\underbrace{\quad}_{z}}$ $z \geq 0$ $z-4 \geq 0$ 4 was taken as a

$x \geq 0$ $x \geq 4$ smalest number value.

So it means the following $D: [4, \infty)$

$R: [0, \infty).$

Week 1. problem. 9,

$h(x) = -2x^2 + 4x - 9$ ~~tats~~ assume $x=2$

$h(2) = -2 \cdot (2)^2 + 4 \cdot 2 - 9 = -2(4) + 8 - 9 = -7$

$h(2) = -7$

lets assume $x = 4$

$h(4) = -2(4)^2 + 4 \cdot 4 - 9 = -32 + 7 = -25$

$h(4) = -25$.

only numbers could be written.
so $(-\infty; \infty)$.

the vertex is $-\frac{b}{2a}; f\left(-\frac{b}{2a}\right)$ $a=2$ $b=4$

$\left(-\frac{4}{2 \cdot 2}; f\left(-\frac{4}{2 \cdot 2}\right)\right)$ $a=2$ $b=4$

the vertex is $(-1; f(-1))$
wich is $(-1, 2*(-1)^2 - 9)$
or $(-1, -11)$;

the range will be ~~started~~ at -11.
parabola opens ~~uphe~~ upward $R: [-11, \infty)$.

week 1. problem 10.

$x^2 - 2x - 15 \geq 1$

$x^2 - 2x \geq 1 + 15$

$x \cdot (x-2) \geq 16$.

$x^2 - 2x - 15 = 0$

$(x-5)(x+3) = 0$

$x - 5 = 0$ $x = 5$

$x + 3 = 0$ $x = -3$

$f(x) = x - 4x^2 - 2x - 15$

the domain will be:
$(-\infty; -3) \cup (-3; -5) \cup (-5; \infty)$.

week1 problem 11.

$f(x) = -2x + 1 \quad -1 \le x < 0$ points could be $(1, -1)$

$f(x) = x^2 + 2 \quad 1 \le x < 3$

$f(x) = -2x + 1$ $\quad x = 1$

$f(1) = -2 \cdot (-1) + 1 = -2 + 1 = -1$ $\quad x = -1.$

cannot be used.

than let's see next equation.

$f(x) = x^2 + 2 \quad x = 1$

$f(1) = 1^2 + 2 = 3. \quad x = 3$ points could be $(1, 3)$

Let's count left side $(x=-1)$: $f(-1) = 3$ $(-1; 3)$

Let's count right side $(x=1)$: $f(1) = -2(0) + 1 = 1.$ (0)

doesn't include 0. $(0, 1)$

between this points it is possible to create line on the graph.

Let's find points for the second function.

$f(x) = x^2 + 2$ where $0 \le x \le 2.$

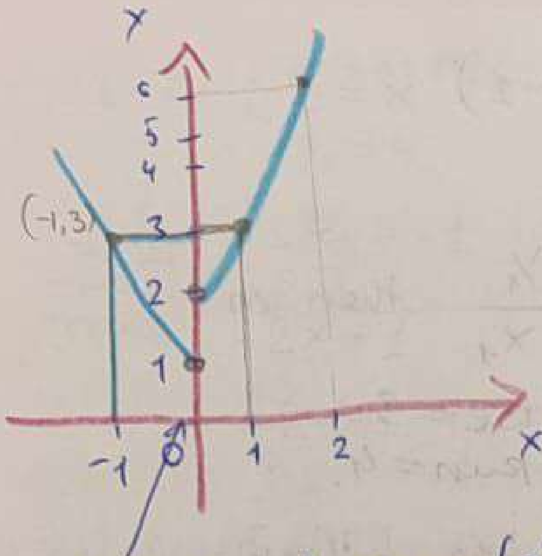
from $x = 0.$ to $x = 2.$ (including).

let's count left side $(x=0)$: $f(0) = 0^2 + 2 = 2$ $(0, 2)$

let's count middle $(x=1)$: $f(1) = 1^2 + 2 = 3$ $(1, 3)$

let's count right side $(x=2)$: $f(2) = 2^2 - 2 = 6$ $(2, 6)$

let's create a graph:



$2x+1 \quad [-1; 0]$

$x=-1 \quad y=3. \quad (-1,3)$

$x=0 \quad y=1. \quad (0;1)$

$x^2+2 \quad [0,2]$

$x=0 \quad y=2 \quad (0,2)$

$x=1 \quad y=3 \quad (1,3)$

$x=2 \quad y=6 \quad (2,6)$

here is not zero(0), but 0,5.

x	-1	$-0{,}5$	0	1	2
$f(x)$	3	2	2	3	6

$x=-1; \quad f(-1)=-2\cdot(-1)+1=3$

$x=-0{,}5; \quad f(-0{,}5)=-2(-0{,}5)+1=2$

$x=0; \quad f(0)=2$

$x=1; \quad f(1)=1^2+2=3$

$x=2; \quad f(2)=2^2+2=6$

second function.
three points becase of parabola.

week 1 problem 12.

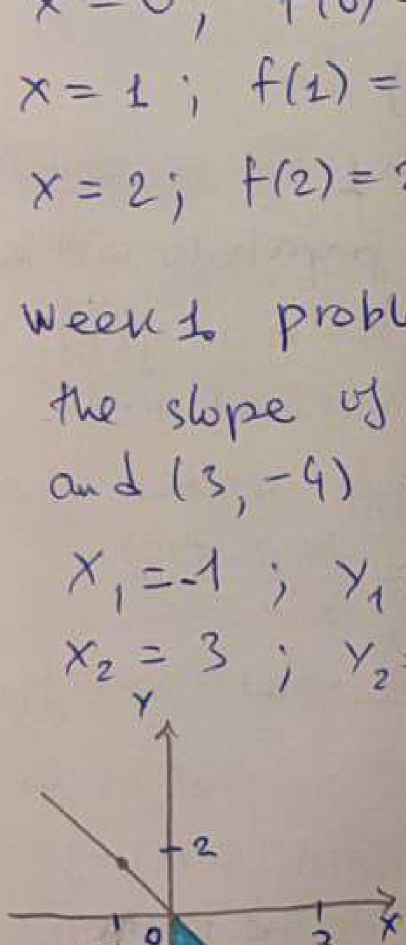
the slope of the line passes through the points $(-1,2)$ and $(3,-4)$ point and graph will be following:

$x_1=-1; \quad y_1=2$

$x_2=3; \quad y_2=-4$

$$m\,(\text{slope})=\frac{y_2-y_1}{x_2-x_2}=\frac{(-4)-2}{3-(-1)}=\frac{-6}{3+1}=-\frac{6}{4}=-\frac{3}{2}.$$

the slope is $=-\frac{3}{2}$.



also range $=\frac{x_1}{y_1};\ \frac{x_2}{y_2}$

week 1 problem 13

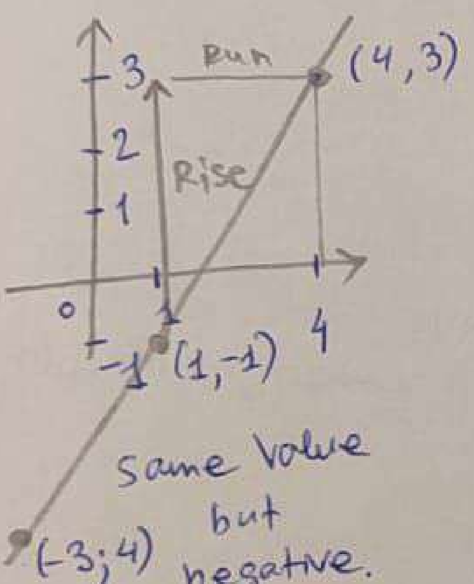
the line is passing the point $(1,-1)$ $x=1$; $y=-1$.
whose slope is $m=\frac{3}{4}$;

if we have formula $m=\frac{y_2-y_1}{x_2-x_1}$ then $m=\frac{\text{Rise}}{\text{Run}}$.

So $m=\frac{3}{4}$ equals $\frac{\text{Rise}}{\text{Run}}=\frac{3}{4}$ or Rise $=3$
Run $=4$.

also it could be negative with the following value:

$y=-3$ Rise $=-3$
$x=-4$ Run $=-4$ } we can consider this as a third point.



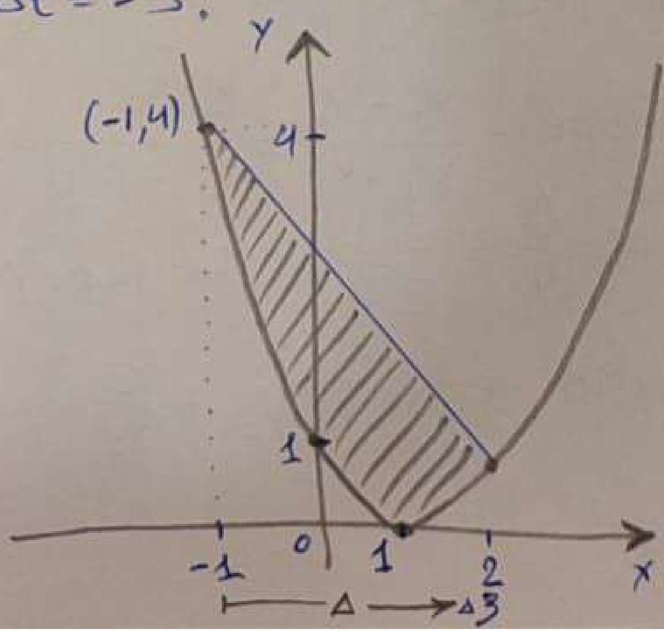
problem 14

find average rate of change on the interval function $g(t)$

$x_1=-1$ if $(t)=-1$
$x_2=2$ $g(t)=g(-1)=4$
$t=2$ $g(2)=1$.

So the point on the parabola will be $(-1,4)$ and $(2,1)$ shown in $g(t)$

and t the horizontal change $\Delta t=3$. vertical and.
also $\Delta t=-3$.



the average rate of change $=\frac{f(4)-f(2)}{4-2}=$

$=\frac{\frac{31}{2}-\frac{7}{2}}{2}$; let's simplify:

$=\frac{12}{2}=6$. So this is an average speed (Rate) of change with the function.
to $f(x)=x^2-\frac{1}{2}$ on the interval ($x=2$ $x=4$) or $(2, 3,5)$ and $(4, 15,\frac{0}{9})$

Week 1 Problem 14. continue.

$y_2 = 1$ $\quad y_1 = 4$

$y_1 = 2$ $\quad x_1 = -1$ $\quad m = \dfrac{y_2 - y_1}{x_2 - x_1} = \dfrac{1-4}{2-(-1)} = -\dfrac{3}{3} = -1.$

Problem 15.

Complete the areverage rate of $f(x) = x^2 - \frac{1}{x}$ on the interval $[2, 4]$. the areroage rate of change is equels $ARC = \dfrac{f(b) - f(a)}{b - a}$

$[a, b]$ is an interval, than $f(x) = x^2 - \frac{1}{2}$ $[2, 4]$.

$a = 2$ $\quad b = 4$

$f(x) = x^2 - \frac{1}{2}$ $[2, 4]$ $\quad f(x) = f(2) = 2^2 - \frac{1}{2} = 4 - \frac{1}{2} = \frac{8-1}{2} = \frac{7}{2}$

~~$f(4) = 4^2 - \frac{1}{2} = 16 - \frac{1}{2} = \frac{32}{2} - \frac{1}{2} = \frac{31}{2}$;~~

[illegible].

$f(x) = x^2 - \frac{1}{x}$ $\quad x = 2$ $\quad$ Range.

$\qquad\qquad\quad x = 4$

~~$f(2) = 2^2 - \frac{1}{2}$~~ $\quad f(4) = 4^2 - \frac{1}{2} = 16 - \frac{1}{2} = \frac{63}{4}$

$ARC = \dfrac{f(4) - f(2)}{4-2} = \dfrac{\frac{63}{4} - \frac{7}{2}}{4-2} = \dfrac{\frac{49}{4}}{2} = \dfrac{49}{8}.$

Problem 16. $\quad$ we need to evaluate $f(h(1))$

$f(t) = t^2 - t$ $\quad h(x) = 3x + 2$ $\quad x = 1$

$h(1) = 1 \cdot 3 + 2 = 5$ $\quad h(1) = 5.$

$f(h(1)) = 5^2 - 5 = 25 - 5 = 20.$ $\quad f(h(1)) = 20.$

Problem 17. Week 1

$(g-f)(x) = g(x) - f(x)$ so $\left(\frac{g}{f}\right)(x) = \frac{g(x)}{f(x)}$

$f(x) = x-1$ $\quad x^2-1-(x-1) = x^2-x = x(x-1)$

$g(x) = x^2-1$ $\quad (g-f)(x) = x(x-1)$

$$\frac{g(x)}{f(x)} = \frac{x^2-1}{x-1} = \frac{x+1}{1} = x+1.$$

$x+1 \neq x(x-1)$ No the same :)

it also necessary that we should here $x \neq 1$, becy the denominator musb be not $x=0$.