DETERMINE WHEATHER EACH RELATION REPRESENTS A FUNCTION. FOR EACH FUNCTION, STATE THE DOMAIN AND RANGE

$\{(-2,4),(-2,6),(0,3),(3,7)\}$ $-2 \begin{smallmatrix} 4 \\ 6 \end{smallmatrix}$ Not function ⇒ Relation

$\{(-2,16),(-1,4),(0,3),(1,14)\}$ ⇒ function

domain = $\{-2,-1,0,1\}$
range $\{3,4,14,16\}$

DETERMINE WHEATHER THE EQUATION DEFINES y AS A FUNCTION OF x

$y=2x^2-3x+4$ yes

$x^2-4y^2=1 \Rightarrow -4y^2=1-x^2$

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

$y=\pm\sqrt{\frac{x^2}{4}-\frac{1}{4}}$ $y=\begin{cases}\sqrt{\frac{x^2}{4}-\frac{1}{4}} \\ -\sqrt{\frac{x^2}{4}-\frac{1}{4}}\end{cases}$ No

$x^2+y-13=0 \Rightarrow y=13-x^2$ yes

FIND THE FOLLOWING FOR $f(x)$:

$f(x)=\sqrt{x^2+x}$

$f(0)=\sqrt{0^2+0}=\sqrt{0}=0$

$f(1)\ \sqrt{1^2+1}=\sqrt{2}$

$f(-1)=\sqrt{(-1)^2+(-1)}=\sqrt{1-1}=\sqrt{0}=0$

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

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

$f(x+1)=\sqrt{(x+1)^2+(x+1)}$
$=\sqrt{x^2+2x+1+x+1}$
$=\sqrt{x^2+3x+2}$

FIND THE DOMAIN OF EACH FUNCTION:

$f(x) = x^2+2 \Rightarrow$ Domain $(-\infty, \infty)$; $\mathbb{R}$

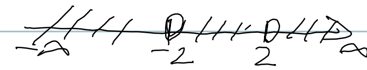
$h(x) = \dfrac{2x}{x^2-4} \Rightarrow x^2-4 \neq 0$ $x \neq 2$, $x \neq -2$

$x^2-4=0$

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

$x-2=0 \qquad x+2=0$

$x=2 \qquad x=-2$

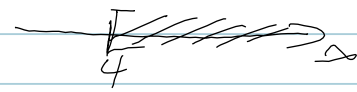


Domain $(-\infty,-2) \cup (-2,2) \cup (2,\infty)$; $\mathbb{R}-\{-2,2\}$

$g(x) = \sqrt{3x-12} \Rightarrow 3x-12 \geq 0$

$3x \geq 12$

$x \geq 4$



Domain $[4,\infty)$

$f(x) = \dfrac{x}{\sqrt{x-4}} \Rightarrow x-4>0$

$x>4$

Domain $(4,\infty)$

$f(x) = \dfrac{x^2}{x^2+1} \Rightarrow x^2+1 \neq 0$

$x^2+1=0$

$x^2=-1$

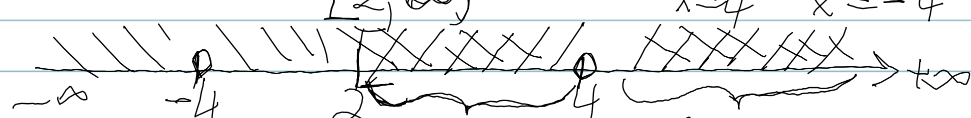
$x = \pm\sqrt{-1} \Rightarrow$ complex solution Not real

Domain $(-\infty,\infty)$

$\ell(x) = \dfrac{\sqrt{x-2}}{x^2-16} \Rightarrow x-2 \geq 0 \qquad x^2-16=0$ $x \neq 4$, $x \neq -4$,

$x \geq 2 \qquad (x-4)(x+4)=0$

$[2,\infty) \qquad x=4 \quad x=-4$



Domain $[2,4) \cup (4,\infty)$

FOR THE GIVEN FUNCTIONS $f(x)=\sqrt{x}$ AND $g(x)=3x+5$, FIND THE FOLLOWING:

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

$(f\cdot g)(x)=f(x)\cdot g(x)=\sqrt{x}(3x+5)=3x\sqrt{x}+5\sqrt{x}$

$\left(\frac{f}{g}\right)(x)=\frac{f(x)}{g(x)}=\frac{\sqrt{x}}{3x+5}$

$(f-g)(4)=f(4)-g(4)=(\sqrt{4})-(3\cdot4+5)$
$=(2)-(12+5)$
$=2-17$
$=-15$

IF $f(x)=\frac{2x-B}{3x+4}$ AND $f(2)=\frac{1}{2}$, WHAT IS THE VALUE OF B?

$f(2)=\frac{4-B}{6+4}=\frac{4-B}{10}$

$f(2)=\frac{1}{2}$

$\frac{4-B}{10}=\frac{1}{2}$

$8-2B=10$
$-2B=2$
$B=-1$