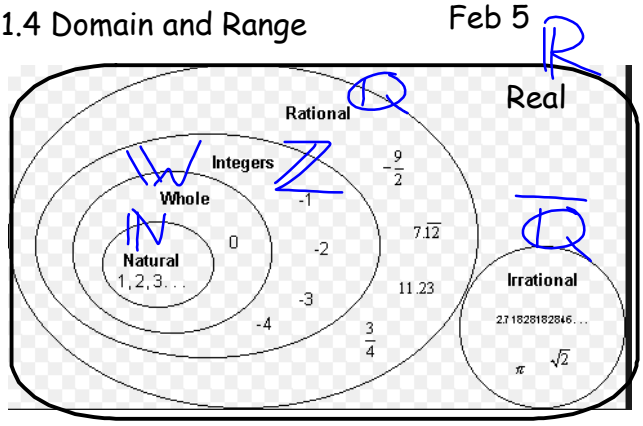
1.4 Domain and Range

Feb 5

Number Sets



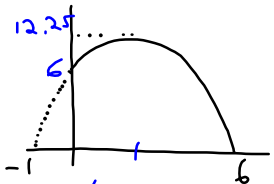
Realistic restrictions

A rock is tossed off of a building according to the function $h(t) = -t^2 + 5t + 6$ with h in metres and t in seconds.
Determine the domain and range of the problem.

$0 = -t^2 + 5t + 6$ → $t = -1, 6$

$0 = -(t^2 - 5t - 6)$

$0 = -(t + 1)(t - 6)$



$t = \frac{-1+6}{2} = \frac{5}{2} = 2.5$

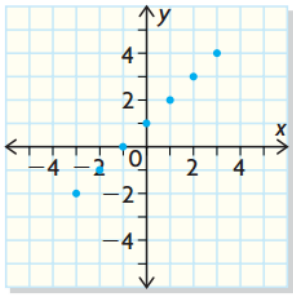
$\therefore D = \{t \in \mathbb{R} \mid 0 \le t \le 6\}$

$R = \{h(t) \in \mathbb{R} \mid 0 \le h(t) \le 12.25\}$

$h(2.5) = -2.5^2 + 5(2.5) + 6 = 12.25$

Determine domain and range of each relation

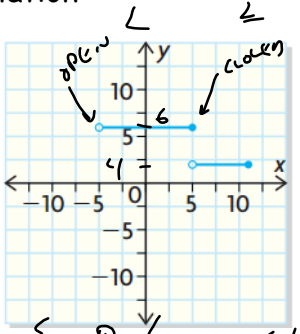
a)



$D = \{-3, -2, -1, 0, 1, 2, 3\}$

$R = \{-2, -1, 0, 1, 2, 3, 4\}$

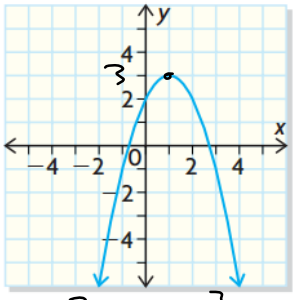
b)



$D = \{x \in \mathbb{R} \mid -5 < x \le 10\}$

$R = \{4, 6\}$

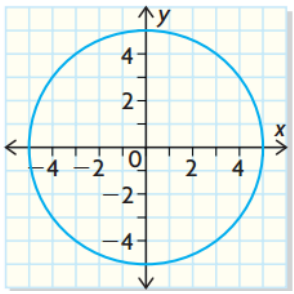
c)



$D = \{x \in \mathbb{R}\}$

$R = \{y \in \mathbb{R} \mid y \le 3\}$

d)



$D = \{x \in \mathbb{R} \mid -5 \le x \le 5\}$

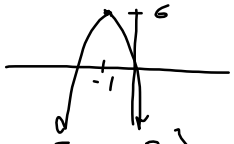
$R = \{y \in \mathbb{R} \mid -5 \le y \le 5\}$

Determine the domain and range of each function.

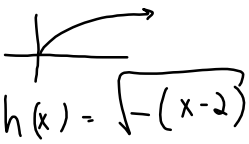
a) $f(x) = 2x - 3$ **b)** $g(x) = -3(x + 1)^2 + 6$ **c)** $h(x) = \sqrt{2 - x}$

HORIZONTAL REFLECTION

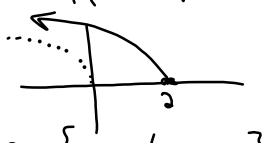
$D = \{x \in \mathbb{R}\}$
$R = \{y \in \mathbb{R}\}$



$D = \{x \in \mathbb{R}\}$
$R = \{y \in \mathbb{R} / y \leq 6\}$



$h(x) = \sqrt{-(x-2)}$

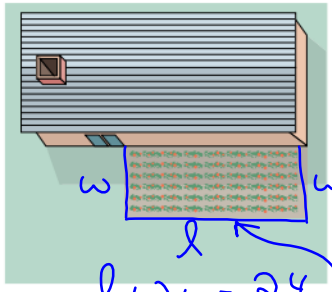


$D = \{x \in \mathbb{R} / x \leq 2\}$
$R = \{y \in \mathbb{R} / y \geq 0\}$

Vitaly and Sherry have 24 m of fencing to enclose a rectangular garden at the back of their house.

a) Express the area of the garden as a function of its width.

b) Determine the domain and range of the area function.



$l + 2w = 24$

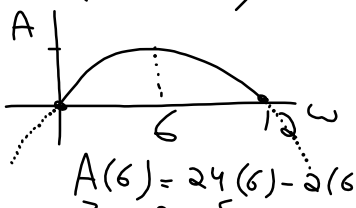
$l = 24 - 2w$

a) $A(w) = lw$

$= (24 - 2w)w$

$A(w) = 24w - 2w^2$

b) $A(w) = 2w(12 - w)$



$A(6) = 24(6) - 2(6)^2 = 72$

$\therefore D = \{w \in \mathbb{R} / 0 \leq w \leq 12\}$, $R = \{A(w) \in \mathbb{R} / 0 \leq A(w) \leq 72\}$

Homework: p.35#1-5,7,9,11-14