Homework 1

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2.2 C

we pick

2.2 D

2.3 D

Worksheet 1

a

if $x > 1$ then $x^2 > x$. If $0 < x < 1$ then $x^2 < x$

proof

$$x^2 = x \cdot x$$
$$x \cdot x > 0 \text{ by axiom 8}$$
$$x \cdot x = x_1 + x_2 + ... + x_x$$
$$0 < x$$
$$0 + x < x + x \text{ by axiom 7}$$
$$x < x_1 + x_2 + ... + x_i \text{ by induction}$$

Therefore $x < x^2$ □

b

if $x > 0$ then $x^{-1} > 0$

proof

let $x^{-1} = z$. Then $xz = 1$. Axiom 8 states that if $0 > xy$ then $x < 0$ or $y < 0$. Because multiplication is closed on $\mathbb{R}$ we know that $-xz = -1$. Since $-1 < 0$ we know that $x < 0$ or $-z < 0$ because $x > 0$ we know that $-z < 0$. Or $z > 0$ □

c

if $0 < x < y$ then $0 < y^-1 < x^-1$

proof

$y^{-1} = m, x^{-1} = n.$ $xn = 1, ym = 1.$

Worksheet 2

a

supremum$=\frac{3}{2}$. infimum$=-1$. No minimum, maximum is $\frac{3}{2}$

b

this set is all reals. no supremum, infimum or min or max

Worksheet 3

let m lower bound for A. Then $m < x$ for all x in A. and $-x < -m$. because -x is in -A then we have an upper bound of -m for -A. Thus inf(A)=-sup(-A)