Section 2.1: 10, 11, 13, 14, 20, 23, 25
Section 2.2: 1, 2, 10, 12, 17

2.1.10a)

If $a<b$ and $c\leq d$, then $a+c<b+d$.
Let's suppose that $c=d$. This implies that $a+c<b+d$.
So if $c<d$ we can construct $a<b$ where $a+c<b+c$ and
$c\leq d$ to be constructed $b+c\leq b+d$.
$\therefore$ $a<b$ and $c\leq d$ then $a+c<b+d$

2.1.10b)

We know that $a>b$ we multiply the multiplicative inverse of b which is b^{-1} to both sides.

$$a<b \Rightarrow b^{-1}a \quad b\cdot b^{-1} \Rightarrow \frac{a}{b}<1$$

Same goes for c d

$$c\leq d \Rightarrow d^{-1}c \quad d\cdot d^{-1} \Rightarrow \frac{c}{d}\leq 1$$

then multiplying $\frac{a}{b}$ and $\frac{c}{d}$ results in $\frac{ac}{bd}\leq 1$ by multiplying bd on both sides we get $ac\leq bd$.
If $c\leq d$ holds then $0\leq ac\leq bd$ holds.

2.1.11a)

Proof by contradiction:

Assume $1/a \ngtr 0$. If $1/a=0$, then $1=a\cdot(1/a)=a\cdot 0=0$, which contradicts multiplicative inverse.
If $1/a<0$, then this implies $1=a(1/a)<0$ contradicts the Trichomotry properties. Thus $1/a>0$, and
to show that $1/(1/a)=a$.

We know that $a\cdot\frac{1}{a}=1$ by the multiplicative inverse property.

$$a\cdot\frac{1}{a}=1 \quad \text{multiplicative inverse}$$

$$a\cdot\left(\frac{1}{a}\right)^{-1}\left(\frac{1}{a}\right)=1\cdot\left(\frac{1}{a}\right)^{-1} \quad \text{multiplicative inverse/identity}$$

$$\therefore\ a=1/\left(\frac{1}{a}\right)$$

2.1.11 b)

If $a < b$,