Math 231 HW #2

2.1 12, ~~11~~ 46a

2.2 7, 21,

3.1 7

2.1 #12 $\sim p \wedge q$:

p	q	$\sim p$	$\sim p \wedge q$
T	T	F	F
T	F	F	F
F	T	T	T
F	F	T	F

2.1 #46a $p \oplus p \equiv c$ a contradiction

p	$p \oplus p$
T	F
F	F

$(p \oplus p) \oplus p \equiv c \oplus p$, this is p:

p	c	$c \oplus p$
T	F	T
F	F	F

So $(p \oplus p) \oplus p = p$.

2.2 #7 $p \wedge \sim q \rightarrow r$

p	q	r	$\sim q$	$p \wedge \sim q$	$p \wedge \sim q \rightarrow r$
T	T	T	F	F	T
T	T	F	F	F	T
T	F	T	T	T	T
T	F	F	T	T	F
F	T	T	F	F	T
F	T	F	F	F	T
F	F	T	T	F	T
F	F	F	T	F	T

2.2 #21 $p \to q$ is false, so $p = T$ & $q = F$.
(this is the only way $p \to q$ is F)

a. $\sim p \to q$ is $F \to F$ is true

b. $p \vee q$ is $T \vee F$ is true

c. $q \to p$ is $F \to T$ is true.

3.1 #7 Truth sets:

a. $6/d \in \mathbb{Z}$, domain $\mathbb{Z}$.

$\{-6, -3, -2, -1, 1, 2, 3, 6\}$

b. $6/d \in \mathbb{Z}^+$, domain $\mathbb{Z}^+$.

it's $\{1, 2, 3, 6\}$

c. $1 \le x^2 \le 4$, domain $\mathbb{R}$

it's all x with $1 \le x \le 2$ or $-2 \le x \le -1$.

d. $1 \le x^2 \le 4$, domain $\mathbb{Z}$

it's $\{-2, -1, 1, 2\}$