Discrete Math 3.1 functions

Pg 131 Review Exercises #9-12 all see Back of book

Pg 132 Exercise #17-27 odd, 33-37 odd

(17) $f(m,n) = m$ $f(0,1) = f(0,2) = 0$ ∴ not one-to-one

for every $k \in \mathbb{Z}$, $f(k,n) = k$, ∴ $f(m,n) = m$ is onto

(19) see back of book

(21) $f(m,n) = m+n+2$ since $f(1,0) = f(0,1)$, f is not one-to-one

f is onto since $\forall k \in \mathbb{Z}$, $f(k-2,0) = k-2+0+2 = k$.

(25) $f(x) = 6x-9$ f is 1-1 since $f(m) = 6m-9 = 6n-9 = f(n)$

$6m = 6n$

$m = n$ ∴ f is one-to-one

$f(x)$ is onto, since $\forall w \in \mathbb{R}$, $f(k) = w = 6x-9$

or $w+9 = 6x$

$w+9/9 = x$ ∴ f is onto

(27) $f(x) = 3^x - 2$ one-to-one

not onto. there does not exist an x such that

$f(x) = -2$

page 131 #9-12 all

page 132 Exercise #17-27 odd #33-37 odd

#33 $f(x) = 3^x$ $\boxed{f^{-1}(x) = \log_3 x}$

$y = 3^x \Rightarrow x = 3^y$ or $y = \log_3 x$

(35) $f(x) = 3 + \frac{1}{x}$ $\boxed{f^{-1}(x) = \frac{1}{x-3}}$

$y = 3 + \frac{1}{x} \Rightarrow x = 3 + \frac{1}{y}$ or $\frac{1}{y} = x - 3 \Rightarrow y = \frac{1}{x-3}$

(37) $f(x) = 6 + 2^{7x-1}$

$y = 6 + 2^{7x-1} \Rightarrow x = 6 + 2^{7y-1}$ or $2^{7y-1} = x - 6$

$7y - 1 = \log_2(x-6)$ or $7y = 1 + \log_2(x-6)$

$$\boxed{f^{-1}(x) = \frac{1 + \log_2(x-6)}{7}}$$