MTH 231 QUIZ 1

- 2.3: 8, 9, 63; 2.4: 29, 30, 32, 33, 43, 44, 45, 46
- 1.1: 1, 3a, 3b, 5c, 9, 11, 13, 16, 17, 29, 31, 32b, 35f

2.3

8) a) $\lfloor 1.1 \rfloor = 1$ b) $\lceil 1.1 \rceil = 2$ c) $\lfloor -0.1 \rfloor = -1$ d) $\lceil -0.1 \rceil = 0$ e) $\lceil 2.99 \rceil = 3$ f) $\lceil -2.99 \rceil = -2$

g) $\lfloor 0.5 + \lceil 0.5 \rceil \rfloor = \lfloor 1.5 \rfloor = 1$ h) $\lceil \lfloor 0.5 \rfloor + \lceil 0.5 \rceil + 0.5 \rceil = \lceil 1.5 \rceil = 2$

9) a) $\lceil 3/4 \rceil = \lceil 0.75 \rceil = 1$ b) $\lfloor 7/8 \rfloor = 0$ c) $\lceil -3/4 \rceil = 0$ d) $\lfloor -7/8 \rfloor = -1$ e) $\lceil 3 \rceil = 3$

f) $\lfloor -1 \rfloor = -1$ g) $\lfloor 0.5 + \lceil 1.5 \rceil \rfloor = \lfloor 2.5 \rfloor = 2$ g) $\lfloor \frac{1}{2} \cdot \lfloor 5/2 \rfloor \rfloor = \lfloor \frac{1}{2} \cdot 2 \rfloor = 1$

63) step function with a leg on $[0, 1)$ ...

2.4

29) a) $\sum_{k=1}^{5} (k+1) = 2 + 3 + 4 + 5 + 6 = 20$

b) $\sum_{j=0}^{4} (-2)^j = -2^0 + -2^1 + -2^2 + -2^3 + -2^4 = 1 + (-2) + 4 + (-8) + 16 = 11$

c) $\sum_{i=1}^{10} 3 = (b - a + 1) \cdot 3 = 3 \cdot (10) = 30$

d) $\sum_{j=0}^{8} (2^{j+1} - 2^j) = \underset{=1}{(2-1)} + \underset{=2}{(4-2)} + \underset{=4}{(8-4)} + \underset{=8}{(16-8)} + \underset{=16}{(32-16)} + \underset{=32}{(64-32)} + \underset{=64}{(128-64)}$

$+ \underset{=128}{(256-128)} + \underset{=256}{(512-256)} = 511$

<skipp'd some...>

33) a) $\sum_{i=1}^{2} \sum_{j=1}^{3} (i+j) \neq \sum_{i=1}^{2} i + \sum_{j=1}^{3} j = (1+2) + (1+2+3)$

$= (1+1) + (1+2) + (1+3) + (2+1) + (2+2) + (2+3) = 21$

43) a $\prod_{i=0}^{10} i = 0 \cdot 1 \cdot 2 \cdot 3 \cdot 4 \cdot 5 \cdot 6 \cdot 7 \cdot 8 \cdot 9 \cdot 10 = 10! \cdot 0 = 0$

44) $n! = \prod_{i=1}^{n} i$

45) $\sum_{j=0}^{4} j! = 0! + 1! + 2! + 3! + 4! = 1 + 1 + 2 + 6 + 24 = 34$

$0! = 1!!$

46) NOPE!

1.1

1) a) is prop, T b) is prop, F c) is prop, T d) is prop, F e) not prop f) Not prop

3a) Mei does not have an MP3 player 3b) There is pollution in NJ

5c) Steve does not have more than 100GB on his HDD

9) a) Sharks haven't been seen

b) swiming allowed and sharks have been spotted
c) p "or" q d) If swimming is allowed, sharks haven't been seen
e) if sharks haven't been spotted, then swimming is allowed
f) If sharks haven't been spotted, then swimming isn't allowed
g) iff h)

11) p: below frz q: snowing

a) $p \wedge q$ b) $p \wedge \neg q$ c) $\neg p \wedge \neg q$ d) $p \vee q$ e) $p \rightarrow q$ f) $(p \vee q) \wedge (p \rightarrow \neg q)$

g) $(p \leftrightarrow q)$

13) p: drive >65 q: spd tkt

a) $\neg p$ b) $p \wedge \neg q$ c) $p \rightarrow q$ d) $\neg p \rightarrow \neg q$ e) $p \rightarrow q$ f) $\neg p \wedge q$ g) $p \not\rightarrow q$

16) <guess...> a) T, b) F, c) T d) F

17) a) F b) T c) T d) T ||Note only F if T→F

29) 2^n rows for each: a) 2 b) $2^4 = 16$ c) $2^6 = 64$ d) $2^4 = 16$

31) e)

p	q	$(p \rightarrow q) \leftrightarrow (\neg q \rightarrow \neg p)$				
T	T	T	T	(F)	T	(F)
F	T	T	T	(F)	T	(T)
T	F	F	T	(T)	F	(F)
F	F	T	T	(T)	T	(T)

32) b) $p \leftrightarrow \neg q$

p	q	$p \leftrightarrow \neg q$		$\cong$ xor
T	T	F	F	F
F	T	T	T	F
T	F	T	T	T
F	F	F	F	T

35) f) $(\neg p \leftrightarrow \neg q) \leftrightarrow (p \leftrightarrow q)$

p	q	$(\neg p \leftrightarrow \neg q)$			$\leftrightarrow$	$(p \leftrightarrow q)$		
T	T	(F)	T	(F)	T	(T)	T	(T)
F	T	(T)	F	(F)	T	(F)	F	(T)
T	F	(F)	F	(T)	T	(T)	F	(F)
F	F	(T)	T	(T)	T	(F)	T	(F)