From Wednesday's Quiz

Bonus, because I don't think I demo'ed it.

#97, §3.6 RHS $\neq 0$

$$\frac{g-2}{g+3} < 2 \cdot \frac{g+3}{g+3} = \frac{2g+6}{g+3}$$

Can't throw away the denominator, unless it's an equation. We're facing an inequality. Need sign pattern.

$$\frac{g-2}{g+3} < \frac{2g+6}{g+3} \Longrightarrow$$

$$\frac{g-2}{g+3} - \frac{2g+6}{g+3} < 0$$

$$\frac{g-2-(2g+6)}{g+3} < 0$$

$$\frac{g-2-2g-6}{g+3} < 0$$

$$\frac{(-g-8)'}{g+3} < 0$$

critical values:

$-g-8=0$ $g+3=0$

$-g=8$ $g=-3$

$g=-8$

$-$ $+$ $-$

-8 -3

Test: $g=0$

$\frac{-0-8}{0+3} = -\frac{8}{3}$ "$-$"

Want <0, i.e., "$-$" is good

$(-\infty,-8)\cup(-3,\infty)$

$-g-8$ sucks, so -1 times both sides:

$$\frac{(g+8)'}{g+3} > 0$$

critical:

$g=-8$, $g=-3$

$+$ $-$ $+$

Y -8 N -3 Y

Test $g=0$ (or anything >-3)

Want >0

Want $+$

$(-\infty,-8)\cup(-3,\infty)$

§8.1/8.2/8.3

$\sum$ - Sigma stands for Sum

$\sum_{k=1}^{4} a_k$ = the sum, from $\underbrace{k=1 \text{ to } k=4}_{k=1 \text{ to } 4}$, of the a_k's.

$= a_1 + a_2 + a_3 + a_4$

a_k is [redacted] a function from the natural numbers to the real numbers.

$a_k = f(k)$ and $\underbrace{k \text{ is a natural number}}_{k \in \mathbb{N}}$

$\mathbb{N} = \{1, 2, 3, \ldots\}$

$a_k = 3k - 1$

$\sum_{k=1}^{5} a_k = \sum_{k=1}^{5} (3k-1) = (3(1)-1) + (3(2)-1)$
$+ (3(3)-1) + (3(4)-1)$
$+ (3(5)-1)$

$= 2 + 5 + 8 + 11 + 14$

Recursive Definition:

$a_1 = 2, \quad a_{k+1} = a_k + 3$ Fractal, Dude.

$a_k = a_{k-1} + 3$

Representation is NOT unique.

$\sum_{k=1}^{5} (3k-1) = \sum_{k=0}^{4} (3(k+1)-1)$

$a_0 = 3(1) - 1 = 3(0+1) - 1 = \boxed{3(k+1) - 1}$

work the zero into the formula.

Index is zero

Factorials

$0! = 1$

$1! = 1$

$2! = 2 \cdot 1 = 2$

$3! = 3 \cdot 2 \cdot 1 = 6$

$4! = 4 \cdot 3 \cdot 2 \cdot 1 = 24$

$5! = \qquad = 120$

etc.

$n! = n(n-1)(n-2) \cdots (3)(2)(1)$

Nov 2-10:23 AM

$$\sum_{k=1}^{3} 5\cdot 2^{k} = 5(2^1) + 5(2^2) + 5(2^3)$$
$$= 5(2 + 2^2 + 2^3)$$
$$= 5\sum_{k=1}^{3} 2^{k}$$

Anything without a "K" in it can be factored out.

$$\sum_{k=1}^{100} k = 1+2+3+4+\cdots+97+98+99+100$$

$= 50(101)$

In general $\sum_{k=1}^{n} k = \frac{n(n+1)}{2}$

$$\sum_{k=1}^{37} 5k = 5\sum_{k=1}^{37} k = 5\left(\frac{37(38)}{2}\right) = 5(37)(19)$$

3610

$5 \cdot 165$

$$\begin{array}{r} 165 \\ \times\ 19 \\ \hline 1485 \\ 1650 \\ \hline 3135 \end{array}$$

S'8.1 #s 8, 18, 20, 24, 28, 32,
38, 42, 44, 50*, 54*, 90

* Only do 1st 4 terms.

S'8.2 #s 6, 8, 18*. 20, 22, 26, 29, 32, 38

* $\sum_{i=1}^{6} (i-1)(i-3)$ I say

" Expand : $(i-1)(i-3) = i^2 - 4i + 3$

& use this :

$$\sum_{k=1}^{n} 1 = n \Longrightarrow \sum_{k=1}^{n} 5 = 5\sum_{k=1}^{n} 1 = 5n$$

$$\sum_{k=1}^{n} k = \frac{n(n+1)}{2} \Longrightarrow \sum_{k=1}^{n} 7k = 7\left(\frac{n(n+1)}{2}\right)$$

$$\sum_{k=1}^{n} k^2 = \frac{n(n+1)(2n+1)}{6}$$

So $\sum_{k=1}^{50} (k+2)(k-5) = \sum_{k=1}^{50} (k^2 - 3k - 10)$

$$= \sum_{k=1}^{50} k^2 - 3\sum_{k=1}^{50} k - 10\sum_{k=1}^{50} 1$$

$$= \frac{50(51)(2(50)+1)}{6} - 3\,\frac{50(51)}{2} - 10 \cdot 50$$

$$\frac{x+8}{x+3}$$