HW18

4.3 #1

$$\sum_{i=1}^{n}\left(\frac{2}{n}+\frac{4}{n^2}i\right)$$

$$=\frac{2}{n}\sum_{i=1}^{n}1+\frac{4}{n^2}\sum_{i=1}^{n}i$$

$$=\frac{2}{\cancel{n}}\cdot\cancel{n}+\frac{\cancel{4}^{2}}{n^2}\cdot\frac{n(n+1)}{\cancel{2}}$$

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

$$\lim_{n\to\infty}\left(2+\frac{2n(n+1)}{n^2}\right)=4.$$

#2.

$$\sum_{i=1}^{n}\frac{6}{n}\ln\left(1+\frac{6}{n}i\right)$$

$$=\frac{6}{n}\sum_{i=1}^{n}\ln\left(1+\frac{6}{n}i\right)$$

$$=\underbrace{\frac{6}{n}}_{\text{width of each block}}\sum_{i=1}^{n}\underbrace{\ln\left(1+6\cdot\frac{i}{n}\right)}_{\text{given } x=\frac{6i}{n}\text{, height of each block}}$$

so $b=6$.

$f(x)=$ $\ln(1+x)$

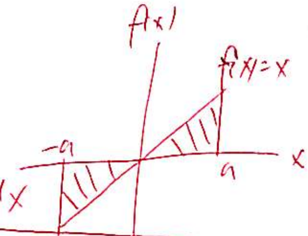
#10 A: $f(-x)$

$= -x = -(x) = -f(x)$

NOT even (odd)

True	False
B	A
D	C
E	

B: true. Intermediate Value Theorem



C: $\int_{-a}^{a} f(x)\,dx = 0 \neq 2\int_0^a f(x)\,dx$

$$\cancel{= \int_{-a}^{0} f(x)\,dx + \int_0^a f(x)\,dx}$$

$$\cancel{= -\int_{0}^{-a} f(x)\,dx + \int_0^a f(x)\,dx}$$

$$\cancel{=}$$

#17 $\sum_{i=0}^{n-1} \frac{i}{n^2} = \underbrace{\frac{1}{n}}_{\text{block width}} \sum_{i=0}^{n-1} \underbrace{\frac{i}{n}}_{\text{height of each block}}$

given $x = \frac{i}{n}$, starting from $x = \frac{0}{n} = 0$, up to

$\frac{n-1}{n} \to 1$ as $n \to \infty$.

$a = 0$

$b = 1$

$f(x) = x$.