Sec 4.4

267/15-31 odd, 35, 39

15) $\sum_{i=1}^{20} 2i = 2\sum_{i=1}^{20} i = 2\left(\frac{20(21)}{2}\right)$

$= 20(21)$

$\boxed{= 420}$

17) $\sum_{i=1}^{20} (i-1)^2 = \sum_{i=1}^{20} (i^2 - 2i + 1) = \sum_{i=1}^{20} i^2 - \sum_{i=1}^{20} 2i + 20$

$= \frac{20(21)(41)}{6} - 2\left(\frac{20(21)}{2}\right) + 20$

$= 2870 - 420 + 20$

$\boxed{= 2470}$

19) $\sum_{i=1}^{15} i(i-1)^2 = \sum_{i=1}^{15} i^3 - 2i^2 + i = \sum_{i=1}^{15} i^3 - 2\sum i^2 + \sum i$

$= \frac{15^2(16)^2}{4} - 2\left(\frac{15(16)(31)}{6}\right) + \frac{15(16)}{2}$

$= 14,400 - 2480 + 120$

$\boxed{= 12040}$

21) $\sum_{i=1}^{20}(i^2+3) = \sum_{i=1}^{20} i^2 + 60 = \frac{20(21)(41)}{6} + 60$

$= 2470 + 60 = \boxed{2930}$

23) Upper sum: $3+4+4.5+5 = 16.5\,u^2$

Lower sum: $1+3+4+4.5 = 12.5\,u^2$

The shaded area is between $16.5\,u^2$ and $12.5\,u^2$.

25) Upper sum: $3+3+5 = 11\,u^2$

Lower sum: $2+2+3 = 7\,u^2$

The shaded area is between $11\,u^2$ and $7\,u^2$

27) Upper: $\frac{.5+.7+.4+1}{4} = .75$ ✓

Lower: $0+.5+.7+.8 = .5$ ✓

$\frac{.75+.5}{2} = \boxed{0.625}$ They wanted these!

But asked for this

29) Upper: $\frac{1 + .8 + .7 + .6 + .9}{5} = 0.8$

close enough to back of book w/c estimation

Lower: $\frac{.8 + .7 + .6 + .5 + .9}{5} = 0.7$

31) $\frac{81n^4 + \dots}{4n^4}$ $\therefore$ $\frac{81}{4}$

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

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