7.5 # 7 The graph is decreasing so we expect LEFT $> \int >$ RIGHT and LEFT $>$ MIDDLE $>$ RIGHT. Always, TRAP is between LEFT and RIGHT The graph is smiling so we expect TRAP $> \int >$ MID. So we have LEFT $>$ TRAP $> \int >$ MID $>$ RIGHT. Therefore LEFT $= 0.664$, TRAP$=0.633$, MID$=0.632$, and RIGHT$=0.601$ and the true value is between 0.663 and 0.633.

7.5 # 17 Use the TRAP rule which in this case is equal to LEFT and RIGHT $= 100*(80+85+95+110+105+100+100+105+110) = 89000$ square feet. So we will need $89000/200 = 445$ pounds of fertilizer.

7.6 # 9 $\int_0^4 e^x dx = e^x \big|_0^4 = e^4 - 1 = 53.59815003$

Method	approx$_2$	approx$_4$	error$_2$	error$_4$	ratio
LEFT	16.77811220	31.19287485	36.82003783	22.40527518	1.64
RIGHT	123.9744123	84.79102488	-70.37626227	-31.19287485	2.26
MIDDLE	45.60763750	51.42835626	7.99051253	2.16979377	3.68
TRAP	70.37626223	57.99194987	-16.77811220	-4.39379984	3.82
SIMPSON	53.86384573	53.61622080	$-.26569570$	$-.01807077$	14.7

  a 53.59815003

  b table above for $n = 2$

  c table above for $n = 4$

  d yes errors improve roughly as they should, $2, 2, 4, 4, 16$

7.7 # 10

$$\int_1^\infty \frac{1}{x^2+1} dx = \lim_{M\to\infty} \int_1^M \frac{1}{x^2+1} dx = \lim_{M\to\infty} \arctan x \big|_1^M = \lim_{M\to\infty} (\arctan M - \arctan 1) = \frac{\pi}{2} - \frac{\pi}{4} = \frac{\pi}{4}.$$

7.8 # 5 This looks like $1/x^3$ on the tail which converges. And since $x^3 + 1 > x^3$ we have $0 < 1/(x^3+1) < 1/x^3$ so

$$\int_1^\infty \frac{dx}{x^3+1} < \int_1^\infty \frac{dx}{x^3}$$

and the integral converges by the comparison test.