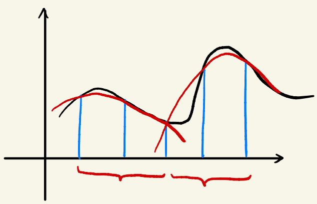
3a. K_T = maximum of $|f''(x)|$ on $[a,b]$, here $f(x)=\frac{3}{x}$, so $f''(x)=\frac{6}{x^3}$ $\searrow$
$a=1,\ b=2$ decrease

so $K_T=|f''(1)|=\left|\frac{6}{1^3}\right|=6$

$E_n^T \le \frac{6}{12n^2}(2-1)^3=\frac{1}{2n^2}\le\frac{1}{100} \Rightarrow n^2 \ge \frac{100}{2}=50 \Rightarrow n\ge\sqrt{50}=7.07\cdots \Rightarrow$ n is at least 8

3b. $\int_0^3 e^{(t^2)}dt = \frac{3-0}{3\times 6}\left[e^{0^2}+4e^{(\frac{1}{2})^2}+2e^{1^2}+4e^{(\frac{3}{2})^2}+2e^{2^2}+4e^{(\frac{5}{2})^2}+e^{3^2}\right]$
$= \frac{1}{6}\left(1+4e^{\frac{1}{4}}+2e+4e^{\frac{9}{4}}+2e^4+4e^{\frac{25}{4}}+e^9\right)$

3c. It is necessary that n be even for Simpson's Rule, since it uses parabolas, each of which is defined by 3 distinct points, yielding 2 intervals on the x axis

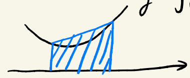


For each parabola, you need 3 points, that's 2 intervals hence you need even number of intervals for Simpson's Rule, BUT there is no need for trapezoidal Rule

4a. $\int_1^\infty \frac{x^{\frac{3}{2}}}{\pi+x^3}dx \le \int_1^\infty \frac{x^{\frac{3}{2}}}{x^3}dx = \int_1^\infty x^{-\frac{3}{2}}dx = -2x^{-\frac{1}{2}}\Big|_1^\infty = 0-(-2)=2$, so convergent

comparison property

4b. Trapezoidal Rule yields a bigger number that $\int_a^b f(x)dx$. Graph:



4c

n	0	1	2	3	4	$\cdots$	n
$f^{(n)}(x)$	e^{-x}	$-e^{-x}$	$(-1)^2e^{-x}$	$(-1)^3e^{-x}$	$(-1)^4e^{-x}$	$\cdots$	$(-1)^ne^{-x}$
$f^{(n)}(0)$	1	-1	$(-1)^2$	$(-1)^3$	$(-1)^4$	$\cdots$	$(-1)^n$

Hence $P_n(x)=1-x+\frac{x^2}{2!}-\frac{x^3}{3!}+\cdots+\frac{(-1)^nx^n}{n!}$