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

$a=1,\ b=2$

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

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

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

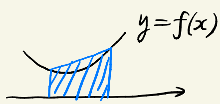
$= \frac{1}{6}\left(1 + 4e^{\frac{1}{4}} + 2e + 4e^{\frac{9}{4}} + 2e^4 + 4e^{\frac{25}{4}} + e^9\right)$

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

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

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