From Practice final, something like

$\sum_{n=1}^{5} 3\left(\frac{1}{2}\right)^{n-1} = 3 + 3\left(\frac{1}{2}\right) + 3\left(\frac{1}{2}\right)^2 + 3\left(\frac{1}{2}\right)^3 + 3\left(\frac{1}{2}\right)^4$

$3\left(\frac{1}{2}\right)^0 = 3 \cdot 1 = 3$

$\sum ar^{n-1} = a\left(\frac{1-r^n}{1-r}\right)$

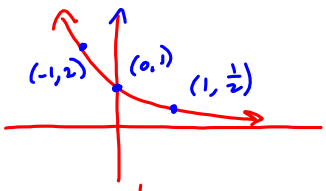
$S_n = \sum_{k=1}^{n} 3 \cdot \left(\frac{1}{2}\right)^{k-1} = 3 + 3\left(\frac{1}{2}\right) + \cdots + 3\left(\frac{1}{2}\right)^{n-1}$

$= 3\left(\frac{1-\left(\frac{1}{2}\right)^n}{1-\frac{1}{2}}\right)$

$\sum_{k=1}^{\infty} 3 \cdot \left(\frac{1}{2}\right)^{k-1} = \lim_{n\to\infty} S_n = \lim_{n\to\infty} \sum_{k=1}^{n} 3 \cdot \left(\frac{1}{2}\right)^{k-1}$

$= \lim_{n\to\infty} 3\left(\frac{1-\left(\frac{1}{2}\right)^n}{1-\frac{1}{2}}\right) = 3\left(\frac{1}{1-\frac{1}{2}}\right)$

$\left(\frac{1}{2}\right)^n$ Exponential Decay



$a\left(\frac{1}{1-r}\right)$ for $\sum_{k=1}^{\infty} ar^{k-1}$

Annuities grow geometrically

$S_n = R + R(1+i) + R(1+i)^2 + \cdots + R(1+i)^{n-1}$

$= \sum_{k=1}^{n} R(1+i)^{k-1} = R\left(\frac{1-(1+i)^n}{1-(1+i)}\right)$

$= FV = R\left(\frac{(1+i)^n - 1}{i}\right)$ on cheat sheet.

Saving for kids' college

common ratio $(r) = x = 1+i$

reserve r for interest rate

$A = FV$

$P(1+i)^n = R\left(\frac{(1+i)^n - 1}{i}\right)$

Price of the annuity (Amount of Loan)

Payments.

$|A| < B$

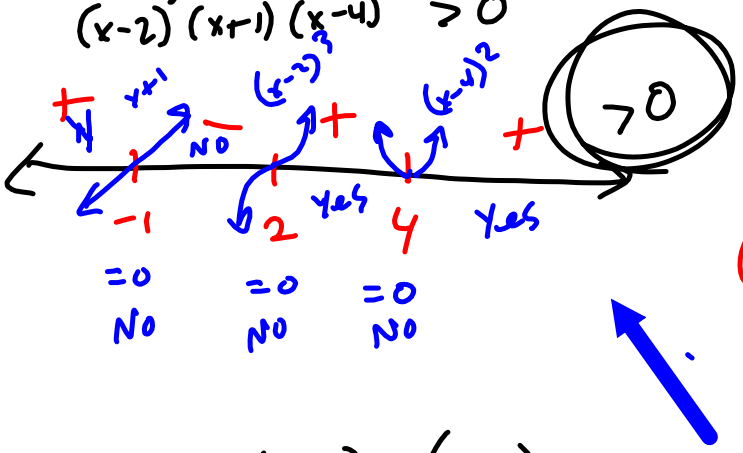
$A < B$ AND $A > -B$

$|A| > B$

$A > B$ OR $A < -B$

$(x^3)(x)(x)^2 = x^{3+1+2} = x^6$ ↑...↗

$(x-2)^3(x+1)(x-4)^2 > 0$

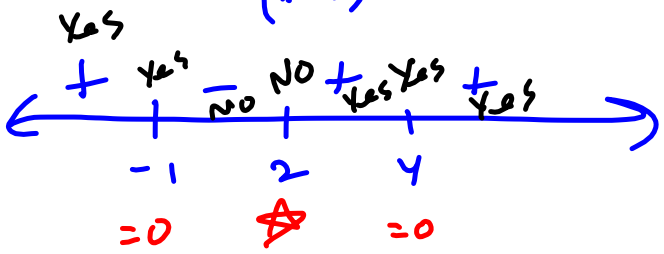


$(x-4)^2$ doesn't change sign

@ $x=4$, so neither does $(x-2)^3(x+1)(x-4)^2$

$= (-\infty, -1) \cup (2,4) \cup (4, \infty)$

$$\frac{(x+1)(x-4)^2}{(x-2)^3} \geq 0$$



$= (-\infty, -1] \cup (2, \infty)$