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Mathématiques
Composition de Mathématiques n°2
Tiers Temps

mardi 3 mars 2020

Mathématiques

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Note :	Appréciations :	Signature :
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Problème 2 :

Partie A : Monotonie

a)

$U_n = 2^n - n$

Je calcule U_{n+1} :

$U_{n+1} = 2^{n+1} - n + 1$

$U_{n+1} = 2^{(2^n - n)+1} - (2^n - n) + 1$

$U_{n+1} = 4^n - 2n + 2 - 2^n + n + 1$

$\boxed{U_{n+1} = 2^n - n + 3}$

La suite U_{n+1} est égale à $2^n - n + 3$.

Je calcule la monotonie :

$U_{n+1} - U_n = 2^n - n + 3 - (2^n - n)$

$U_{n+1} - U_n = 2^n - 2^n - n + n + 3$

$\boxed{U_{n+1} - U_n = 3}$

La suite à une monotonie qui est égale à 3.

b)

$V_n = \dfrac{n^2}{2^n}$

Je calcule V_{n+1} :

$V_{n+1} = \dfrac{(n+1)^2}{2^{n+1}}$

$V_{n+1} = \dfrac{(n^2+1)^2}{2^{2n+1}}$

$V_{n+1} = \dfrac{n^4 + 2n^2 + 1}{4^n + 2}$

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$$V_{n+1}-V_n=\frac{n^4+2n^2+1}{4^n+2}-\left(\frac{n^2}{2^n}\right)$$

$$V_{n+1}-V_n=\frac{2^n(n^4+2n^2+1)}{2^n(4^n+2)}-\left(\frac{(4^n+2)(n^2)}{(4^n+2)(2^n)}\right)$$

Je n'ai pas réussi à résoudre cette équation.

c)

Partie B : Suites Arithmétiques et géométriques

a)

Calculer une somme S

a)

b) S=590490+587700+584910+…+10170

Je soustrais 587700 à 584910 :

587700-584910=2790

J'ajoute 2790 à 587700 pour vérifier le calcul :

587700+2790=590490

On a donc une suite arithmétique de raison r=2790.

La formule est donc $U_{n+1}=U_n+2790$

Je détermine U_0, pour cela je soustrais 2790 à 10170 jusqu'à arriver au plus proche de 0:

10170-2790=7380

7380-2790=4590

4590-2790=1800

U_0 est donc égal à 1800.

Je calcule les termes de la suite :

U0=1800+2790=4590	U52=146880+2790=149670	U104=291960+2790=294750	U155=434250+2790=437040
U1=4590+2790=7380	U53=149670+2790=152460	U105=294750+2790=297540	U156=437040+2790=439830
U2=7380+2790=10170	U54=152460+2790=155250	U106=297540+2790=300330	U157=439830+2790=442620
U3=10170+2790=12960	U55=155250+2790=158040	U107=300330+2790=303120	U158=442620+2790=445410
U4=12960+2790=15750	U56=158040+2790=160830	U108=303120+2790=305910	U159=445410+2790=448200
U5=15750+2790=18540	U57=160830+2790=163620	U109=305910+2790=308700	U160=448200+2790=450990
U6=18540+2790=21330	U58=163620+2790=166410	U110=308700+2790=311490	U161=450990+2790=453780
U7=21330+2790=24120	U59=166410+2790=169200	U111=311490+2790=314280	U162=453780+2790=456570
U8=24120+2790=26910	U60=169200+2790=171990	U112=314280+2790=317070	U163=456570+2790=459360
U9=26910+2790=29700	U61=171990+2790=174780	U113=317070+2790=319860	U164=459360+2790=462150
U10=29700+2790=32490	U62=174780+2790=177570	U114=319860+2790=322650	U165=462150+2790=464940
U11=32490+2790=35280	U63=177570+2790=180360	U115=322650+2790=325440	U166=464940+2790=467730

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U12=35280+2790=38070	U64=180360+2790=183150	U116=325440+2790=328230	U167=467730+2790=470520
U13=38070+2790=40860	U65=183150+2790=185940	U117=328230+2790=331020	U168=470520+2790=473310
U14=40860+2790=43650	U66=185940+2790=188730	U118=331020+2790=333810	U169=473310+2790=476100
U15=43650+2790=46440	U67=188730+2790=191520	U119=333810+2790=336600	U170=476100+2790=478890
U16=46440+2790=49230	U68=191520+2790=194310	U120=336600+2790=339390	U171=478890+2790=481680
U17=49230+2790=52020	U69=194310+2790=197100	U121=339390+2790=342180	U172=481680+2790=484470
U18=52020+2790=54810	U70=197100+2790=199890	U122=342180+2790=344970	U173=484470+2790=487260
U19=54810+2790=57600	U71=199890+2790=202680	U123=344970+2790=347760	U174=487260+2790=490050
U20=57600+2790=60390	U72=202680+2790=205470	U124=347760+2790=350550	U175=490050+2790=492840
U21=60390+2790=63180	U73=205470+2790=208260	U125=350550+2790=353340	U176=492840+2790=495630
U22=63180+2790=65970	U74=208260+2790=211050	U126=353340+2790=356130	U177=495630+2790=498420
U23=65970+2790=68760	U75=211050+2790=213840	U127=356130+2790=358920	U178=498420+2790=501210
U24=68760+2790=71550	U76=213840+2790=216630	U128=358920+2790=361710	U179=501210+2790=504000
U25=71550+2790=74340	U77=216630+2790=219420	U129=361710+2790=364500	U180=504000+2790=506790
U26=74340+2790=77130	U78=219420+2790=222210	U130=364500+2790=367290	U181=506790+2790=509580
U27=77130+2790=79920	U79=222210+2790=225000	U131=367290+2790=370080	U182=509580+2790=512370
U28=79920+2790=82710	U80=225000+2790=227790	U132=370080+2790=372870	U183=512370+2790=515160
U29=82710+2790=85500	U81=227790+2790=230580	U133=372870+2790=375660	U184=515160+2790=517950
U30=85500+2790=88290	U82=230580+2790=233370	U134=375660+2790=378450	U185=517950+2790=520740
U31=88290+2790=91080	U83=233370+2790=236160	U135=378450+2790=381240	U186=520740+2790=523530
U32=91080+2790=93870	U84=236160+2790=238950	U136=381240+2790=384030	U187=523530+2790=526320
U33=93870+2790=96660	U85=238950+2790=241740	U137=384030+2790=386820	U188=526320+2790=529110
U34=96660+2790=99450	U86=241740+2790=244530	U138=386820+2790=389610	U189=529110+2790=531900
U35=99450+2790=102240	U87=244530+2790=247320	U139=389610+2790=392400	U190=531900+2790=534690
U36=102240+2790=105030	U88=247320+2790=250110	U140=392400+2790=395190	U191=534690+2790=537480
U37=105030+2790=107820	U89=250110+2790=252900	U141=395190+2790=397980	U192=537480+2790=540270
U38=107820+2790=110610	U90=252900+2790=255690	U142=397980+2790=400770	U193=540270+2790=543060
U39=110610+2790=113400	U91=255690+2790=258480	U143=400770+2790=403560	U194=543060+2790=545850
U40=113400+2790=116190	U92=258480+2790=261270	U144=403560+2790=406350	U195=545850+2790=548640
U41=116190+2790=118980	U93=261270+2790=264060	U145=406350+2790=409140	U196=548640+2790=551430
U42=118980+2790=121770	U94=264060+2790=266850	U146=409140+2790=411930	U197=551430+2790=554220
U43=121770+2790=124560	U95=266850+2790=269640	U147=411930+2790=414720	U198=554220+2790=557010
U44=124560+2790=127350	U96=269640+2790=272430	U148=414720+2790=417510	U199=557010+2790=559800
U45=127350+2790=130140	U97=272430+2790=275220	U149=417510+2790=420300	U200=559800+2790=562590
U46=130140+2790=132930	U98=275220+2790=278010	U150=420300+2790=423090	U201=562590+2790=565380
U47=132930+2790=135720	U99=278010+2790=280800	U151=423090+2790=425880	U202=565380+2790=568170
U48=135720+2790=138510	U100=280800+2790=283590	U152=425880+2790=428670	U203=568170+2790=570960
U49=138510+2790=141300	U101=283590+2790=286380	U153=428670+2790=431460	U204=570960+2790=573750
U50=141300+2790=144090	U102=286380+2790=289170	U154=431460+2790=434250	U205=573750+2790=576540
U51=144090+2790=146880	U103=289170+2790=291960		U206=576540+2790=579330
			U207=579330+2790=582120
			U208=582120+2790=584910
			U209=584910+2790=587700
			U210=587700+2790=590490
			U211=590490+2790=593280