Problem 1

$\{1.,3,5,7 \ldots\ldots\ldots\}$

$an=1+(n-1)(2)=2n-1$

$S_n=\frac{n}{2}(1+2n-1)$

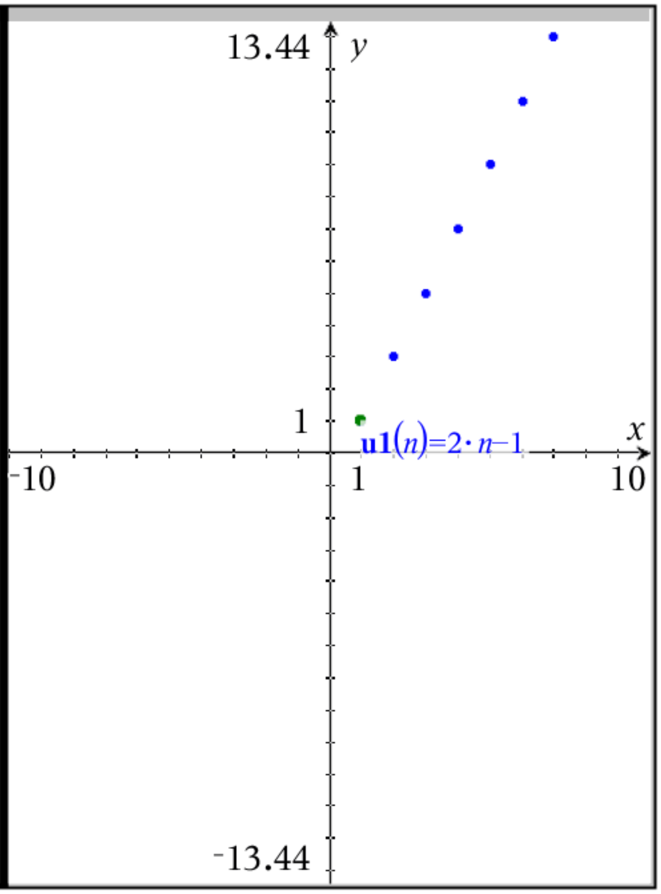
$=\frac{n}{2}(2n)$

$=n^2$

So the sum of the n terms in this sequence is n^2

$961=n^2$

$n=\sqrt{961} = 31$



Problem 2

a1=20000 d = 1750 n = 8

an =20000+(n−1)(1750)

a8 = $20000+(8-1)\cdot 1750 = 32250$

S8 = $\frac{8}{2}\cdot(20000+32250) \blacktriangleright 209000$

Which answer makes sense?

Problem 3

a1 = 15 d = −1   an = 15+(n−1)(−1)

Find S15 = $\frac{15}{2}\cdot(15+1) = 120$

Problem 4

a1 = 1.00   a 2 = 1.75   a3 = 2.50

$1.75-1. = 0.75$ $2.5-1.75 ▸ 0.75$

d = 0.75

an =1+(n−1)(0.75)

a19 $=1+(19-1)\cdot 0.75 = 14.5$

a31 $=1+(31-1)\cdot 0.75 = 23.5$

S31 $=\frac{31}{2}\cdot(1+23.5) ▸ 379.75$

Problem 5

a1=25 a2 = 27 a3 = 29 n = 20 cost per ticket $2300

an = 25+(n−1)(2)

a20 = $25+(20-1)\cdot 2$ ▸ 63

S20 = $\frac{20}{2}\cdot(25+63)$ ▸ 880

Income = $880\cdot 2300$ ▸ 2024000

Problem 6

total block 55

each row has one less block than previous row

a1 = 1 an = 1+(n−1)(1)

= 1+−1+n

an=n

a1 =1

Sn=55

Sn=$\frac{n}{2}(1+n)$

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

55=$\frac{1}{2}(n^2+n)$ leads to 110=n^2+n

leads to $n^2+1n-110=0$ solve$(n^2+1\cdot n-110=0,n)$ ▸ $n=^-11$ or $n=10$

If n = −11 (impossible)

So a−11 = $1+(-11-1)\cdot 1$ ▸ -11

S11= $\frac{11}{2}\cdot(1+-11)$ ▸ -55

If n = 10

a10 = $1+(10-1)\cdot 1$ ▸ 10

S10= $\frac{10}{2}\cdot(1+10)$ ▸ 55

Problem 7

a1=26 a2 = 30 a3 = 34 n = 32

an = 26+(n−1)(4)

a32 = $26+(32-1)\cdot 4$ ▸ 150

S32 = $\frac{32}{2}\cdot(26+150)$ ▸ 2816

Problem 8

Total distance = 800

1st m = 250

remaining distance = increases by 50 per meter

250, 300, 350, 400, ...

a1 = 250 d = 50   an = $250+(n-1)\cdot 50 = 50\cdot n+200$

a750 =$250+(750-1)\cdot 50 = 37700$

a800 =$250+(800-1)\cdot 50 = 40200$

S800=$\frac{800}{2}\cdot(250+40200) = 16180000$

Problem 9

Sum of all multiples of 3 between 1 and 1000

Note 999 is largest multiple of three in this set

Note: $333\cdot 3$ =999 so there are 333 terms

an = 3+(n−1)(3)=3n

S333 =$\frac{333}{2}\cdot(3+999) = 166833$

Check sum(**seq_1**) ▸ 166833

	A integers	B seq_1	C
=		=3*integer	
1	1	3	
2	2	6	
3	3	9	
4	4	12	
5	5	15	
6	6	18	
7	7	21	
8	8	24	
9	9	27	
10	10	30	
11	11	33	

A1 1

Problem 10

an =three digit numbers

a1 = 100 +(n−1)(1)

How many numbers have three digits?

1000−100=900

Test n=900 does a900= 999?

a900= $100+(900-1)\cdot 1 = 999$

Find S900 $=\frac{900}{2}\cdot(100+999) = 494550$

what is the first multiple of 6 > 100

102 = $6\cdot 17 \blacktriangleright 102$

bn = 102+(n−1)(6)

What is the last multiple of 6 < 1000

$\frac{1000}{6.} \blacktriangleright 166.667 \quad 6\cdot 166 \blacktriangleright 996$

$166-16 \blacktriangleright 150$

b150 $=102+(150-1)\cdot 6 \blacktriangleright 996$

S150= $\frac{150}{2}\cdot(102+996) \blacktriangleright 82350$

So sum of all the NON multiples of 6 with three digits

$494550-82350 = 412200$

$\text{sum}(\textbf{seq\_1}) \blacktriangleright 494550$

$\text{sum}(\textbf{seq\_2}) \blacktriangleright 82350$

$494550-82350 \blacktriangleright 412200$

	A seq_1	B seq_2	C	D
=				
1	100	102		
2	101	108		
3	102	114		
4	103	120		
5	104	126		
6	105	132		
7	106	138		
8	107	144		
9	108	150		
10	109	156		
11	110	162		

A1 100

Problem 11

How we write a sequence that gives us numbers that end in 3?

an=3+10(n−1)

How many numbers our sequence contains? 100

a99=$3+10\cdot(100-1)=993$

S100=$\frac{100}{2}\cdot(3+993)=49800$

How do we write a sequence that gives us numbers that end in 4?

bn=4+10(n−1)

How many numbers our sequence contains? 99

499=$4+10\cdot(100-1)=994$

T100=$\frac{100}{2}\cdot(4+994)=49900$

So the sum of all three digit numbers that end in 3 or 4

S100+T100=49800 +49900

=99700

	A seq_3	B seq_4	C seq_34	D
=				
1	3	4	3	
2	13	14	4	
3	23	24	13	
4	33	34	14	
5	43	44	23	
6	53	54	24	
7	63	64	33	
8	73	74	34	
9	83	84	43	
10	93	94	44	
11	103	104	53	

A1 3

sum(**seq_3**) ▸ 49800

sum(**seq_4**) ▸ 49900

sum(**seq_34**) ▸ 99700

Problem 12

There are 79 positive multiples of 5 under 400

{5, 10, 15.......395}

an = 5+(n−1)(5)

$Sn=\frac{79}{2}\cdot(5+395)$ ▸ 15800

sum(**multiple_5**) ▸ 15800

	A odds	B multipl...	C	D
=				
1	1	5		
2	3	10		
3	5	15		
4	7	20		
5	9	25		
6	11	30		
7	13	35		
8	15	40		
9	17	45		
10	19	50		
11	21	55		

A1 1

Problem 13

Why is this problem geometric?

$6\cdot6$ ▸ 36

$6\cdot6\cdot6$ ▸ 216

$6\cdot6\cdot6\cdot6$ ▸ 1296

a1= 6 r = 6 an = $6\cdot6^{n-1}$

a12=$6\cdot6^{12-1}$ ▸ 2176782336

Problem 14

a1 = 40000 r = 1+0.1=1.1

an=$40000(1.1)^{n-1}$

S10 =$40000\left(\frac{1-(1.1)^{10}}{1-1.1}\right)$

=$40000\cdot\frac{1-(1.1)^{10}}{1-1.1}$ ▸ $637497.$

	A salary	B	C	D
=				
1	40000			
2	44000.			
3	48400.			
4	53240.			
5	58564.			
6	64420.4			
7	70862.4			
8	77948.7			
9	85743.6			
10	94317.9			
11				

A1 40000

sum(salary) ▸ 637497.

Problem 15

a1 = 15 d = −2 n = 8 an = 15+(n−1)(−2)

$a8=15+(8-1)\cdot -2$ ▸ 1

$S8=\frac{8}{2}\cdot(15+1)$ ▸ 64

sum(blocks) ▸ 64

	A blocks	B	C	D
=				
1	15			
2	13			
3	11			
4	9			
5	7			
6	5			
7	3			
8	1			
9				
10				
11				

A1 15

Problem 16

a1=100 r =1.5 $an=100(1.5)^{n-1}$

$a5=100\cdot(1.5)^{5-1}$ ▸ 506.25

$S5=100\cdot\frac{1-(1.5)^5}{1-1.5}$ ▸ 1318.75

	A bugs	B	C	D
=				
1	100			
2	150.			
3	225.			
4	337.5			

A1 100

sum(**bugs**) ▸ 1318.75

Problem 17

invest 1000 a1 r = 0.12+1 $an=1000(1.12)^{n-1}$

$a10=1000\cdot(1.12)^{10-1}$ ▸ 2773.08 (but this only gets interest 9 times)

$a11=1000\cdot(1.12)^{11-1}$ ▸ 3105.85 (but this gets interest 10 times)

	A balance	B balanc...	C	D	E	F	G	H
=								
1	1000	1120.						
2	1120.	1254.4						
3	1254.4	1404.93						
4	1404.93	1573.52						
5	1573.52	1762.34						
6	1762.34	1973.82						
7	1973.82	2210.68						
8	2210.68	2475.96						
9	2475.96	2773.08						
10	2773.08	3105.85						
11	3105.85							

A1 1000

Problem 18

a1=8 r =3/4 an =$8\left(\frac{3}{4}\right)^{n-1}$

$S\infty=\frac{8}{1-\frac{3}{4}}$ ▸ 32

	A bounce	B	C	D
=				
1	8			
2	6			
3	9/2			
4	27/8			

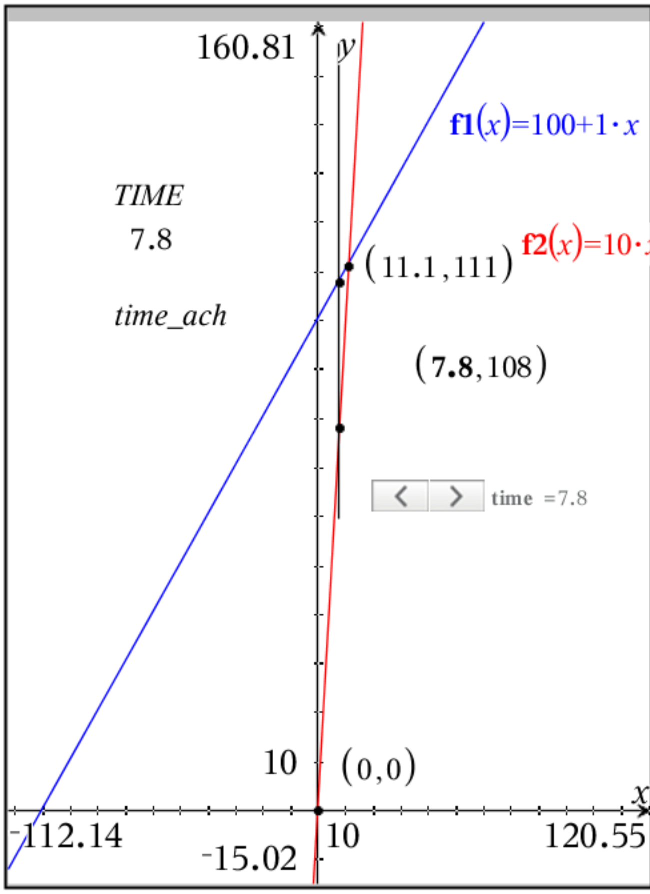
A1 8

sum(**bounce**)

▸ $\frac{327339060789614187001318969682740846846852524942747502297192009058843253597832}{1022934564967544334379121780258624735067700639388457746713528552530041811376}$

sum(1.·**bounce**) ▸ 32.

Problem 19



	A integers	B achilles	C turtle	D de
=		=10*intege	=100.+1/1	
1	1	10	100.1	
2	2	20	100.2	
3	3	30	100.3	
4	4	40	100.4	
5	5	50	100.5	
6	6	60	100.6	
7	7	70	100.7	
8	8	80	100.8	
9	9	90	100.9	
10	10	100	101.	
11	11	110	101.1	

A1 1