

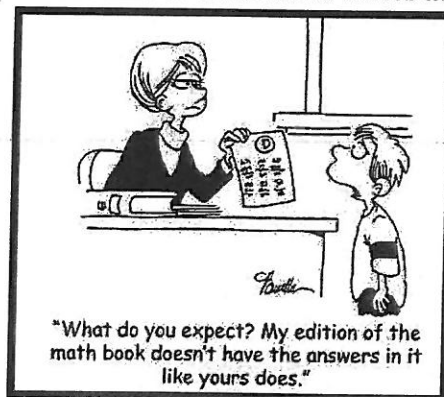
NAME: _____

Sequences and Series Agenda

Topic/EQ	Classwork/Homework	Stamp
What is an arithmetic sequence?	WS #1	
What is an arithmetic series, and how do I find the sum of an arithmetic series?	WS #2	
How do I find the sum of an arithmetic series when I'm not given my 'n' term?	WS #3 WS #4	
What have I learned about arithmetic sequences?	Quiz: Arithmetic Sequences and Series #4	
How confident am I arithmetic sequences and series?	Review Sheet (WS#5)	
What I have learned this unit?	TEST	

Standards:

- Explore arithmetic series and various ways of computing their sums.
- Explore sequences of partial sums of arithmetic series as examples of quadratic functions.



Word Problems

#6

Mixed

#7, #8, #9

Geometric

#10, #11

Partial Sums

#12

ALL GEO

#13

Arithmetic Sequences Worksheet #1

Name: _____ Hr: _____

Write the equation for the arithmetic series below and the given term

1. 6, 9, 12, 15... $t_n =$ $t_{20} =$	2. 10, 100, 190, 280... $t_n =$ $t_{38} =$	3. 12, 11, 10, 9... $t_n =$ $t_{25} =$
4. 4, 1, -2, -5... $t_n =$ $t_9 =$	5. 4, 4.5, 5, 5.5... $t_n =$ $t_{12} =$	6. 10, 8, 6, 4, $t_n =$ $t_{14} =$
7. $a_1 = 3$ and $d = 7$ $t_n =$ $t_{29} =$	8. $a_1 = 20$ and $d = -9$ $t_n =$ $t_{100} =$	9. $a_2 = 24$ and $d = 6$ $t_n =$ $t_{50} =$
10. $a_3 = 14$ and $d = 2$ $t_n =$ $t_{14} =$	11. $a_6 = 11$ and $d = -4$ $t_n =$ $t_{11} =$	12. $a_9 = 15$ and $d = 5$ $t_n =$ $t_{32} =$
13. $a_6 = 15$ and $a_8 = 19$ $t_n =$ $t_{20} =$	14. $a_{12} = 5$ and $a_{14} = -3$ $t_n =$ $t_{40} =$	15. $a_1 = \frac{1}{2}$ and $a_3 = \frac{3}{2}$ $t_n =$ $t_{20} =$

16. Given $a_n = 3n - 1$. Find: $d =$ _____. $a_1 =$ _____. $a_9 =$ _____

17. Write the first 5 terms of the sequence $a_n = 9n + 5$

9. $t_{20} = 63, t_n = 3 + 3n$
10. $t_{38} = 3340, t_n = -80 + 90n$
11. $t_{25} = -12, t_n = 13 - n$
12. $t_9 = -20, t_n = 7 - 3n$
13. $t_{12} = 9.5, t_n = 3.5 + 0.5n$
14. $t_{14} = -16, t_n = 12 - 2n$
15. $t_{29} = 199, t_n = -4 + 7n$
16. $t_{100} = -871, t_n = 29 - 9n$
17. $t_{50} = 312, t_n = 12 + 6n$

1. $t_{14} = 36, t_n = 8 + 2n$
2. $t_{20} = -85, t_n = -5 - 4n$
3. $t_{32} = 130, t_n = -30 + 5n$
4. $t_{20} = 43, t_n = 3 + 2n$
5. $t_{40} = -107, t_n = 53 - 4n$
6. $t_{20} = 10, t_n = 0.5n$
7. $d = 3, t_1 = 2, t_9 = 26$
8. $d = 9, 14, 23, 32, 41, 50$

Investigating Sums of Arithmetic Sequences

STEP 1: **Add** the given terms of the sequence to find the sum for those terms.

STEP 2: **Calculate** the average of the first and last terms of the sequence.

STEP 3: **Multiply** the average found in step 2 by the number of terms in the sequence.

STEP 4: **Record** your answers in a table.

Sequences	Sum	Average of 1 st and last term	Multiply Avg. by number of terms
2, 5, 8, 11, 14			
1, 8, 15, 22			
-1, 1, 3			
2, 11, 20, 29, 38, 47, 56			
-25, -29, -33, -37, -41			
20, 16, 12, 8, 4, 0			

Draw Conclusions:

1. Compare your answers from Steps 1 and 3. What do you notice?
2. Write a sentence that explains how to calculate the sum of the first n terms of a sequence without adding all of the terms.
3. Write a formula for the explanations you gave in Exercise 3. Use t_1 to represent the first term, t_n to represent the last term, and n to represent the number of terms.
5. Use your formula to find the sum of the terms in each of the following sequence:
 - a. 3, 9, 15, 21
 - b. 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13

Arithmetic Series: Worksheet #2

Name: _____ **Period:** _____

Use the series formula and show your work.

Given the series 5, 8, 11, 14....

1. Find the sum of the first 4 terms.

2. Find S_8 .

Given the series 8, 7, 6, 5, 4, 3, 2....

3. Find the sum of the first 7 terms.

4. Find S_{12} .

Given $a_n = 4n + 1$

5. Find the sum of the first 12 terms.

6. Find the sum of the first 20 terms.

Given $a_n = 5n - 2$

7. Find the sum of the first 9 terms.

8. Find the sum of the first 11 terms.

Given $a_n = -3n + 1$

9. Find the sum of the first 99 terms.

10. Find the sum of the first 200 terms.

Arithmetic Sequences: Worksheet #3

Name: _____ Period: _____

1. Find the sum of the first 200 terms of the sequence 5, 7, 9, 11.....

2. Find the sum of the first 150 terms of the sequence 20, 15, 10, 5.....

3. Find the sum of the first 50 terms of the sequence 2, 4, 6, 8.....

4. Find S_{81} of the sequence 12, 11, 10, 9.....

5. Find the sum of the first 100 odd numbers.

6. Find the sum of the first 200 even numbers.

7. Find the sum of the first 600 multiples of 5.

8. Find the sum of the first 50 multiples of 3.

1. 40800 2. -52875 3. 2550 4. -2268 5. 10,000 6. 40,200 7. 901,500 8. 3,825

Review for Quiz: Worksheet #4

Name: _____ Period: _____

Write the rule for the sequence below. Give the requested information about the sequence.

Given Sequence Information	Rule	Additional Request
1. 6, 7, 8, 9....	$a_n =$	$a_{20} =$
2. 12, 10, 8, 6....	$a_n =$	$d =$
3. 2, 12, 22, 32...	$a_n =$	$a_{50} =$
4. $a_2 = 5$ $d = 2$	$a_n =$	$a_{12} =$
5. $a_1 = 500$ $d = 20$	$a_n =$	$a_2 =$
6. $a_2 = 12$ $a_6 = 32$	$a_n =$	$d =$
7. $a_{10} = 30$ $a_{12} = 26$	$a_n =$	$d =$
8. $a_4 = -10$ $a_8 = -8$	$a_n =$	$a_2 =$

Find the sum of the following. Make sure you use the formula.

9. The first 12 terms of the sequence $a_n = -2n + 10$	10. The first 21 terms of the sequence $a_n = 3n - 1$
11. S_8 if the sequence is 3, 6, 9, 12, 15, 18...	12. 100, 98, 96, 94, 92, 90, 88, 86, 84, 82, 80, 78
13. The first 7 terms of the sequence 20, 30, 40, 50, 60, 70, 80....	14. S_{10} if the sequence is 1, 5, 9,

1. $a_n = n + 5$, 25 2. $a_n = -2n + 14$, -2 3. $a_n = 10n - 8$, 492 4. $a_n = 2n + 1$, 25
 5. $a_n = 20n + 480$, 520 6. $a_n = 5n + 2$, 5 7. $a_n = -2n + 50$, -2 8. $a_n = \frac{1}{2}n - 14$, -13
 9. -36 10. 672 11. 108 12. 1068 13. 350 14. 190

Review of Arithmetic Sequences and Series: WS #5 **Name:** _____ **Period:** _____

1. Write a rule for the arithmetic sequences below.

a. 7, 12, 17, 22...	b. 10, 9, 8, 7....
c. $a_1 = 6$ $d = 9$	d. $a_2 = 12$ $d = -2$
e. $a_8 = 40$ $d = 4$	f. $a_3 = 7$ $a_5 = 13$
g. $a_8 = 14$ $a_2 = 44$	h. $a_3 = 9$ $a_5 = 10$

2. Write the first five terms of the sequence $a_n = 4n - 1$. Find a_{100} .

(Continued on the next page)

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(WS #5 CONTINUED)

3. Find the sum of the sequence below:

e. 5, 8, 11, 14.... 44	f. The first 49 terms of the sequence $a_n = 4n - 9$
g. The first 30 terms of the sequence -7, -3, 1, 5....	3h. The first 100 odd numbers.

ANSWERS: ☺

1a. $a_n = 5n + 2$ 1b. $a_n = -n + 11$ 1c. $a_n = 9n - 3$ 1d. $a_n = -2n + 16$ 1e. $a_n = 4n + 8$
 1f. $a_n = 3n - 2$ 1g. $a_n = -5n + 54$ 1h. $a_n = \frac{1}{2}n + 7.5$ 2. 3, 7, 11, 15, 19. 399
 3a. 330 3b. -288 3c. 1050 3d. 2550 3e. 343 3f. 4459 3g. 1530 3h.
 10,000

Arithmetic Sequences. #6

Finding the Sum:

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

(1) 2, 7, 12, ..., $S_{20} =$

(2) An engineer's starting salary was \$30 000, and he was given annual increases of \$2 400.

What were his total earnings over the first ten years?

(3) Kelly hits her 1 iron 240 metres, and each successive iron 15 metres less.

In a promotion, she has one hit with each iron, one after the other. What is the total distance she hits with all nine irons?

(4) A set of steps is built with paving stones. The bottom step has 4 paving stones and 4 extra paving stones are added for each successive step.

How many paving stones will be needed altogether for the first 15 steps?

(5) On 1 February 2002, Ryan started a "get fit" plan. He ran 500 metres the first day, and managed to increase this by 60 metres each day.

How far had he run altogether in the first 20 days?

1. 990 2. 408,000 3. 1620 4. 480 5. 21,400

2.7 Arithmetic Sequence Homework #8

$$t_n = a + (n-1)d$$

1. For the sequence 8, 12, 16, 20... find a (the first term) d, t_{10} , t_{50} , t_n
2. For the sequence 7, 4, 1, -2... find a (the first term) d, t_{10} , t_{50} , t_n
3. An arithmetic sequence has a first term of -11 and a common difference of 5. Write down the first five terms of the sequence and the 53rd term.
4. An arithmetic sequence has first term of 1 and a fifth term of 29. Write down d and t_{50} .
5. An arithmetic sequence has $t_5 = 2\frac{1}{2}$ and $t_8 = \frac{1}{4}$. Write down d and t_{20} .
6. A person who wins a prize in lotto receives \$50 day 1, \$59.50 day 2, ..., for a year. How much will she get on the first day of the 20th week? On which day will she get over \$2000.00?

Handwritten calculations for problem 6:

$$\begin{aligned}
 &1. d = 4 \quad t_{10} = 44 \quad t_{20} = 204 \quad t_n = 4 + 4n \\
 &2. d = -3 \quad t_{10} = -20 \quad t_{20} = -140 \quad t_n = 10 - 3n \\
 &3. -11, -6, -1, 4, 9, \dots \quad t_{53} = 249 \\
 &4. d = 7 \quad t_5 = 344 \quad a = 1 \\
 &5. d = -0.75 \quad t_{20} = -8.75 \quad a = 5.5 \\
 &6. day = 141 \quad t_{141} = 1380
 \end{aligned}$$

US5248 Arithmetic Sequence Worksheet #9

$$t_n = a + (n - 1) d$$

1. For the sequence 58, 65, 72, 79... find the
 - a) 10th term
 - b) 25th term
2. For the sequence 117, 105, 93... find the
 - a) 15th term
 - b) 28th term
3. For the sequence \$76.70, \$95.20, \$113.70... find the
 - a) 12th term
 - b) 45th term
4. George buys a car with an odometer reading of 23985 and drives the car 62km every day. What will the odometer reading be on the
 - a) 14th day?
 - b) 105th day?
5. A person who wins a prize in lotto receives \$50 day 1, \$59.50 day 2, ..., for a year.
 - a) How much will she get on the first day of the 20th week?
 - b) On which day will she get over \$2000.00?

Handwritten calculations for problem 5:

$$\begin{aligned}
 &1a) \quad t_{10} = 121 \\
 &2a) \quad t_{15} = -51 \\
 &3a) \quad t_{12} = 280.20 \\
 &4a) \quad \text{day 1} = 24047 \quad t_{14} = 24853 \\
 &5a) \quad 1^{st} \text{ day} = 134 \quad t_{134} = 1313.50 \\
 &1b) \quad t_{25} = 226 \\
 &2b) \quad t_{28} = -207 \\
 &3b) \quad t_{45} = 890.70 \\
 &4b) \quad t_{105} = 30495 \\
 &5b) \quad 20^{th} \text{ day} = 206.26
 \end{aligned}$$

Year 12 Homework – Geometric Sequence Formula #10

$$t_n = ar^{n-1}$$

- For the sequence find the terms indicated ;
8, 24, 72, ... t_6, t_9, t_n
- For the sequence below find the terms indicated.
 $\frac{3}{4}, 3\frac{3}{4}, 18\frac{3}{4}, \dots t_4, t_6, t_n$
- For a geometric sequence $t_3 = 5$ and $t_4 = 15$, write down the first 6 terms and give the n^{th} term.
- Money placed in an investment fund increases by 4% per year.
Initially \$5000 was invested.
 - Write out the value of the investment at the beginning of the first five years.
 - How long will it take for the investment to reach or exceed \$500 000 (give your answer to the nearest year).

13.6 years
n = 14 rounded

500,000 = 5000 × 1.04ⁿ⁻¹

4. 5000, 5200, 5408, 5624.32, 5849.29, ...

3. $r = 3$ $t_n = \frac{9}{5} \times 3^{n-1}$

2. $t_4 = 93.75$ $t_6 = 2343.75$ $t_n = 0.75 \times 5^{n-1}$

1. $t_6 = 1944$ $t_9 = 52488$ $t_n = 8 \times 3^{n-1}$

grow + comp

US 5248 Geometric Sequence Worksheet #11

$$t_n = ar^{n-1}$$

1. For the sequence 2, 6, 18... calculate the 12th term.
2. For the sequence 10.5, 12.6, 15.12... calculate the 9th term (rounding to 2 decimal places).
3. A house increases in value by 9% each year (ie the ratio is 1.09). If it starts at a value of \$26,000, how much will it be worth in 15 years. (Round to the nearest dollar)
4. A painting increases in value by 4% each year. If it starts a price of \$6500, how much will it be worth in 20 years.
5. A company expects to increase production of a product by 24% each year. If they begin making 34 products in the first year, how many do they expect to be making in 15 year. (round to the nearest whole number)
6. Every year a car is owned it decreases in value by 15% (ie the ratio is $1-0.15=0.85$). If a car is bought for \$16500, how much will it be worth in 10 years.
7. A painting is worth \$12000 the first year, \$10800 the next year and continues to decrease at the same rate. How much is it worth in 12 years?

$$6. t_{10} = 3822$$

$$5. t_{15} = 691$$

$$4. t_{20} = 13,695$$

$$3. t_{15} = 86,885$$

$$2. t_9 = 45.15$$

$$1. t_{12} = 354,294$$

$$7. t_{12} = 3765.13$$

US 5248 Geometric Sequence Partial Sums #12

Worksheet

$$t_n = ar^{n-1}$$

$$s_n = \frac{a(r^n - 1)}{r - 1}$$

- Peter deposits \$500 in the bank at 5% interest p.a. paid at the end of the year. He keeps reinvesting this money, for a further 6 years. How much will he have at the end of the 7th year?
- Emma is training for a race. The first day she runs 10km and each day she increases this amount by 11%.
 - How far will she run on the 6th day?
 - How far in total has she run by the 10th day?
- After a particular fruit is picked its acid content increases by 3% an hour. If the acid content starts at 20 units, what will it be after 7 hours?
- When Mark first starts a job it takes him 500 minutes to assemble an electrical device. He gradually gets faster reducing the time he takes 6% each time he assembles on.
 - How long will it take for him to assemble the 8th item?
 - How long altogether did it take him to assemble the first 6 items?
- Caleb plays a computer game where he has to do a set of things in the shortest possible time. The first time it takes him 40 seconds, but over the first 10 games he reduces this by 2% each game.
 - How long will it take him to play for the 6th time?
 - How long in total did it take him to play the first 10 games?
- Steph gets tired as she swims lengths of the pool. After she has been swimming a while Sapphire starts to time her and she gets the following times:
40 seconds, 46 seconds, 52.9 seconds...
If the patterns continues like this
 - how long does the 16th length take?
 - How long in total does it take to do the first 12 lengths?
- A towns population is currently 52 000. If it grows constantly at 4% pa what will it be after
 - 6 years?
 - 20 years?

$$95601 = 27(9) \quad 1239 = 7(2) \quad 7. (a) \quad 7. (a) \quad 7. (a)$$

$$225 \pm 0.0911 = 25 (9) \quad 325.48 (9) \quad 512 = 1160.07 \text{ sec}$$

$$225 \pm 0.09 = 25 (9) \quad 91.98 = 7(2) \quad 5.2) \quad 7. (a) \quad 7. (a) \quad 7. (a) \quad 7. (a) \quad 7. (a)$$

$$88.82 = 7(2) \quad 3. (a) \quad 167.22 \text{ km} \quad 510 = 16.85 \quad 2. (a) \quad 7. (a) \quad 7. (a) \quad 7. (a) \quad 7. (a)$$

2.7 Geometric Progressions Homework

#13

$$t_n = ar^{n-1}$$

$$s_n = \frac{a(1-r^n)}{1-r}$$

$$s_\infty = \frac{a}{1-r}$$

- For each of the following GPs, find the indicated terms. a) 8, 24, 72, ... t_6, t_{10}
b) -1, 2, -4, 8, ... t_{10}, t_{18}
- For a GP with $t_3=5$ and $t_4=15$, write down the first six terms
- In a GP, $t_1=4$ and $t_3=\frac{4}{9}$. Find t_7
- What is the sum of the first 10 terms of the sequence 3, 6, 12, ...?
- A GP has first term 4 and second term 6. Find the sum of the first 10 terms.
- A man on a diet loses 1.5% of his body weight during each week. If he initially weighs 150kg, write down his body weight at the end of the first five weeks. How much does he lose in total during that time?
- Which of the following GPs have a sum to infinity?
a) 2, 3, 4.5... b) 2, 1, 0.5, 0.25... c) 4, 3, 2.25...
- Find the sum to infinity of a GP with third term 6 and a common ratio $\frac{2}{3}$.
- $\frac{1}{3} + \frac{1}{6} + \frac{1}{12} + \dots =$
- Find the common ratio of a GP with $t_1=5$ and $s_\infty=8$
- When Kate rinses her hair after washing it she removes a quantity of shampoo. The first rinse removes 5g of shampoo. Each successive rinse removes 20% of the amount removed by the previous rinse. How much shampoo is removed in the third rinse? How much shampoo did Kate use to wash her hair?

$$s_\infty = 6.25$$

$$t_3 = 0.2g$$

$$r = \frac{3}{8}$$

$$s_\infty = \frac{2}{3}$$

$$< \frac{5}{9}, \frac{5}{3}, 5, 15, 45, 135, \dots >$$

$$t_{10} = 157464$$

$$t_{18} = 131072$$

$$1. a = 3, r = 2, t_6 = 1944, t_{10} = 512$$

$$2. r = 3, a = \frac{5}{9}, t_7 = \frac{4}{129}$$

$$3. r = \frac{1}{3}, t_7 = \frac{4}{129}$$

$$4. s_{10} = 3069$$

$$5. s_{10} = 453.32$$

$$7. t_5 = 141.2 \text{ loses } 8.8 \text{ kg}$$

$$8. b \text{ and } c$$

$$9. s_\infty = 40.5$$

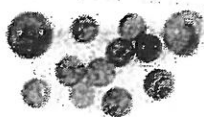
US 5248 Sequences and Series Homework

Name.....

1. Phil decides to generate some income during winter by selling kindling wood at the market. His first day of sales is very successful and he sells 200 bags. With the demands of winter he expects sales to improve so he plans to increase his sales by 20 bags per week.

Sarah has noticed that the game of marbles has become very popular

- Calculate if in week 12 he will sell at least 400 bags.
- Calculate if in the first 16 weeks if he has sold at least 6000 bags.
- Calculate if the sales for week 16 is more than the total sales for the first 6 weeks.
- In which week will his sales reach at least 720 bags?
- What will his total sales be for the month of June (week 5 to 8 inclusive)?



2. Sarah has noticed that the game of marbles has become very popular so she decides to sell marbles at the market. On her first day she sells 2500 marbles but predicts the game will lose its appeal. Her plan is to reduce her sales by 10% per week. This means each week's sales will be only 90% of the previous week's sales.

- Calculate if she will sell more than 800 marbles in week 12.
- Calculate if she will have sold a total of more than 20 000 by the end of week 16.
- If she keeps selling at this rate will she ever reach a total of 15 000 marbles sold?

3. Michela has been selling craft items at the market and on her first Saturday she earned \$150.00. Her stall has been getting more popular and her earnings are increasing by 10% per week.

- What will she earn in week 10?
- what will be her total earnings in the first 10 weeks?

12.3 Year 12 Mathematics

Homework Assignment – Sequences 1

Answer the following questions on refill and hand in by

1. For each of the following Arithmetic sequences, find the indicated terms.
 - a. $3, 6, 9, 12, \dots, t_6, t_{20}, t_n$
 - b. $4, 2, 0, -2, \dots, t_7, t_{13}, t_n$
2. For each of these Geometric sequences find the following indicated terms.
 - a. $6, 12, 24, 48, \dots, t_6, t_{10}, t_n$
 - b. $-1, 2, -4, 8, \dots, t_{10}, t_{14}, t_n$
3. In an arithmetic sequence, $t_3 = 6$ and $t_6 = -3$, Write down the first 8 terms and the general term.
4. In a geometric sequence the first term is 4 and the second term is 6. Write down the common ratio and the 10th term.
5. In a geometric sequence the 3rd term is $\frac{1}{12}$ and the 6th term is $\frac{1}{96}$. Find the first term, the common ratio and the 4th and 5th terms.
6. A cup of tea has a temperature of 80°C when first poured out. The temperature reduces by a factor of 0.9 per minute.
 - a. Write down the sequence of numbers representing the temperature of the tea for 10 minutes after it has been poured.
 - b. Graph this sequence and use your graph to estimate the temperature after 8.5 minutes.
 - c. If you like to drink your tea when it is 65°C , estimate the approximate time you should leave your tea before drinking.
7. An arithmetic sequence has a 1st term of 5 and a common difference of 13. Find the sum of the first 10 terms.
8. An arithmetic sequence has a first term of -7, the sum of the first 15 terms is 315. Find the common difference.
9. A geometric sequence has a 1st term of 6 and a second term of 2. Find the sum of the first 10 terms, the first 20 terms, and the first 30 terms.
10. Fifty thousand dollars is donated to the school and the money is invested at 14.5% p.a. compounded 6-monthly for a period of 20 years. How much money will be available in 20 years time?

Sequences and series practice 1

1. Jenny manufactures and sells fleece jackets. Her sales for the first week were 26 jackets, 33 next week, 40 the week after, then 47 the week after that. If sales continue like this :-

a) How many will she sell in week 19?

b) How many jackets will she sell altogether in the first 25 weeks?

2. Joe's gold mine produced 560 oz of gold the first week but from then on there was a 15% drop in production from week to week. Assuming this pattern continued :-

a) How much gold would the mine produce in week 10?

b) How much gold would the mine produce altogether in the first 8 weeks?

c) Will the total gold the mine produces ever reach 3600 oz?

1a) $t_{19} = 152$ b) $S_{25} = 2750$ 2a) $t_{10} = 129.7$ oz b) $S_8 = 2716$ oz c) $S_{\infty} = 3733.3$ oz Yes

Sequences and series practice 2

1. The number of press-ups Julie did on consecutive days followed the pattern 5, 8, 11, 14,

a) If this pattern continued how many would she do on day 23?

b) On which day would she do 119 press-ups?

c) How many would she do in total in the first 12 days?

2. Sam was told her gran was putting aside some money for her once a year. Gran was increasing the amount she deposited each year, the amounts following the pattern :-

\$6000, \$6300, \$6615, \$6945.75 (assume gran keeps any interest the money earns)

a) If this pattern continued how big would the 10th deposit be?

b) What would be the total of the first 8 deposits?

c) Her nanna is not so well off and deposits \$1200 the first year then reduces this by 10% each year after that. Assuming this keeps going for many years will her nanna ever deposit more than \$11500?

1a) $t_{23} = 71$ b) 39th day c) $S_{12} = 258$ 2a) $r = 1.05$, $t_{10} = \$9307.97$ b) $S_8 = \$57,294.65$ c) $S_{\infty} = \$12,000$ Yes

Sequences and series practice 3

1. Bert collects pine cones for the fire. The numbers he collects on successive days are 185, 181, 177, 173, 169, If this pattern continues :-

- a) How many will he collect on day 15?
- b) On which day will he collect 61 cones?
- c) How many will he collect altogether in the first 20 days?

2. As the apple picking season gets under way at a large orchard the weight of fruit picked each day is recorded. The figures (in tonnes) are 20, 22, 24.2, 26.62 If this pattern continues :-

- a) How many tonnes will be picked on day 12?
- b) What total weight will be picked in the first 14 days?

3. In the first year of its growth a tree grows 0.8 m. This growth (extra height added) drops by 5% each year after that. If this pattern continues will the tree ever reach 17 m high?

1) a) $t_{15} = 129$ b) 32 c) $S_{20} = \frac{2793}{2940}$ 2) a) $r = 1.1$ $t_{12} = 57.06$ b) $S_{14} = 559.50$ 3) $S_{\infty} = 16\text{m}$, never

Sequences and series practice 4

1. Josh sets out a large patio area with paving stones. Each row has more stones than the one before. The number of paving stones in consecutive rows is 25, 29, 33, 37,

- a) How many paving stones will there be in the 24th row?
- b) Which row will have exactly 121 paving stones?
- c) What will be the total number of paving stones in the first 18 rows?

2. The weight of rubbish created by the people living in Toytown is found each week. This (measured in Tonnes) was 200, 210, 220.5, 231.525, ... If this pattern continued :-

- a) how much rubbish would be created in the 15th week? (round to 2 dp)
- b) How much rubbish altogether would be created in the first 9 weeks? (to 2 dp)

3) Apricots are left to dry in the sun. The first day the drop in weight is 42 kg. Each day their weight drops by 7% (of the previous day's drop) due to evaporation of their moisture content. Will the total drop in weight ever be as much as 560 kg?

1a) $t_{24} = 117$ b) 25 c) $S_{18} = 1062$ 2a) $r = 1.05$, $t_{15} = 395.99\text{T}$ b) $S_9 = 2205.31$ c) $S_{\infty} = 600$, yes