Integrated Math 1 - Chapter 5 Homework Scoring Guide

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Lesson	Lesson Title	Homework Problems	Score
5.1.1	How does the pattern grow?	5-6 to 5-15	
5.1.2	How high will it bounce?	5-22 to 5-27	
5.1.3	What is the pattern?	5-35 to 5-37	
5.2.1	How can I describe a sequence?	5-46 to 5-55	
5.2.2	How do arithmetic sequences work?	5-66 to 5-71	
5.2.3	How else can I write the equation?	5-77 to 5-80	
5.3.1	What is the rate of change?	5-86 to 5-90	
5.3.2	How can I use a multiplier?	5-102 to 5-112	
5.3.3	Is it a function?	5-120 to 5-125	
Total Points (add all points together)			
Total Number of Assignments (# divided by)			
Average Score per Assignment			

5.1.1 How does the pattern grow?

Representing Exponential Growth

5-6. What if the data for Lennie and George (from problem 5-1) matched the data in each table below? Assuming that the growth of the rabbits multiplies as it did in problem 5-1, complete each of the following tables. Show your thinking or give a brief explanation of how you know what the missing entries are.

a.

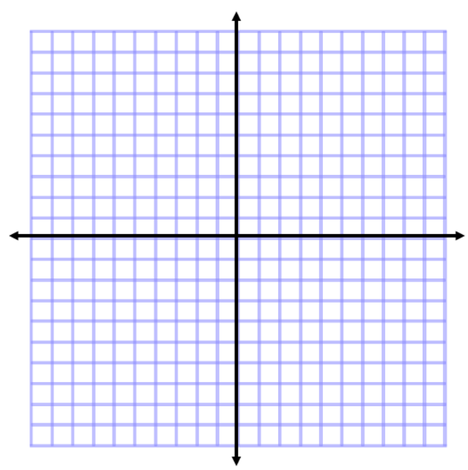
Months	Rabbits
0	4
1	12
2	36
3	
4	

b.

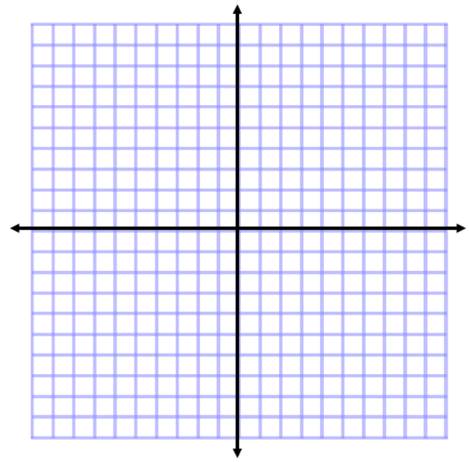
Months	Rabbits
0	6
1	
2	24
3	
4	96

5-7. The equation of a line describes the relationship between the *x*- and *y*-coordinates of the points on the line.

a. Plot the points (3, –1), (3, 2), and (3, 4) and draw the line that passes through them. State the coordinates of two more points on the line. Then answer this question: What will be true of the coordinates of any other point on this line? Now write an equation that says exactly the same thing. (Do not worry if it is very simple! If it accurately describes all the points on this line, it is correct.)



b. Plot the points (5, –1), (1, –1), and (–3, –1). What is the equation of the line that goes through these points?



5-13. Write each expression below in a simpler form.

a. $\frac{5^{723}}{5^{721}}$

b. $\frac{3^{300}}{3^{249}}$

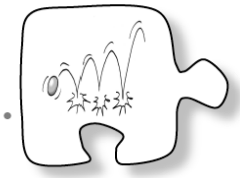
c. $\left(\frac{3 \bullet 4^3}{3^{-2} \bullet 4^{-7}}\right)^0$

d. $\left(\frac{4 \bullet 10^3}{10^{-2}}\right)^2$

5-15. Write the equation of each line described below.

- A line with a slope of –2 and *y*-intercept (0, 7).
- A line with a slope of $-\frac{3}{2}$ and *x*-intercept (4, 0).
- A line perpendicular to the line in part (b) with *x*-intercept (4, 0).

5.1.2 How high will it bounce?



Rebound Ratios

5-22. Solve each equation.

a. $2(x - 2) = -6$

b. $2(x + 1) + 3 = 3(x - 1)$

5-23. Calculate the slope of the line through the points (6, –8) and (3, –4).

- Write the equation of the line.

- Is the point (–3, 4) on the line you found in part (a)? How can you tell?

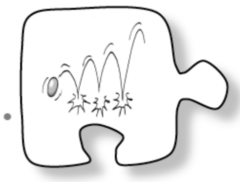
5-25. AAA Packages Plus sends packages overnight for \$5 plus \$0.25 per ounce. United Packages charges \$2 plus \$0.35 per ounce.

- Mr. Molinari noticed that his package would cost the same to mail using either service. Write an equation to represent this situation.

- How much does Mr. Molinari's package weigh?

5-27. Ms. Cai's class is studying a tile pattern. The equation for the tile pattern is $y = 10x - 8$. Kalil thinks that Figure 12 of this pattern will have 108 tiles. Is he correct? Justify your answer.

5.1.3 What is the pattern?



The Bouncing Ball and Exponential Decay

5-35. DeShawna and her team gathered data for their ball and recorded it in the table shown at right.

Drop Height	Rebound Height
150 cm	124 cm
70 cm	59 cm
120 cm	100 cm
100 cm	83 cm
110 cm	92 cm
40 cm	33 cm

- What is the rebound ratio for their ball?

- Predict how high DeShawna's ball will rebound if it is dropped from 275 cm. Look at the precision of DeShawna's measurements in the table. Round your calculation to a reasonable number of decimal places.

- Suppose the ball is dropped and you notice that its rebound height is 60 cm. From what height was the ball dropped? Use an appropriate precision for your answer.

- Suppose the ball is dropped from a window 200 meters up the Empire State Building. What would you predict the rebound height to be after the first bounce?

- How high would the ball in part (d) rebound after the second bounce? After the third bounce?

5-37. Write an equation for the line containing the points listed in the table.

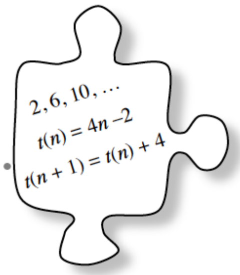
x	3	-2	5	12
y	4	-11	10	31

5-39. Solve each equation.

a. $\frac{2x-8}{10} = 6$

b. $9^x = 3^{40}$

5.2.1 How can I describe a sequence?



Generating and Investigating Sequences

5-46. Chelsea dropped a bouncy ball off the roof while Nery recorded its rebound height. The table at right shows their data.

- To what family does the function belong? Explain how you know.

- Write the data as a sequence. Is the sequence arithmetic, geometric, or something else? Justify your answer.

Bounce	Rebound Height
1	475 cm
2	290 cm
3	175 cm
4	100 cm
5	60 cm

5-47. The average distance from the earth to the moon is 3.844×10^{8} meters. If the length of the average pencil is 1.8×10^{-1} meters, approximately how many pencils would need to be connected together to reach the moon? Use appropriate precision in your answer.

5-48. For the line passing through the points $(-2, 1)$ and $(2, -11)$:

a. Calculate the slope of the line.

b. Write the equation of the line.

5-49. Allie is making 8 dozen chocolate-chip muffins for the food fair at school. The recipe she is using makes 3 dozen muffins. If the original recipe calls for 16 ounces of chocolate chips, how many ounces of chocolate chips does she need to make 8 dozen muffins? (Allie buys her chocolate chips in bulk and can measure them to the nearest ounce.)

5-51. A tank contains 8000 liters of water. Each day, half of the water in the tank is removed. How much water will be in the tank at the end of:

- The 4^{th} day?

- The 8^{th} day?

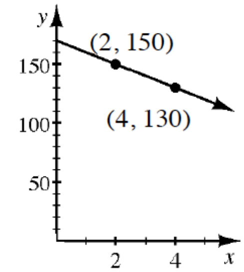
5-52. Simplify each expression below.

- $y + 0.03y$

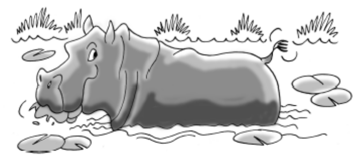
- $z - 0.2z$

- $x + 0.002x$

5-53. Draw a slope triangle and use it to write the equation of the line shown in the graph below.



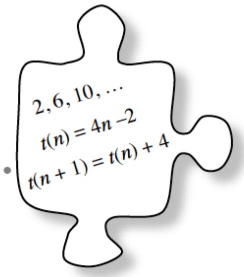
5-55. Harry the Hungry Hippo is munching on the lily pads in his pond. When he arrived at the pond, there were 20 lily pads, but he is eating 4 lily pads an hour. Heinrick the Hungrier Hippo found a better pond with 29 lily pads! He eats 7 lily pads every hour.



- If Harry and Heinrick start eating at the same time, when will their ponds have the same number of lily pads remaining?

- How many lily pads will be left in each pond at that time?

5.2.2 How do arithmetic sequences work?



Generalizing Arithmetic Sequences

5-66. Determine whether 447 is a term of each sequence below. If so, which term is it?

$t(n) = 5n - 3$

d. $t(n) = 14 - 3n$

$t(n) = 24 - 5n$

e. $t(n) = -8 - 7(n - 1)$

c. $t(n) = -6 + 3(n - 1)$

5-67. Choose one of the sequences in problem 5-66 for which you determined that 447 is *not* a term. Write a clear explanation describing how you can be sure that 447 is not a term of the sequence.

5-68. Determine the common difference (sequence generator) for each arithmetic sequence listed below. Then write an equation for the n^{th} term in each sequence, keeping in mind that the first term of each sequence is $t(1)$.

- 4, 7, 10, 13, …

- 3, 8, 13, …

- 24, 19, 14, …

- 7, 9.5, 12, …

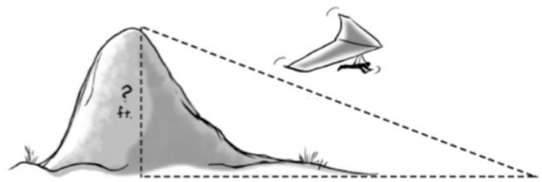
5-69. Great Amusements Park has been raising its ticket prices every year, as shown in the table below.

- Describe how the ticket prices are growing.

- What will the price of admission be in year 6?

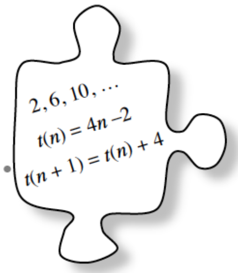
Year	Price
0	\$50
1	\$55
2	\$60.50
3	\$66.55

5-71. Monique and her dad built a hang glider together. After testing the new glider for safety, the glider was ready for the first big flight. Monique jumped off a tall sand dune and traveled in a diagonal line from the top of the dune toward the ground. She flew for 137 feet and landed on level ground at a spot 105 feet horizontally from where she took off. How tall was the sand dune?



5.2.3 How else can I write the equation?

Recursive Sequences



5-77. Avery and Collin were trying to challenge each other with equations for sequences. Avery was looking at an explicit equation that Collin wrote.

$$t(n) = 4.5n - 8$$

a. Write the first 4 terms for the sequence.

b. What would Avery do to write the 15^{th} term of this sequence?

c. Write a recursive equation for this sequence.

5-78. Write both an explicit equation and a recursive equation for the sequence:
5, 8, 11, 14, 17, …

5-79. Compute the following products using area models.

- $(4x + 5)(4x - 5)$
- $(4x + 5)^2$

5-80. Lona received a stamp collection from her grandmother. The collection is in a leather book and currently has 120 stamps. Lona joined a stamp club, which sends her 12 new stamps each month. The stamp book holds a maximum of 500 stamps.

- Complete the table at right.
- How many stamps will Lona have in one year from now?

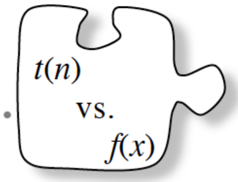
Month	Stamps
0	120
1	132
2	
3	
4	
5	

- Write an equation using function notation to represent the total number of stamps that Lona has in her collection after n months. Let the total be represented by $t(n)$.
- Solve your equation from part (c) for n when $t(n) = 500$. Will Lona be able to fill her book exactly with no stamps remaining? How do you know? When will the book be filled?

5-82. A calculator manufacturer offers two different models for students. The company has sold 10,000 scientific calculators so far and continues to sell 1500 per month. It has also sold 18,000 graphing calculators and continues to sell 1300 of this model each month.

- If at some month, m, the number of scientific calculators sold is equal to the number of graphical calculators sold, then write an equation that represents this situation.
- When will the number of scientific calculators sold equal the number of graphical calculators sold? That is, solve your equation from part (b) for m.

5.3.1 What is the rate of change?



Comparing Growth in Tables and Graphs

5-86. Identify the following sequences as arithmetic, geometric, or neither. For the arithmetic and geometric sequences, identify the growth pattern.

a. 12, 144, 1728, …

b. 0, 5, 10, 15, 20, 25, …

c. 0, 4, 16, 36, 64, …

d. 1.5, 2.25, 3.375, 5.0625, …

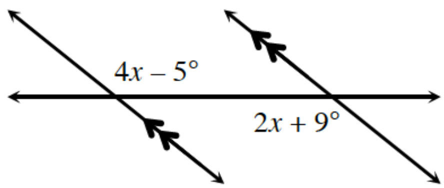
5-87. Write the first five terms of of each recursively-defined sequence.

- $t(1) = -3$
  $t(n+1) = -2 \cdot t(n)$

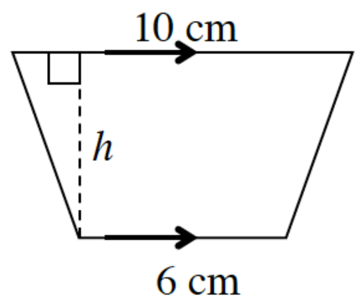
- $t(1) = 8$
  $t(n+1) = t(n) - 5$

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

5-88. Use angle relationships and the diagram below to write and solve an equation for *x*. Show all work.



5-89. The area of the trapezoid at right is 56 cm^2. What is the height, *h*? (Hint: The formula for the area of a trapezoid can be written as A = $\frac{1}{2}(b_1 + b_2)h$, were b_1 and b_2 are the lengths of the bases.) Show all work.



5-90. Simplify each expression.

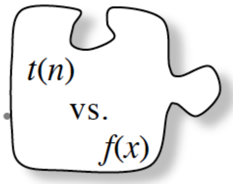
- $(2m^3)(4m^2)$

- $\frac{6y^5}{3y^2}$

- $\frac{-4y^2}{6y^7}$

- $(-2x^2)^3$

5.3.2 How can I use a multiplier?



Using Multipliers to Solve Problems

5-102. Convert each percent increase or decrease into a multiplier.

a. 3% increase

b. 25% decrease

c. 13% decrease

d. 2.08% increase

5-104. Write the equation of the line parallel to $y = -\frac{1}{3}x + 5$ passing through the point (9, –1).

5-105. Solve each equation.

a. $8 - (2x + 1) = 3$

b. $\sqrt{x} + 4 = 9$

5-108. Zeke ran 4 miles in 45 minutes. If he keeps running at the same pace, how long will it take him to run 10 miles? What is his unit rate in miles per hour?

5-110. Solve each equation.

a. $(x + 2)(x + 3) = x^2 - 10$

b. $\frac{1}{2}x + \frac{1}{3}x - 7 = \frac{5}{6}x$

c. $\frac{x+1}{3} = \frac{x}{2}$

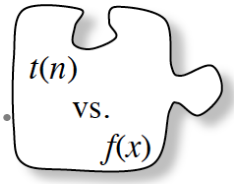
d. $9^x = \left(\frac{1}{3}\right)^{x+3}$

5-111. What is the equation of the line that has a y-intercept of (0, –3) and passes through the point (–9, –9)?

5-112. If $f(x) = \frac{1}{x+2}$, calculate each of the following values.

- $f(-3)$
- $f(-1.5)$
- $f(-2)$
- x if $f(x) = 5$

5·3·3 Is it a function?



Comparing Sequences to Functions

5-120. Describe the domain of each function or sequence below.

a. The function $f(x) = 3x - 5$.

b. The sequence $t(n) = 3n - 5$

c. The function $f(x) = \frac{5}{x}$.

d. The sequence $t(x) = \frac{5}{n}$.

5-121. Think about the difference between a function and a sequence as you answer the questions below.

- A certain sequence has an explicit equation of $t(n) = 5 \cdot 2^n$. Is it possible for this sequence to have a term with the value of 200? If so, which term is it? If not, justify why not.

- Now think about a function with the equation of $f(x) = 5 \cdot 2^x$. Is it possible for this function to have an output of 200? If so, what input gives this output? If not, justify why not.

5-122. Read the Math Notes box in this lesson for information about an alternative notation for sequences, then use the given sequence to complete the parts below.

$a_1 = 5$
$a_n = a_n - 1 + 6$

Therefore: $a_1 = 5$
$a_2 = a_1 + 6 = 5 + 6 = 11$
$a_3 = a_2 + 6 = 11 + 6 = 17$

Now continue the sequence:

- $a_4 = a_? + ? = ?$
- $a_5 = a_? + ? = ?$
- The first 5 terms of the sequence are:

5-123. The Coopersville Mad Hens baseball team played Q games last year, each consisting of 9 innings. Their star pitcher, Kasmir, pitched T innings total, walked Wbatters, and struck out K batters. The opposing batters got on base by a hit or an error H times in those innings. He made a total of P pitches for the year. What do the following expressions represent in this context?

- $W + K + H$
- $\frac{K}{T}$
- $9Q$
- $\frac{T}{9Q}$
- $\frac{P}{T}$

5-124. Geoffrey and Ricardo are running a relay race. Two minutes into the race, they have run 775 meters total. If Geoffrey ran x meters of the race, write an expression that represents the distance Ricardo has run.

5-125. Figure 2 of a tile pattern is shown at right. If the pattern grows linearly and if Figure 5 has 15 tiles, then write an equation for the pattern.

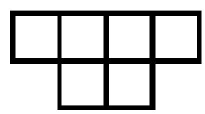


Figure 2