

# Answers

## for Grade 7 Group Assignments - Quarter #1

### Notes for Parents:


- Answers for group assignment problems that are out of the workbook can be found in the “G7 Workbook Answer Key”.
- It is probably best not to give this document to the students, as it might spoil it for them.
- This answer key doesn’t include all answers.

### Week 1

Coin puzzle: 18 quarters and 32 nickels.

### Week 2

Age puzzle: Bill is 10.

Equation Puzzle:  = 7

### Week 3

1. a)  $2^3 \times 3^4 \times 11^1$   
b)  $2 \times 5^3 \times 7^2$
2. Stan should pay Bill \$0.75 and pay Sara \$5.25. The reasoning is as follows: Everyone received 8 oranges. Therefore, Bill only gave Stan 1 orange, and Sara gave Stan 7 oranges. Since the ratio of the amount given by Sara and Bill is 7:1 (Sara gave 7 times as much as Stan), they should divide the money in that same ratio. Therefore, Bill gets  $\frac{1}{8}$  of the money and Sara gets  $\frac{7}{8}$  of the money (i.e., Sara gets 7 times as much money as Stan).
3. Brianna is 45 and Charlotte is 30.
4. Annie is 21 now.

### Week 4

1. a) 720  
b) 229,500  
c) *Prime Factorization Law*  
*The number of ending zeroes in the resulting number is always equal to the number of two-five pairs. (For example,  $2 \times 2 \times 2 \times 3 \times 5 \times 5 \times 13$  is the same as  $(2 \times 5) \times (2 \times 5) \times 3 \times 2 \times 13$  has 2 two-five pairs.) More simply: The smaller of the exponents with the base 2 and base 5, indicates the number of ending zeroes in the resulting number. (Using the same example,  $2^3 \times 3 \times 5^2 \times 13$ : The 2 has an exponent of 3 and the 5 has an exponent of 2. The smaller exponent is 2, so the resulting number (7800) must end in 2 zeroes.*
2. a) Time is 7 and Frank is 13.  
b) Jim is 8 and Mike is 20.

### Week 5

1. A fraction puzzle:  
Part 1: many solutions, one is  $\frac{3}{4} \times \frac{5}{6} \times \frac{4}{5}$   
Part 2: many solutions, one is  $\frac{61}{73} \times \frac{73}{74} \times \frac{37}{61}$ . The trick is to line up three places for the fractions, and see what cross multiplies to end up with  $\frac{1}{2}$ .
2. A special number: 47,347,347,347

## Week 6

### Tear and Stack

After 1 tear we have 2 sheets, after 2 tears we have 4 sheets, after 3 tears we have 8 sheets, after 4 tears we have 16 sheets, etc. We can see that the number of sheets (2, 4, 8, 16, etc.) is always a power of two, which can be expressed by the formula  $S = 2^n$ , where S is the number of sheets, and n is the number of times that the stack has been torn and stacked. Putting in 42 for n, gives us  $2^{42}$ , which can be written as  $2^2 \cdot 2^{10} \cdot 2^{10} \cdot 2^{10} \cdot 2^{10}$ , and since  $2^{10} \approx 1000$ , we can say that  $2^{42} \approx 4,000,000,000,000$ . Since a ream (500 sheets) is 4.5cm thick (or 1000 sheets is 9cm thick) each sheet is 0.009cm thick. We then can calculate that the stack is about 36,000,000,000cm, or 360,000km high. The exact answer is 395,824km high, which is a bit more than the distance to the moon (384,000km)!

### Digit Arithmetic Puzzles

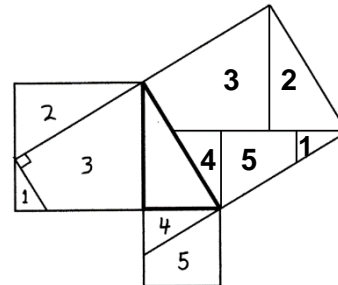
1) 
$$\begin{array}{r} 23 \\ 23 \\ 23 \\ +23 \\ \hline 92 \end{array}$$

2) 
$$\begin{array}{r} 89 \\ + 9 \\ \hline 98 \end{array}$$

3) 
$$\begin{array}{r} 1045 \\ 45 \\ + 2867 \\ \hline 3957 \end{array} \quad \text{or} \quad \begin{array}{r} 1275 \\ 75 \\ + 3608 \\ \hline 4958 \end{array}$$

## Week 7

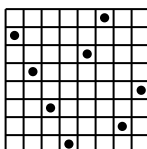
- The drawing on the right shows a solution to the cutout square puzzle
- The other problems are talked about in the lectures.



## Week 8

- 12 of the small squares fit inside of the rectangle
- 144
  - 9
  - 10,000
  - 1,000,000
  - 27,878,400
- 20
  - 77
  - 15
  - 15
  - 20

4) One Solution is shown here:



- The hypotenuse is 13m
- The shortest side is 65cm