

Student Name: \_\_\_\_\_

1. Evaluate  $2 + 3 \times 4 + 5$  following the order of operations.

Evaluating the expression (evaluating  $3 \times 4$  first) yields the 19.

2. What do you get when you subtract 2 copies of the number 4 from 3 copies of the number 5? In other words, what is  $5 + 5 + 5 - 4 - 4$ ?

Evaluating the expression from left to right yields 7.

3. Bobby, Johnny and Jeff all went to buy apples. Jeff bought 3 apples. Bobby has 3 more apples than Jeff. Johnny has 5 more apples than Bobby and Jeff combined. How many apples did Johnny buy?

Bobby has 6 apples (since he has 3 more apples than Jeff, who has 3 apples). Similarly, Johnny has 14 apples (since he has 5 more apples than Bobby and Jeff combined, i.e.  $5 + (6 + 3)$ ). Thus Johnny bought 14 apples.

4. What is the sum of all the odd numbers from 1 to 17 inclusive?

The odd numbers from 1 to 17 inclusive are: 1, 3, 5, 7, 9, 11, 13, 15, 17. Summing them up we get 81. Alternatively, one could have realized that the sum of the first  $n$  odd numbers is  $n^2$ , and since the numbers to sum up are the first 9 odd numbers, the answer is  $9^2 = 81$ .

5. A game of peg solitaire begins with pegs placed as shown in the following diagram:



How many pegs are there?

There are four 3 by 3 squares of pegs (i.e.  $3 \times 3 \times 4 = 36$ ). However, 4 of the pegs are counted twice (namely the 2 corners of each square). Thus there are  $36 - 4 = 32$  pegs.

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6. What is the least number of coins needed to make 123 cents using only dimes (worth 10 cents), nickels (worth 5 cents) and pennies (worth 1 cent)?

Notice that you can take 12 dimes to make 120 cents, and 3 pennies to make 3 cents, which in total make 123 cents. This is the least number of coins needed, as replacing any dime with nickels or pennies require a larger number of coins. Thus the least number of coins needed is 15 (12 dimes + 3 pennies).

7. The sum of 3 consecutive odd whole numbers is 27. What is the largest of the 3 numbers?

The sum of 3 consecutive odd whole numbers is just 3 times the middle whole number, since the smallest number is 1 less than the middle number, and the highest number is 1 more than the middle number. Thus 27 is 3 times the middle odd number, and so the middle odd number is 9, making the largest odd number 11.

8. Evaluate the following:

$$\frac{3}{4} - 2\frac{5}{6}$$

and express your answer as an improper fraction.

Writing  $2\frac{5}{6}$  as an improper fraction we get  $\frac{17}{6}$ . Setting the fractions to the common denominator of 12, we have  $\frac{9}{12} - \frac{34}{12} = -\frac{25}{12}$ .