Just-for-Fun Team Round

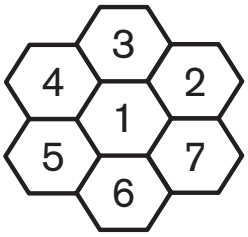
STEM Exchange, presented by DoD STEM
February 24, 2023

A team in the **MATHCOUNTS Competition Series** consists of 4 students (called "Mathletes") working together to solve challenging math problems like the ones you see below. During the Sprint Round, Mathletes have 40 minutes to answer 30 math problems without the use of a calculator...

Instructions

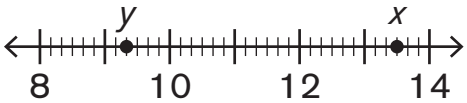
- Please work in groups of 3-5.
- Your team will have **4 minutes** to solve 3 problems.
- No calculators or phones allowed!

1. _____ path(s) In the figure shown, if no cell may be visited more than once and not every cell must be visited, how many paths start in cell 1 and end in cell 7?



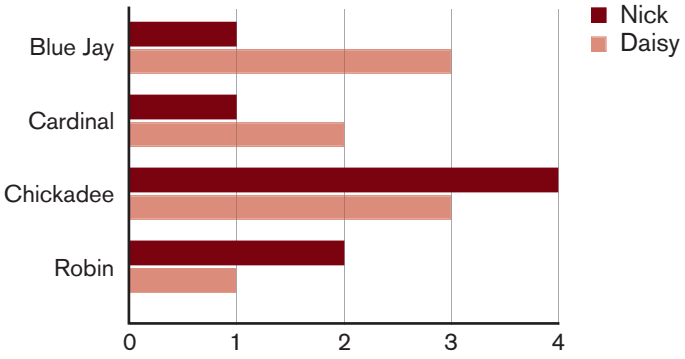
2. _____ If $3x + 155 = 272$, then what is the value of $3x + 160$?

3. _____ On the number line shown, what is the value of $x - y$? Express your answer as a mixed number.



BONUS! If your team has extra time...

4. _____ bird(s) Daisy and Nick went bird-watching. The chart shows the numbers of birds they saw of each species. How many more birds did Daisy see than Nick?



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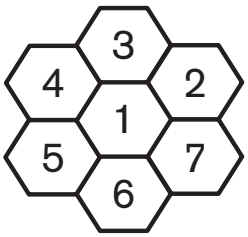
MATHCOUNTS® FOUNDATION

Answers & Solutions

Even if your team got the right answer, take a look at our solutions...you may find additional ways to solve these problems! See more math resources like this at **mathcounts.org/stemexchange**!

1. **11** path(s)

In the figure shown, if no cell may be visited more than once and not every cell must be visited, how many paths start in cell 1 and end in cell 7?



One path goes directly from cell 1 to cell 7. To find all the other paths, we will systematically list five clockwise paths and then five counterclockwise paths that end in cell 7. The **11** *paths are 1-7, 1-2-7, 1-3-2-7, 1-4-3-2-7, 1-5-4-3-2-7, 1-6-5-4-3-2-7, 1-6-7, 1-5-6-7, 1-4-5-6-7, 1-3-4-5-6-7, 1-2-3-4-5-6-7.*

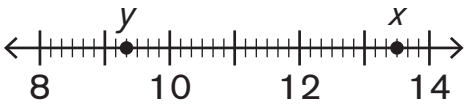
2. **277**

If $3x + 155 = 272$, then what is the value of $3x + 160$?

There is no need to solve for x. *Because* 3x + 160 *is 5 more than* 3x + 155, *the value is* 3x + 160 *is* 272 + 5 = **277**.

3. **4 1/6**

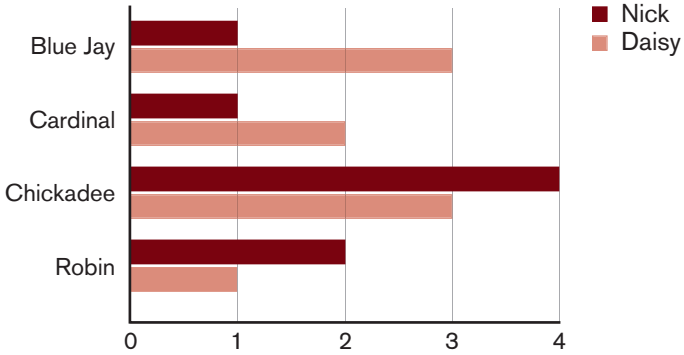
On the number line shown, what is the value of $x - y$? Express your answer as a mixed number.



The scale of the number line is 1/6, so $x = 13\frac{3}{6}$ and $y = 9\frac{2}{6}$. The difference is $x - y = 13\frac{3}{6} - 9\frac{2}{6} = \mathbf{4\frac{1}{6}}$.

4. **1** bird(s)

Daisy and Nick went bird-watching. The chart shows the numbers of birds they saw of each species. How many more birds did Daisy see than Nick?



Nick saw a total of
1 + 1 + 4 + 2 = 8 birds,
and Daisy saw a total
of 3 + 2 + 3 + 1 = 9 birds. So, Daisy saw 9 − 8 = **1** bird more than Nick
Alternatively, we look at the differences in the numbers of birds that Daisy and Nick saw. That's 3 − 1 = 2 for blue jays, 2 − 1 = 1 for cardinals, 3 − 4 = −1 for chickadees and 1 − 2 = −1 for robins. That means Daisy saw 2 + 1 − 1 − 1 = **1** bird more than Nick.