

Student Name: _____
Please write your name on *every* page.

2 Section B

B1

How many numbers between 10 and 100 have the property that their digits add up to 10?

Solution. It’s easiest to just list them out. Given a tens digit, there is one option for the ones digit. Thus such numbers are 19, 28, 37, 46, 55, 64, 73, 82, 91 for a total of 9.

Answer to B1: 9

B2

At MathMart, mechanical pencils are sold at \$2.00 each and scientific calculators are sold at \$4.50 each. One day, Stephen buys 3 mechanical pencils and 3 scientific calculators from MathMart, which he plans on giving to his friends. How much money did he spend that day at MathMart? (Ignore tax.)

Solution. The total cost is $3 \times \$2.00 + 3 \times \$4.50 = \$6.00 + \$13.50 = \$19.50$.

Answer to B2: \$19.50

B3

Given the equation $y = 4x + 9$, if the value of y is 25, what is the value of x ?

Solution. If you don’t know algebra, this can be solved by trying a few values of x . If you do, then we have $25 = 4x + 9$, or $4x = 16$, which means $x = 4$.

Answer to B3: 4

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B4

An integer x is shown on the number line below, where numbers on the right are larger than numbers on the left. If x is a perfect square, what is the value of x ?

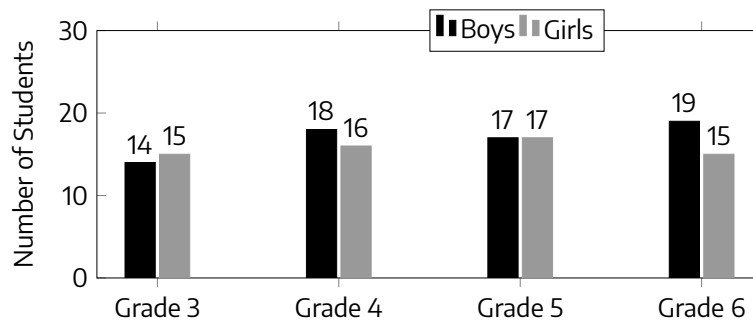


Solution. We have that $6^2 = 36$ is the only perfect square between 25 and 40.

Answer to B4: 36

B5

The graph below shows the number of boys and girls in grades 3 through 6 at Hilbert Elementary School. How many more boys than girls are there in even numbered grades?



Solution. The even numbered grades are grades 4 and 6. In total between the two grades we have $18 + 19 = 37$ boys and $16 + 15 = 31$ girls, for a difference of 6.

Answer to B5: 6

B6

What is the smallest positive integer that is divisible by 1, 2, 3, 4, 5, 6, and 7?

Solution. We simply take the largest power of each prime which divides any number on the list, to find that the smallest such number is $2^2 \times 3 \times 5 \times 7 = 420$.

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Answer to B6: 420

B7

If the word "MATHEMATICS" is written in capital letters, how many of the 11 letters will look identical when flipped from left to right (i.e. How many of the 11 letters look the same as they do normally when you look at them through a horizontal mirror?)

Solution. The letters with horizontal symmetry are M, A, T, H, I, so that makes a total of 8 letters (M, A, and T are written twice each).

Answer to B7: 8

B8

A group of friends (Andrew, Cristian, Kevin, Trevor) challenged each other to a pie-eating contest, where the first person to finish eating an entire pie would win. The following information is known about the results of the contest:

- Trevor finished his pie before Cristian and Kevin.
- Cristian finished his pie after Kevin.
- Kevin finished in third place.
- Andrew finished his pie before Trevor.

Which friend came in second place?

Solution. Since Kevin finished in third and Cristian finished after Kevin, Cristian must have finished fourth. Then Trevor and Andrew each either finished first or second. But Andrew finished before Trevor, so Andrew finished first and Trevor finished second.

Answer to B8: Trevor