Elementary School 11021 Answer Key

Sprint Test

1. B. 2015
2. D. Wednesday
3. C. $6.30
4. B. 394
5. A. 1233
6. D. 3
7. A. $1.05
8. C. 55
9. D. 10
10. A. 27
11. B. octagon
12. D. 245
13. C. 5
14. A. 33
15. C. 35
16. B. 17
17. D. 6/14
18. B. 122
19. A. 200
20. C. 12 sq cm
21. D. $3.96
22. A. 82188531
23. D. 20
24. C. $0.72
25. B. 3013
26. C. 32
27. D. 2
28. A. 144
29. C. $39.75
30. B. 36

Target Test

1. 6:36
2. 3:34
3. 22 (quarters)
4. 18 (triangles)
5. 12
6. 3
7. 216 (square meters)
8. 144 (square units)

Team Test

1. 30
2. 73656
3. -10,000
4. $40.95
5. 246
6. 421
7. 60 (minutes)
8. 8853
9. $4.87
10. 103

Number Sense Test

1. 58
2. 35
3. 21
4. 9
5. 95
6. 163
7. 72
8. 13
9. 198
10. (*) [817.95 - 904.05] (861)
11. 438
12. 0
13. 1857
14. 3087
15. 9099
16. 6972
17. 9
18. 12
19. 30000
20. (*) [1860.10 - 2055.90] (1958)
21. 59
22. 60
23. 11110
24. 99
25. 9
26. 22
27. 5
28. 208
29. 35
30. (*) [6647.04 - 7346.73] (6996.89)
31. 14
32. 513
33. 2
34. 2222
35. 7
36. $6.12 or 6.12
37. 132
38. 23
39. 13
40. (*) [69,186.60 - 76,469.4] (72,828)
41. 7
42. XXIV
43. 15
44. 0
45. 27
46. 96
47. 2005
48. 10
49. 128
50. (*) [1264.45 - 1397.55] 1331
51. 180
52. 6
53. 671
54. 10
55. 8
56. 25 sq meters
57. 12
58. 225
59. 7
60. (*) [300.41 - 332.04] (316.23)
61. 36
62. 30096
63. 64
64. 11
65. 6
66. 224
67. 12
68. 50
69. 16
70. (*) [60, 458 - 66,822] (63, 640)
71. 1.2
72. 2025
73. 6
74. $0.72 (72 cents)
75. 2/3
76. 50
77. 1
78. 2230
79. 50
80. (*) [419,159,883.5 - 463,281,976.5] (441, 220, 930)

For the estimation problems, the numbers in brackets are the range of acceptable values for the answer. The number in parentheses is the exact answer.

Sprint Test Solutions

1. If this year is Ava's 10th birthday, her 16th birthday will be in 6 more years. 2009 + 6 = 2015. **Answer: 2015 (B)**

2. A week is 7 days. 165 days ÷ 7 days in a week gives 21 weeks with 4 days left over. 4 days after Saturday is Wednesday. **Answer: Wednesday (D)**

3. One day of kangaroo food costs (2 x $0.45) = $0.90. One week costs (7 x $0.90) = $6.30. Tie me kangaroo down, sport!. **Answer: $6.30 (C)**

4. 90 + 300 + 4 = 394. The values were put out of order to try to confuse you! **Answer: 394 (B)**

5. We could divide all four numbers by 9 and see which one doesn't have a remainder, but there's a faster way! A number is divisible by 9 if and only if the sum of its digits is divisible by 9. The sums of the digits of the four answers are 9, 10, 12, and 15, respectively. The only number the sum whose digits is divisible by 9 is 1233. **Answer: 1233 (A)**

6. The smallest value for the sum of two prime numbers is 2 + 2 = 4. Since 3 is less than 4, it can not be the sum of two prime numbers. (To check, 14 = 3 + 11, 13 = 2 + 11, 7 = 2 + 5). **Answer: 3 (D)**

7. Pei-Chan had (1 x 25) + (2 x 10) + (5 x 5) + (4 x 1) = 64 cents. His mother gave him (3 x 10) + (1 x 1) + (2 x 5) = 41 cents. His total is 64 + 41 = 105 cents, or $1.05. **Answer: $1.05 (A)**

8. We could add up all the numbers in the parenthesis and then take one-third, but there's a faster way. Notice that each number is a multiple of 3. By the distributive property, we can take one-third of each number and then add them together. We get (1 + 2 + 3 + 4 + ... + 10) = 55. **Answer: 55 (C)**

9. Let's work backwards with the ratios. Since 21 = (3 x 7), 21 Noogies is worth (3 x 5) = 15 Boogies. Since 15 = (5 x 3), 15 Boogies is worth (5 x 2) = 10 Oogies. **Answer: 10 (D)**

10. We could multiply together (12 x 12 x 12), then multiply together (4 x 4 x 4), then divide, but there's a faster way. Since 12 = (3 x 4), we can rewrite (12 x 12 x 12) as (3 x 4 x 3 x 4 x 3 x 4) = (3 x 3 x 3) x (4 x 4 x 4). When we divide by (4 x 4 x 4), the (4 x 4 x 4) terms cancel out and we're left with (3 x 3 x 3) = 27. **Answer: 27 (A)**

11. A hexagon has 6 sides. An octagon has 8 sides. A pentagon has 5 sides. A rectangle has 4 sides. The octagon has the most sides. **Answer: octagon (B)**

12. Since one week is seven days, one week and three days is 10 days. 10 days x 24 hours in a day = 240 hours. Add the other five hours and we get 245 hours. **Answer: 245 (D)**

13. (9876 ÷ 5) has remainder 1 (since 6 ÷ 5 has remainder 1). (1234 ÷ 10) has remainder 4 (since it ends in 4). 1 + 4 = 5. **Answer: 5 (C)**

14. The sum of the digits of 2009 = (2 + 0 + 0 + 9) = 11. The sum of the digits of 2010 = (2 + 0 + 1 + 0) = 3. 11 x 3 = 33. **Answer: 33 (A)**

15. We can do this using area. The area of the brownie pan is (10 x 14) = 140 square inches. One little brownie is 4 square inches. This means the big brownie made (140 ÷ 4 =) 35 little brownies. **Answer: 35 (C)**

16. Let's work through this carefully. If Evelyn is 6 this year, then 2 years ago she was 4. Then, this year, Teresa is (4 + 10) = 14. In three years, Teresa will be (14 + 3) = 17. **Answer: 17 (B)**

17. We could find the common multiple of 8, 10, 12, and 14 and convert all the fractions, but that's a lot of work. Notice that the value of each numerator is one less than half the value of the denominator. For example, if we added 1 to the 6 in 6/14, we'd get 7/14 which is 1/2. So the 6/14 is 1/14 less than 1/2. Doing this for all four fractions means we can figure out how far away each fraction is from 1/2 (how much we'd subtract from 1/2 to get that fraction). Respectively, those values are 1/8, 1/10, 1/12, and 1/14. 1/14 is the smallest, and this means that 6/14 is the biggest of the fractions (since it's closest to 1/2). **Answer: 6/14 (D)**

18. July and January have 31 days each, November and June have 30 days each. 31 + 31 + 30 + 30 = 122. **Answer: 122 (B)**

19. We could add up all those numbers, but that's sure a lot of work and we might make a mistake. Instead, notice that if we pair up the bigger and smaller numbers, we can make pairs that add up to 25. (20 + 5), (19 + 6), (18 + 7), etc, down to

(12 + 13). There are 8 pairs total, so the sum of the numbers is (8 x 25) = 200. **Answer: 200 (A)**

20. If the squares are joined to form the rectangle, then the area of the rectangle must be the same as the combined area of all the squares. A square with perimeter 8 has side length (8/4 =) 2 and area (2 x 2 =) 4. There are three squares so their combined area is (3 x 4 = 12). **Answer: 12 (C)**

21. If Jorge and Mateo split the cost equally, then they each bought 1 sandwich, 2 cookies, and 1 lemonade. So they each spent \$1.99 + (2 x \$0.49) + \$0.99 = \$1.99 + \$0.98 + \$0.99 = \$3.96 **Answer: \$3.96 (D)**

22. What? Multiply those two numbers by hand? No way! First, look at the answers. Notice that they are the same except for the value of the tens' digit! Since the answer is one of the four answers, we only have to figure out the value of the tens' digit. We can do this by figuring out the tens' digit of (53 x 27). (53 x 27) = 14931, the tens' digit is 3, and the answer must be 82188531. **Answer: 82188531 (A)**

23. If the three digit palindrome number is less than 300, it must start with 1 or 2. So it must be of the form 1D1 or 2D2 where D can be any digit from 0 to 9. Since there are 10 digits, there are 10 numbers of the form 1D1 (101, 111, etc) and 10 numbers of the form 2D2 (202, 212, etc). So there are 20 numbers total. **Answer: 20 (D).**

24. Since she has at least one coin, 4 of her 7 coins are already determined (1 penny, 1 nickel, 1 dime, 1 quarter). There are 3 coins left that can be anything. The largest amount of money the 3 coins would be is if they were all quarters, and that would be 75 cents (\$0.75). The smallest amount of money the 3 coins would be is if they were all pennies, and that would be 3 cents (\$0.03). The difference is (75 - 3 =) 72 cents, or \$0.72. **Answer: \$0.72 (C)**

25. Wow, that's a lot of numbers. Doing the math in order would take forever. But look at the pattern, and we can rewrite it as 2009 + (2008 - 2007) + (2006 - 2005) + ... + (4 - 3) + (2 - 1). Each of the pairs of numbers have a difference of 1, and there are (2008/2 =) 1004 pairs. So the answer is 2009 + 1004 = 3013. **Answer: 3013 (B).**

26. This is a great problem for working backwards. Don had 4 marbles after he gave half to Peggy, so before he gave marbles to Peggy he must have had 8 marbles (4 to Peggy and he kept 4). Similarly, before he gave marbles to Joan he must have had 16, and before he gave marbles to Betty he must have had 32. So he started with 32 marbles. (To check our answer, start with Don having 32 marbles and walk through the problem.) **Answer: 32 (C)**.

27. Oh no, that's a huge multiplication! But let's think about it another way. From problem #22 on this test, we can assume that to find the hundreds' digit, we would only need to multiply together the parts of the numbers starting with the hundreds' place (999 x 777). But that's still pretty hard. Now, notice that 999 = (1000 - 1). So, (999 x 777) = (1000 - 1) x 777 = (1000 x 777) - (1 x 777) = 777000 - 777 = 776223. The hundreds' digit of (999 x 777) is 2, so the hundreds' digit of the original giant multiplication is also 2. **Answer: 2 (D)**.

28. To make the largest possible sum, each number must be as large as possible. They are each less than 50, and each different, so the largest numbers they can be are 49, 48, and 47. (49 + 48 + 47) = 144. **Answer: 144 (A)**

29. First let's figure out the final cost of 10 cookies, which is (10 x \$1.75) - \$2.00 = \$17.50 - \$2.00 = \$15.50. Joon buys 25 cookies, which is 10 cookies plus 10 cookies plus 5 cookies. So his final cost is \$15.50 + \$15.50 + (\$1.75 x 5) = \$15.50 + \$15.50 + \$8.75 = \$39.75. **Answer: \$39.75 (C)**

30. We could write down every number where the ones' digit is larger than the tens' digit, but that would take a while. Let's look at parts of the problem and see if we can find a pattern. If the ones' digit is 9, then the tens' digit could be anything from 1 to 8 (19, 29, 39, ... 89). There are 8 such numbers. If the ones' digit is 2, the tens' digit could be anything from 3 to 9. There are 7 such numbers. If the ones' digit is 3, the tens' digit could be 4 through 9. There are 6 such numbers. See the pattern? When we follow it to the end, we see that when the ones' digit is 8, there's only 1 number, (which is 98). Adding up the count, we get that the number of two digit numbers with a ones' digit larger than the tens' digit is 8 + 7 + 6 + 5 + 4 + 3 + 2 + 1 = 36. **Answer: 36 (B)**

Target Test Solutions

1. If the fast clock gains 2 minutes per hour, and the slow clock loses 3 minutes per hour, then one hour after they were set to the same, correct, time, the times they showed would be (2 + 3 =) 5 minutes apart. Since the clocks are now an hour apart, and an hour is 60 minutes, the clocks were set to the same, correct, time (60 / 5 =) 12 hours ago. In those 12 hours, the slow clock has lost (12 x 3 =) 36 minutes. So the correct time is 6:00 + 36 minutes = 6:36. (We can check this by noting that the fast clock has gained 12 x 2 = 24 minutes and taking 24 minutes from 7:00). **Answer: 6:36**

2. For this one, we convert everything to minutes and be very careful when we add them up. All of the time are already in minutes except for the length of the school day. School was 6 hours and 41 minutes, which is (6 x 60) + 41 = 360 + 41 = 401 minutes. The total number of minutes for Carmela's whole day is (9 + 13 + 27 + 4 + 401 + 8 + 24 + 13) = 499 minutes. 499 minutes is 8 hours and 19 minutes. Carmela left her house at 7:15, and 8 hours and 19 minutes after 7:15 is 3:34 in the afternoon. **Answer: 3:34**

3. If Guillermo's coins were all nickels, their value would be (36 x 5 =) 180 cents, or $1.80. Since this is less than $6.20, some of the nickels must be replaced by quarters. To have the value of his coins be $6.20, he must increase the value by ($6.20 - $1.80) = $4.40. Each nickel that is replaced by a quarter increases the value of his coins by (25 - 5 =) 20 cents. Since (440 / 20) = 22, he must have replaced 22 nickels by quarters and he must have (36 - 22 =) 14 nickels and 22 quarters. Let's check: (22 x 25) + (14 x 5) = 550 + 70 = 620 cents = $6.20. **Answer: 22 (quarters)**

4. Since she has at least one triangle, one square and one hexagon, there are 20 shapes left which can be any of the three. But she has to have more squares than hexagons, so she must have at least 2 squares. That leaves 19 shapes. If we make them all triangles, then she has 20 triangles, 2 squares, and 1 hexagon That's 74 sides total, which isn't enough. We can trade triangles for squares or hexagons, but we have to make sure she has more squares than hexagons. Trade 1 triangle for a square, and we're at 19 triangles, 3 squares, 1 hexagon, and 75 sides total. Trade 1 more triangle for a hexagon and it's 18 triangles, 3 squares, 2 hexagons. That's 78 sides total, and so the most triangles Yi-Mei can have is 18 triangles. **Answer: 18 (triangles)**

5. This is a pretty big problem, so let's first see if we can solve a smaller problem and learn something about the average of consecutive numbers. Take the first 5 consecutive numbers (1, 2, 3, 4, 5). Their sum is 15 and their average is 3, which is the middle number. Try the 7 consecutive numbers starting with 3, which are (3, 4, 5, 6, 7, 8, 9). Their sum is 42 and their average is 7, which is the middle number. In fact, it's true that in a set of consecutive numbers that contains an odd number of consecutive numbers, the average is always the middle number. With this information, we can solve the problem. In a set of 17 consecutive numbers whose average is 17, the middle number is 17. This means that there are 8 consecutive numbers before 17. Those numbers are 9, 10, 11, 12, 13, 14, 15, 16. The first seven of these numbers are 9, 10, 11, 12, 13, 14, 15, and their average will be the middle number 12. You could also do a "guess and check" approach with this problem by guessing that the first number in the set was 1, then figuring out the average of the first 17 numbers (which is 9) and adjusting your guess until you figure out that the first number of the set must be 9. **Answer: 12**

6. The new number can be represented as DJ5 and their difference can be represented as (DJ5 - DJ). Since this value is 347, we have that DJ5 - DJ = 347. This means that J must be 8. We now have (D85 - D8 = 347). D must be 3 and the original number was 38. We can check by making sure that (385 - 38) = 347, which is true. **Answer: 3**

7. One way to approach this problem is to take the area of the deck around the pool and divide it up into squares and rectangles. By extending the lines of the sides of the pool out, we end up with 4 squares that have side length 3, two rectangles that have sides 12 and 3, and two rectangles that have sides 18 and 3. The area of all these together is (4 x (3 x 3)) + (2 x (12 x 3)) + (2 x (18 x 3)) = 36 + 72 + 108 = 216 (square meters) **Answer: 216 square meters**

   The area of triangle AEF is one-half of the area of rectangle AEDF, and the area of rectangle AEDF is two-thirds the area of square ABCD. So the area of rectangle AEDF is 2 times the area of triangle AEF, and the area of square ABCD is 3/2 times the area of rectangle AEDF. This means that the area of rectangle AEDF is (2 x 48

=) 96 square units, and the area of square ABCD = (3/2) x 96 = (3 x 48) = 144 square units. **Answer: 144 (square units)**

Team Round Solutions

1. First, let's think about all the odd numbers from 1 to 99, and realize which ones contain the digit 3. There's the odd numbers that end in 3 (3, 13, 23, 33, 43, 53, 63, 73, 83, 93) and the odd numbers that start with 3 (31, 33, 35, 37, 39). Note that 33 appears in both these lists, so if we put the lists together, we have (3, 13, 23, 31, 33, 35, 37, 39, 43, 53, 63, 73, 83, 93) The digit 3 appears 15 times in this list. For the odd numbers from 100 to 200, the list would be the same as above, but with 100 added to each number (103, 113, 123, etc). So the digit 3 appears 15 times in the odd numbers from 100 to 200. Overall, the digit 3 appears (15 + 15 =) 30 times in Charlotte's list of the odd numbers from 1 to 200. **Answer: 30**

2. If 7A65B is divisible by 36, then it must be divisible by 4 and by 9. If it's divisible by 4, then the number formed by the last two digits, which is 5B, must be divisible by 4. This is only true when B is 2 or 6. If 7A65B is divisible by 9, then the sum of the digits (7 + A + 6 + 5 + B) must be a multiple of 9. When B is 2, then A must be 7, and the number is 77652. When B is 6, then A must be 3, and the number is 73656. Of these two numbers, the second is smaller. **Answer: 73656**

3. Sure, we could add all these numbers up on our calculator and then take the difference, but then that would take all the time. Instead, notice how each term in the second sum is 100 more than a term in the first sum (101 vs 1, 102 vs 2, up to 200 vs 100). So their difference will be 100 times the number of pairs, which is also 100 (each sum has 100 terms). Since the second sum is larger than the first sum, the value of the difference will be 100 x (-100) = -10,000. **Answer: -10,000**.

4. We can figure out how much allowance Tocher's parents gave him each day (1, 2, 4, 8, 16, 32, 64, 128, 256, 512, 1024, 2048) and then add them all up, but that would take a while. Let's look at the total allowance after each day and see if we can find a pattern. After 2 days, Tocher has received (1 + 2 =) 3 cents. The next day he gets 4 cents and his total is 7 cents. The next day, he gets 8 cents and the total is 15 cents. The next day, he gets 16 cents ... hmmm ... it looks like Tocher's total allowance is always one less than the allowance he will get the next day. Since Tocher's parents gave him 2048 cents on October 11, they would have given him 4096 cents on October 12. So his total allowance through October 11 is (4096 - 1) = 4095 cents = $40.95. **Answer: $40.95.**

5. When you open a book, the page numbers of the two pages facing you are consecutive numbers, and their sum is always one more than twice the number of the page on the left. (Try it with a book and confirm it's true!) So the number of the page on the left is one-half of (489 - 1) = one-half of 488 = 244. The number of the page on the right is 245, and the number of the very next page in the book will be 246. **Answer: 246.**

6. If X leaves a remainder of 1 when it is divided by 3, 4, 5, 6, and 7, then the number one less than X (X - 1) would be divisible by 3, 4, 5, 6, and 7. So the smallest possible value of (X - 1) would be the smallest number that is divisible by 3, 4, 5, 6, and 7 (the least common multiple of those numbers). That's a lot to figure out all at once, so let's do it in stages. The smallest number that is divisible by 3 and 4 is 12. The smallest number that is divisible by 12 and 5 is 60. The smallest number that is divisible by 60 and 6 is 60. The smallest number that is divisible by 60 and 7 is 420. So if X minus 1 is 420, then X is (420 + 1 =) 421. **Answer: 421.**

7. There's a couple of approaches we can use here. One is to find an amount of time that evenly divides both 12 and 15 and see what happens in the tub during that time. 3 divides both 12 and 15. In three minutes, the faucet can fill 3/12 = 1/4 of the tub. But the open drain can empty 3/15 = 1/5 of the tub. So, in 3 minutes, what part of the tub will be full of water? The answer is (1/4 - 1/5 =) 1/20 full. To fill the entire tub, it would take (3 * 20 =) 60 minutes. **Answer: 60 (minutes).**

8. If we want the difference (ABCD - EFGH) to be as large as possible, then ABCD should be as large as possible, and EFGH should be as small as possible. Since each letter is a different digit, the largest EFGH can be is 9876. The smallest ABCD can be, if A can not be zero, is 1023. The difference is (9876 - 1023 =) 8853. **Answer: 8853.**

9. If the cashier returned $6.85 in change from the $20 bill, then the cashier charged Arjun $13.15.

Since this was the incorrect amount, this means that C is 13 and D is 15. Switching these means that the correct price was $15.13 and the correct change from the $20 bill would have been ($20 - $15.13 =) $4.87. **Answer: $4.87**

10. If Jemaine's average after six math contests is going to be higher than Bret's average, then Jemaine's total score will have to be higher than Bret's total score. Bret's total score after the first five contests is (5 x 86.8 =) 434. Adding in his score on the sixth contest (74) means that Bret's total score after six contests is (434 + 74 =) 508. Jemaine's total score after five contests is (5 x 81.2 =) 406. So on the sixth contest Jemaine must score more than (508 - 406 =) 102 points. Since the score on a math contest is a whole number, the smallest possible score Jemaine can get to have a higher average is 103. **Answer: 103.**