The CENTRE for EDUCATION in MATHEMATICS and COMPUTING

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Gauss Contest Grade 7
Solutions

1. The value of $(4 \times 3) + 2$ is
   (A) 33 (B) 10 (C) 14 (D) 24 (E) 11

Source: 2014 Gauss Grade 7 #1

Primary Topics: Number Sense

Secondary Topics: Operations

Answer: C

Solution:

Evaluating, $(4 \times 3) + 2 = 12 + 2 = 14$.

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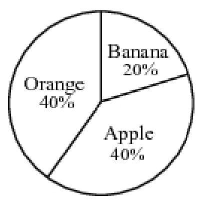
2. In the diagram, the pie chart shows the results of a survey asking students to choose their favourite fruit. 100 students were surveyed. How many students chose banana?



   (A) 40 (B) 80 (C) 100 (D) 20 (E) 60

Source: 2018 Gauss Grade 7 #2

Primary Topics: Data Analysis

Secondary Topics: Percentages

Answer: D

Solution:

Reading from the pie chart, 20% of 100 students chose banana.
Since 20% of 100 is 20, then 20 students chose banana.

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3. Mikhail has \$10 000 in \$50 bills. How many \$50 bills does he have?
   (A) 1000 (B) 200 (C) 1250 (D) 500 (E) 2000

Source: 2006 Gauss Grade 7 #3

Primary Topics: Algebra and Equations

Secondary Topics: Operations

Answer: B

Solution:

To determine the number of \$50 bills, we divide the total amount of money by 50, to get $10\,000 \div 50 = 200$ bills.
Therefore, Mikhail has 200 \$50 bills.

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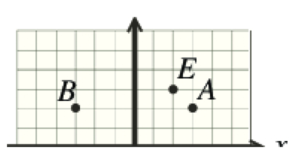
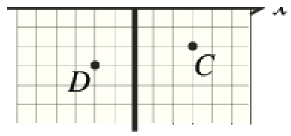
4. In the diagram, the point with coordinates $(-2, -3)$ is located at





(A) A (B) B (C) C (D) D (E) E

Source: 2010 Gauss Grade 7 #4

Primary Topics: Geometry and Measurement

Secondary Topics: Graphs

Answer: D

Solution:

To find the location of the point $(-2,-3)$, we begin at the origin, $(0,0)$, and move left 2 units and down 3 units.
The point $(-2,-3)$ is located at D.

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5. Which of the following is closest to 5 cm?
(A) The length of a full size school bus
(B) The height of a picnic table
(C) The height of an elephant
(D) The length of your foot
(E) The length of your thumb

Source: 2015 Gauss Grade 7 #5

Primary Topics: Geometry and Measurement

Secondary Topics: Estimation | Measurement

Answer: E

Solution:

Of the possible answers, the length of your thumb is closest to 5 cm.

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6. At a class party, each student randomly selects a wrapped prize from a bag. The prizes include books and calculators. There are 27 prizes in the bag. Meghan is the first to choose a prize. If the probability of Meghan choosing a book for her prize is $\frac{2}{3}$, how many books are in the bag?
(A) 15 (B) 9 (C) 21 (D) 7 (E) 18

Source: 2005 Gauss Grade 7 #6

Primary Topics: Counting and Probability

Secondary Topics: Probability

Answer: E

Solution:

Since Meghan chooses a prize from 27 in the bag and the probability of her choosing a book is $\frac{2}{3}$, then $\frac{2}{3}$ of the prizes in the bag must be books.
Therefore, the number of books in the bag is $\frac{2}{3} \times 27 = 18$.

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7. On a map of Nunavut, a length of 1 centimetre measured on the map represents a real distance of 60 kilometres. What length on the map represents a real distance of 540 kilometres?
(A) 9 cm (B) 90 cm (C) 0.09 cm (D) 0.11 cm (E) 5.4 cm

Source: 2009 Gauss Grade 7 #7

Primary Topics: Geometry and Measurement

Secondary Topics: Rates | Measurement

Answer: A

Solution:

Since a real distance of 60 km is represented by 1 cm on the map, then a real distance of 540-km is represented by $\frac{540}{60}$ cm or 9 cm on the map.

8. Ahmed is going to the store. One quarter of the way to the store, he stops to talk with Kee. He then continues for 12 km and reaches the store. How many kilometres does he travel altogether?

(A) 15 (B) 16 (C) 24 (D) 48 (E) 20

Source: 2013 Gauss Grade 7 #8

Primary Topics: Geometry and Measurement

Secondary Topics: Fractions/Ratios | Measurement

Answer: B

Solution:

Since Ahmed stops to talk with Kee one quarter of the way to the store, then the remaining distance to the store is $1 - \frac{1}{4} = \frac{3}{4}$ of the total distance.
Since $\frac{3}{4} = 3 \times \frac{1}{4}$, then the distance that Ahmed travelled from Kee to the store is 3 times the distance that Ahmed travelled from the start to reach Kee.
That is, 12 km is 3 times the distance between the start and Kee. So the distance between the start and Kee is $\frac{12}{3} = 4$ km. Therefore, the total distance travelled by Ahmed is $4 + 12$ or 16 km.

9. The sum of three consecutive integers is 153. The largest of these three integers is

(A) 52 (B) 50 (C) 53 (D) 54 (E) 51

Source: 2017 Gauss Grade 7 #9

Primary Topics: Number Sense | Algebra and Equations

Secondary Topics: Averages | Patterning/Sequences/Series

Answer: A

Solution:

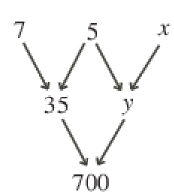
The mean (average) of three integers whose sum is 153 is $\frac{153}{3} = 51$.

The mean of three consecutive integers equals the middle of the three integers.

That is, 51 is the middle integer of three consecutive integers and so the largest of these integers is 52.

(We may check that $50 + 51 + 52 = 153$.)

10. Each number below the top row is the product of the number to the right and the number to the left in the row immediately above it. What is the value of x?



(A) 8 (B) 4 (C) 7 (D) 5 (E) 6

Source: 2010 Gauss Grade 7 #10

Primary Topics: Algebra and Equations

Secondary Topics: Factoring

Answer: B

Solution:

Since 700 is the product of 35 and y, then $35 \times y = 700$ or $y = 700 \div 35 = 20$.
Since 20 is the product of 5 and x, then $5 \times x = 20$ or $x = 20 \div 5 = 4$.

11. A cube has exactly six faces and twelve edges. How many vertices does a cube have?
(A) 4 (B) 5 (C) 6 (D) 7 (E) 8

Source: 2018 Gauss Grade 7 #11

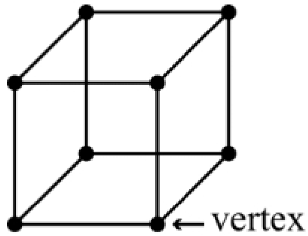
Primary Topics: Geometry and Measurement

Secondary Topics: Polygons

Answer: E

Solution:

Every cube has exactly 8 vertices, as shown in the diagram.



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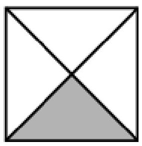
12. The diagonals have been drawn in the square shown. The area of the shaded region of the square is



(A) 4 cm^2 (B) 8 cm^2 (C) 16 cm^2 (D) 56 cm^2 (E) 64 cm^2

Source: 2014 Gauss Grade 7 #12

Primary Topics: Geometry and Measurement

Secondary Topics: Area | Triangles | Quadrilaterals

Answer: C

Solution:

The two diagonals of a square bisect one another (divide each other into two equal lengths) at the centre of the square.
Therefore, the two diagonals divide the square into four identical triangles.
One of these four triangles is the shaded region which has area equal to one quarter of the area of the square.
Since the area of the square is $8 \times 8 = 64$ cm^2, the area of the shaded region is $64 \div 4 = 16$ cm ^{2}.

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13. What is the largest amount of postage in cents that *cannot* be made using only 3 cent and 5 cent stamps?
(A) 7 (B) 13 (C) 4 (D) 8 (E) 9

Source: 2007 Gauss Grade 7 #13

Primary Topics: Number Sense

Secondary Topics: Divisibility

Answer: A

Solution:

Solution 1
We look at each of the choices and try to make them using only 3 cent and 5 cent stamps:
(A): 7 cannot be made, since no more than one 5 cent and two 3 cent stamps could be used (try playing with the possibilities!)
(B): $13 = 5 + 5 + 3$
(C): 4 cannot be the answer since a larger number (7) already cannot be made
(D): $8 = 5 + 3$
(E): $9 = 3 + 3 + 3$
Therefore, the answer must be 7

Therefore, the answer must be 7.
(We have not really justified that 7 is the largest number that cannot be made using only 3s and 5s; we have, though, determined that 7 must be the answer to this question, since it is the only possible answer from the given possibilities!)

(A) 33 (B) 10 (C) 14 (D) 24 (E) 11

Source: 2014 Gauss Grade 7 #1

Primary Topics: Number Sense

Secondary Topics: Operations

Answer: C

Solution:

Evaluating, $(4 \times 3) + 2 = 12 + 2 = 14$.

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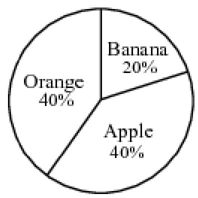
2. In the diagram, the pie chart shows the results of a survey asking students to choose their favourite fruit. 100 students were surveyed. How many students chose banana?



(A) 40 (B) 80 (C) 100 (D) 20 (E) 60

Source: 2018 Gauss Grade 7 #2

Primary Topics: Data Analysis

Secondary Topics: Percentages

Answer: D

Solution:

Reading from the pie chart, 20% of 100 students chose banana.
Since 20% of 100 is 20, then 20 students chose banana.

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3. Mikhail has \$10 000 in \$50 bills. How many \$50 bills does he have?
(A) 1000 (B) 200 (C) 1250 (D) 500 (E) 2000

16. You have exactly \$4.40 (440¢) in quarters (25¢), dimes (10¢), and nickels (5¢). You have the same number of each type of coin. How many dimes do you have?
(A) 20 (B) 11 (C) 10 (D) 12 (E) 4

Source: 2015 Gauss Grade 7 #16

Primary Topics: Number Sense

Secondary Topics: Decimals | Rates

Answer: B

Solution:

The total value of one quarter, one dime and one nickel is $25 + 10 + 5 = 40$¢.

Since you have equal numbers of quarters, dimes and nickels, you can separate your coins into piles, each containing exactly 1 quarter, 1 dime, and 1 nickel.

Each pile has a value of 40¢, and since $440 \div 40 = 11$, then you must have 11 quarters, 11 dimes and 11 nickels.

Therefore, you have 11 dimes. Note: You can check that $11 \times (25¢ + 10¢ + 5¢) = 11 \times 40¢ = 440¢ = \$4.40$, as required.

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17. The mean (average) of the four integers $78, 83, 82$, and x is 80. Which one of the following statements is true?
(A) x is 2 greater than the mean
(B) x is 1 less than the mean

(C) x is 2 less than the mean
(D) x is 3 less than the mean
(E) x is equal to the mean

Source: 2017 Gauss Grade 7 #17

Primary Topics: Number Sense

Secondary Topics: Averages

Answer: D

Solution:

Solution 1

Since 78 is 2 less than 80 and 82 is 2 greater than 80, the mean of 78 and 82 is 80.

Since the mean of all four integers is 80, then the mean of 83 and x must also equal 80.

The integer 83 is 3 greater than 80, and so x must be 3 less than 80.

That is, $x = 80 - 3 = 77$.

(We may check that the mean of $78, 83, 82$, and 77 is indeed 80.)

Solution 2

Since the mean of the four integers is 80, then the sum of the four integers is $4 \times 80 = 320$.

Since the sum of 78, 83 and 82 is 243, then $x = 320 - 243 = 77$.

Therefore, x is 77 which is 3 less than the mean 80.

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18. A rectangle has length x and width y. A triangle has base 16 and height x. If the area of the rectangle is equal to the area of the triangle, then the value of y is
(A) 16 (B) 4 (C) 8 (D) 12 (E) 32

Source: 2019 Gauss Grade 7 #18

Primary Topics: Geometry and Measurement | Algebra and Equations

Secondary Topics: Area | Equations Solving

Answer: C

Solution:

The area of the rectangle with length x and width y is $x \times y$.
The area of the triangle with base 16 and height x is $\frac{1}{2} \times 16 \times x$ or $8 \times x$.
The area of the rectangle is equal to the area of the triangle, or $x \times y = 8 \times x$, and so $y = 8$.

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19. A special six-sided die is rolled. The probability of rolling a number that is a multiple of three is $\frac{1}{2}$. The probability of rolling an even number is $\frac{1}{3}$. A possibility for the numbers on the die is
(A) $1, 2, 3, 5, 5, 6$ (B) $1, 2, 3, 3, 5, 6$ (C) $1, 2, 3, 4, 6, 6$
(D) $1, 2, 3, 3, 4, 6$ (E) $2, 3, 3, 3, 5, 6$

Source: 2013 Gauss Grade 7 #19

Primary Topics: Counting and Probability

Secondary Topics: Probability

Answer: B

Solution:

Using the special six-sided die, the probability of rolling a number that is a multiple of three is- $\frac{1}{2}$.
Since $\frac{1}{2}$ of 6 is 3, then exactly 3 numbers on the die must be multiples of 3.
Since the probability of rolling an even number is $\frac{1}{3}$ and $\frac{1}{3}$ of 6 is 2, then exactly 2 numbers on the die must be even.
The die in (A) has only 2 numbers that are multiples of 3 (3 and 6), and thus may be eliminated.
The die in (C) has 4 numbers that are even $(2, 4, 6, 6)$, and thus may be eliminated.
The die in (D) has 3 numbers that are even $(2, 4, 6)$, and thus may be eliminated.
The die in (E) has 4 numbers that are multiples of 3 $(3, 3, 3, 6)$, and thus may be eliminated.
The die in (B) has exactly 3 numbers that are multiples of 3 $(3, 3, 6)$, and exactly 2 even numbers (2 and 6), and is therefore the correct answer.

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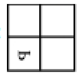
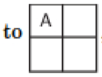
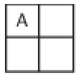
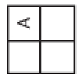
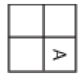
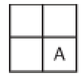
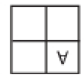
20. The letter P is written in a 2×2 grid of squares as shown: 

A combination

of rotations about the centre of the grid and reflections in the two lines through the centre achieves the result: 

When the same combination of rotations and reflect is applied to , the result is

(A)  (B)  (C)  (D)  (E) 

Source: 2006 Gauss Grade 7 #20

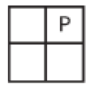
Primary Topics: Geometry and Measurement

Secondary Topics: Transformations

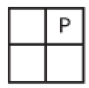
Answer: B

Solution:

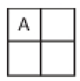
One possible way to transform the initial position of the P to the final position of the P is to reflect the grid in the vertical line in the middle to obtain



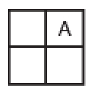
and then rotate the grid 90° counterclockwise about the centre to obtain



Applying these transformations to the grid containing the A, we obtain



and then



(There are many other possible combinations of transformations which will produce the same resulting image with the P; each of these combinations will produce the same result with the A.)

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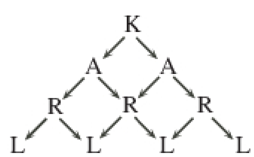
21. In the diagram, how many paths can be taken to spell “KARL”?



(A) 4 (B) 16 (C) 6 (D) 8 (E) 14

Source: 2007 Gauss Grade 7 #21

Primary Topics: Counting and Probability

Secondary Topics: Counting

Answer: D

Solution:

Solution 1
Starting at the "K" there are two possible paths that can be taken. At each "A", there are again two possible paths that can be taken. Similarly, at each "R" there are two possible paths that can be taken.
Therefore, the total number of paths is $2 \times 2 \times 2 = 8$.
(We can check this by actually tracing out the paths.)

Solution 2
Each path from the K at the top to one of the L's at the bottom has to spell KARL.
There is 1 path that ends at the first L from the left. This path passes through the first A and the first R.
There are 3 paths that end at the second L. The first of these passes through the first A and

the first R. The second of these passes through the first A and the second R. The third of these passes through the second A and the second R.
There are 3 paths that end at the third L. The first of these passes through the first A and the second R. The second of these passes through the second A and the second R. The third of these passes through the second A and the third R.
There is 1 path that ends at the last L. This path passes through the last A and the last R.
So the total number of paths to get to the bottom row is $1+3+3+1=8$, which is the number of paths that can spell KARL.

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22. The average of four different positive whole numbers is 4. If the difference between the largest and smallest of these numbers is as large as possible, what is the average of the other two numbers?
(A) $1\frac{1}{2}$ (B) $2\frac{1}{2}$ (C) 4 (D) 5 (E) 2

Source: 2007 Gauss Grade 7 #22

Primary Topics: Number Sense

Secondary Topics: Averages

Answer: B

Solution:

Since the average of four numbers is 4, their sum is $4 \times 4 = 16$.
For the difference between the largest and smallest of these numbers to be as large as possible, we would like one of the numbers to be as small as possible (so equal to 1) and the other (call it B for big) to be as large as possible.
Since one of the numbers is 1, the sum of the other three numbers is $16 - 1 = 15$.
For the B to be as large as possible, we must make the remaining two numbers (which must be different and not equal to 1) as small as possible. So these other two numbers must be equal to 2 and 3, which would make B equal to $15 - 2 - 3 = 10$.
So the average of these other two numbers is $\frac{2+3}{2} = \frac{5}{2}$ or $2\frac{1}{2}$.

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23. The number N is the product of all positive odd integers from 1 to 99 that do not end in the digit 5. That is,
$N = 1 \times 3 \times 7 \times 9 \times 11 \times 13 \times 17 \times 19 \times \cdots \times 91 \times 93 \times 97 \times 99$. The units digit of N is
(A) 1 (B) 3 (C) 5 (D) 7 (E) 9

Source: 2012 Gauss Grade 7 #23

Primary Topics: Number Sense

Secondary Topics: Digits | Divisibility

Answer: A

Solution:

The units digit of any product is given by the units digit of the product of the units digits of the numbers being multiplied.
For example, the units digit of the product 12×53 is given by the product 2×3, so it is 6.
Thus to determine the units digit of N, we need only consider the product of the units digits of the numbers being multiplied to give N.
The units digits of the numbers in the product N are $1, 3, 7, 9, 1, 3, 7, 9, \ldots$, and so on.
That is, the units digits $1, 3, 7, 9$ are repeated in each group of four numbers in the product.
There are ten groups of these four numbers, $1, 3, 7, 9$, in the product.
We first determine the units digit of the product $1 \times 3 \times 7 \times 9$.
The units digit of 1×3 is 3.
The units digit of the product 3×7 is 1 (since $3 \times 7 = 21$).
The units digit of 1×9 is 9.
Therefore, the units digit of the product $1 \times 3 \times 7 \times 9$ is 9.
(We could have calculated the product $1 \times 3 \times 7 \times 9 = 189$ to determine the units digit.)
This digit 9 is the units digits of the product of each group of four successive numbers in-N.
Thus, to determine the units digit of N we must determine the units digit of
$9 \times 9 \times 9 \times 9 \times 9 \times 9 \times 9 \times 9 \times 9 \times 9$.
This product is equal to $81 \times 81 \times 81 \times 81 \times 81$.
Since we are multiplying numbers with units digit 1, then the units digit of the product is 1.

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24. How many of the five numbers $101, 148, 200, 512, 621$ cannot be expressed as the sum of two or more consecutive positive integers?
(A) 0 (B) 1 (C) 2 (D) 3 (E) 4

(A) 0 (B) 1 (C) 2 (D) 3 (E) 4

Source: 2016 Gauss Grade 7 #24

Primary Topics: Number Sense

Secondary Topics: Patterning/Sequences/Series

Answer: B

Solution:

We begin by showing that each of 101, 148, 200, and 621 can be expressed as the sum of two or more consecutive positive integers.

$$\begin{aligned}101 &= 50 + 51\\ 148 &= 15 + 16 + 17 + 18 + 19 + 20 + 21 + 22\\ 200 &= 38 + 39 + 40 + 41 + 42\\ 621 &= 310 + 311\end{aligned}$$

We show that 512 cannot be expressed a sum of two or more consecutive positive integers. This will tell us that one of the five numbers in the list cannot be written in the desired way, and so the answer is (B).

Now, 512 cannot be written as the sum of an odd number of consecutive positive integers.
Why is this? Suppose that 512 equals the sum of p consecutive positive integers, where $p > 1$ is odd.
Since p is odd, then there is a middle integer m in this list of p integers.
Since the numbers in the list are equally spaced, then m is the average of the numbers in the list.
(For example, the average of the 5 integers $6, 7, 8, 9, 10$ is 8.)
But the sum of the integers equals the average of the integers (m) times the number of integers (p). That is, $512 = mp$.
Now $512 = 2^9$ and so does not have any odd divisors larger than 1.
Therefore, 512 cannot be written as mp since m and p are positive integers and $p > 1$ is odd.
Thus, 512 is not the sum of an odd number of consecutive positive integers.

Further, 512 cannot be written as the sum of an even number of consecutive positive integers.
Why is this? Suppose that 512 equals the sum of p consecutive positive integers, where $p > 1$ is even.
Since p is even, then there is not a single middle integer m in this list of p integers, but rather two middle integers m and $m + 1$.
Since the numbers in the list are equally spaced, then the average of the numbers in the list is the average of m and $m + 1$, or $m + \frac{1}{2}$.
(For example, the average of the 6 integers $6, 7, 8, 9, 10, 11$ is $8\frac{1}{2}$.)
But the sum of the integers equals the average of the integers $(m + \frac{1}{2})$ times the number of integers (p). That is, $512 = (m + \frac{1}{2})p$ and so $2(512) = 2(m + \frac{1}{2})p$ or $1024 = (2m + 1)p$.
Now $1024 = 2^{10}$ and so does not have any odd divisors larger than 1.
Therefore, 1024 cannot be written as $(2m + 1)p$ since m and p are positive integers and $2m + 1 > 1$ is odd.
Thus, 512 is not the sum of an even number of consecutive positive integers.

Therefore, 512 is not the sum of any number of consecutive positive integers.
A similar argument shows that every power of 2 cannot be written as the sum of any number of consecutive positive integers.
Returning to the original question, exactly one of the five numbers in the original list cannot be written in the desired way, and so the answer is (B).

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25. How many different combinations of pennies, nickels, dimes and quarters use 48 coins to total \$1.00?
(A) 3 (B) 4 (C) 5 (D) 6 (E) 8

Source: 2005 Gauss Grade 7 #25

Primary Topics: Counting and Probability

Secondary Topics: Counting | Decimals

Answer: B

Solution:

Solution 1
We want to combine 48 coins to get 100 cents.
Since the combined value of the coins is a multiple of 5, as is the value of a combination of nickels, dimes and quarters, then the value of the pennies must also be a multiple of 5.

Therefore, the possible numbers of pennies are 5, 10, 15, 20, 25, 30, 35, 40.
We can also see that because there are 48 coins in total, it is not possible to have anything other than 35, 40 or 45 pennies. (For example, if we had 30 pennies, we would have 18 other

coins which are worth at least 5 cents each, so we would have at least $30 + 5 \times 18 = 120$ cents in total, which is not possible. We can make a similar argument for 5, 10, 15, 20 and 25 pennies.)

It is also not possible to have 3 or 4 quarters. If we did have 3 or 4 quarters, then the remaining 45 or 44 coins would give us a total value of at least 44 cents, so the total value would be greater than 100 cents. Therefore, we only need to consider 0, 1 or 2 quarters.

Possibility 1: 2 quarters
If we have 2 quarters, this means we have 46 coins with a value of 50 cents.
The only possibility for these coins is 45 pennies and 1 nickel.

Possibility 2: 1 quarter
If we have 1 quarter, this means we have 47 coins with a value of 75 cents.
The only possibility for these coins is 40 pennies and 7 nickels.

Possibility 3: 0 quarters
If we have 0 quarters, this means we have 48 coins with a value of 100 cents.
If we had 35 pennies, we would have to have 13 nickels.
If we had 40 pennies, we would have to have 4 dimes and 4 nickels.
It is not possible to have 45 pennies.

Therefore, there are 4 possible combinations.
Solution 2
We want to use 48 coins to total 100 cents.
Let us focus on the number of pennies.
Since any combination of nickels, dimes and quarters always is worth a number of cents which is divisible by 5, then the number of pennies in each combination must be divisible by 5, since the total value of each combination is 100 cents, which is divisible by 5.

Could there be 5 pennies? If so, then the remaining 43 coins are worth 95 cents. But each of the remaining coins is worth at least 5 cents, so these 43 coins are worth at least $5 \times 43 = 215$ cents, which is impossible. So there cannot be 5 pennies.
Could there be 10 pennies? If so, then the remaining 38 coins are worth 90 cents. But each of the remaining coins is worth at least 5 cents, so these 38 coins are worth at least $5 \times 38 = 190$ cents, which is impossible. So there cannot be 10 pennies.
We can continue in this way to show that there cannot be 15, 20, 25, or 30 pennies.
Therefore, there could only be 35, 40 or 45 pennies.

If there are 35 pennies, then the remaining 13 coins are worth 65 cents. Since each of the remaining coins is worth at least 5 cents, this is possible only if each of the 13 coins is a nickel. So one combination that works is 35 pennies and 13 nickels.

If there are 40 pennies, then the remaining 8 coins are worth 60 cents.
We now look at the number of quarters in this combination.
If there are 0 quarters, then we must have 8 nickels and dimes totalling 60 cents. If all of the 8 coins were nickels, they would be worth 40 cents, so we need to change 4 nickels to dimes to increase our total by 20 cents to 60 cents. Therefore, 40 pennies, 0 quarters, 4 nickels and 4 dimes works.
If there is 1 quarter, then we must have 7 nickels and dimes totalling 35 cents. Since each remaining coin is worth at least 5 cents, then all of the 7 remaining coins must be nickels. Therefore, 40 pennies, 1 quarter, 7 nickels and 0 dimes works.
If there are 2 quarters, then we must have 6 nickels and dimes totalling 10 cents. This is impossible. If there were more than 2 quarters, the quarters would be worth more than 60 cents, so this is not possible.

If there are 45 pennies, then the remaining 3 coins are worth 55 cents in total.
In order for this to be possible, there must be 2 quarters (otherwise the maximum value of the 3 coins would be with 1 quarter and 2 dimes, or 45 cents).
This means that the remaining coin is worth 5 cents, and so is a nickel.
Therefore, 45 pennies, 2 quarters, 1 nickel and 0 dimes is a combination that works.

Therefore, there are 4 combinations that work.