Numerical Ability
Answer Key

Set 7

1) Answer: C

Explanation: If ⅗ of the residents of the small town are married, then it means that

1 - ⅗
5/5 - ⅗ = ⅖

of the residents in the same town are not married.

To find the number of residents in the small town who are not married, we need to compute the ⅖ of 520. "⅖ of 520" also means the product of ⅖ and 520:

$$\frac{2}{5} \times 520 = \frac{2}{5} \times \frac{520}{1} = \frac{1040}{5} = 208$$

Therefore, there are 208 residents in the small town who are not married.

2) Answer: A

Explanation: We can answer this problem using the properties of ratios and proportions.
The given problem states that a vehicle can cover 80 kilometers in 2 ½ hours. In ratio form, this can be written as 80 : 2 1/2 . Since 2 ½ is also equal to 5/2, then the ratio can be written in the form: 80 : 5/2.

Let *x* be the number of kilometers that the vehicle can cover in 6 hours. If we write this in ratio form, then we have *x : 6*.

Since 80 : 5/2 and *x : 6* are equal ratios, then we have this proportion:

80 : 5/2 = x : 6

In a proportion, the product of the means (2.5 and x) and extremes (80 and 6) are equal:

So, we have:

$\frac{5}{2}x$ = 480

Multiplying both sides of the equation by 2 to remove the denominator:

$\frac{5}{2}x$ = 480

$2(\frac{5}{2}x) = 2(480)$

5x = 960

Dividing both sides of the equation by 5:

5x/5 = 960/5

x = 192

Since *x* represents the number of kilometers that the vehicle can cover in 6 hours, then the vehicle can cover 192 kilometers in 6 hours.

Thus, the answer is 192 km.

3) Answer: C

Explanation: Given that the wall is 12 ft. long and 10 ft. high, then it covers an area of:
A = 12 x 10 = 120 sq. ft

If a pail of paint can cover 10 square feet of the wall, then $\frac{120}{10} = 12$

12 pails of paint are required to cover the wall.

4) Answer: B

Explanation: Let *x* be Sissy's age in the present. Since Lito is 4 years older than Sissy, then Lito's age can be expressed as *x + 4*.

Three years from now means that Sissy's age can be expressed as *x + 3*. On the other hand, Lito's age will be *(x + 4) + 3 = x + 7*.

Let us tabulate what we have analyzed above:

	Present	**Future (+3 years)**
Sissy	x	x + 3
Lito	x + 4	x + 7
Total		66

The problem states that the sum of the ages of Lito and Sissy three years from now will be 66. Thus, we can form an equation that will enable us to solve for the respective ages of Sissy and Lito:

(x + 3) + (x + 7) = 66
2x + 10 = 66

2x = -10 + 66
2x/2 = 56/2
x = 28

Since *x* represents Sissy's age at the present, then Sissy is 28 years old.

5) Answer: D

Explanation: By substituting a = -1, b = -3/2, and c = 1 to the expression 2c(b - a), we have:

2c(b - a)
2(1)(-3/2 - (-1))

We can simplify the expression above as:

2(-3/2 + 1)

Note that we can express 1 as 2/2. This means that we have:

2(-3/2 + 2/2)
2(-½)

Multiplying the remaining quantities:

$2 \times -\frac{1}{2} = \frac{-2}{2} = -1$

Thus, the answer is -1.

6) Answer: A

Explanation: Let *x* and *y* be the numbers. According to the given problem, if they are subtracted, the result will be 8. Meanwhile, if they are added, the result will be 62. This means that we have the following equations:

(1) x - y = 8
(2) x + y = 62

Note that by adding the equations above, we can eliminate the variable *y* and have *x* as the remaining variable:

$$\begin{array}{rr} & x - y = 8 \\ + & x + y = 62 \\ \hline & 2x \quad = 70 \end{array}$$

We have 2x = 70 as the resulting equation. To solve for x, we divide both sides of the equation by 2:

2x = 70
2x/2 = 70/2
x = 35

Since *x* represents one of the numbers, then 35 is one of the numbers that we are looking for. However, we are looking for the smaller number and we are not yet certain whether 35 is the smaller number between the two. To find the other number, we can use the fact that the difference of these two numbers, x and y, is 8.

x - y = 8
(35) - y = 8

35 + 8 = y
43 = y
y = 43

From our calculation above, the numbers are 35 and 43. Clearly, 35 is the smaller number.

Thus, the answer to this problem is 35.

7) Answer: D

Explanation: Let *x* be the number. Half of this number can be expressed as $\frac{1}{2}x$ or $\frac{x}{2}$.
According to the given problem, if half of this number is decreased by 10, the result will be less than 42. Therefore, we have this inequality:

$$\frac{x}{2} - 10 < 42$$

Let us try to solve for possible values of *x*:

$$\frac{x}{2} - 10 < 42$$

$$\frac{x}{2} < 10 + 42 \qquad \textit{Transposition method}$$

$$\frac{x}{2} < 52 \qquad \textit{Combining like terms}$$

$$2(\frac{x}{2}) < 2(52) \qquad \textit{Multiplying both sides of the inequality by 2}$$

x < 104

From our calculation above, the possible values of *x* are all numbers that are less than 104. Among the given options, only 98 is the number that is less than 104.

Thus, the answer is 98.

8) Answer: D

Explanation: Let us solve for *y* in 2x + 3y = 58 given that x = 11.

2x + 3y = 58
2(11) + 3y = 58 — *Substitute x = 11*
22 + 3y = 58
3y = -22 + 58 — *Transposition method*
3y = 36
3y/3 = 36/3 — *Divide both sides of the equation by 3*
y = 12

Now that we already know the value of *y*, let us identify the value of 2y + 10 given that y = 12.

2y + 10
2(12) + 10 — *since y = 12*
24 + 10
34

Thus, the answer is 34.

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9) Answer: B

Explanation: Let *x* be Orwell's age. If Sabrina is twice as old as Orwell, then Sabrina's age can be expressed as *2x*. Meanwhile, since Lei is 8 years older than Sabrina, then we can express Lei's age as *2x* + 8.

Their ages three years from now can be obtained by adding three years to their respective ages at the present. Thus, the ages of Orwell, Sabrina, and Lei 3 years from now can be expressed as:

Orwell: x + 3
Sabrina: 2x + 3
Lei: (2x + 8) + 3 = 2x + 11

Let us tabulate our analysis above:

	Present	**Future (3 years from now)**
Orwell	x	x + 3
Sabrina	2x	2x + 3
Lei	2x + 8	2x + 11
Total		77

The sum of ages of Orwell, Sabrina, and Lei 3 years from now is 77. Thus, we have this equation:

(x + 3) + (2x + 3) + (2x + 11) = 77
5x + 17 = 77 *Combining like terms*
5x = -17 + 77 *Transposition method*

To God be the glory!

5x = 60
5x/5 = 60/5 *Dividing both sides of the equation by 5*
x = 12

Since *x* represents Orwell's age at the present (refer to our table above), then Orwell is 12 years old at the present.

10) Answer: D

Explanation: The decimal numbers can be added quickly in a vertical manner:

$$\begin{array}{r} {\scriptstyle 1\ \ 1} \\ 9.32 \\ {\scriptstyle 2}\,10.125 \\ 4.15 \\ 7.82 \\ +\ \ 0.03 \\ \hline 31.445 \end{array}$$

Since there are five addends, we divide 31.445 by 5:

$$\begin{array}{r} 6.289 \\ 5\overline{)\,31.445} \\ -\,30 \\ \hline 14 \\ -\,10 \\ \hline 44 \\ -\,40 \\ \hline 45 \\ -\,45 \\ \hline 0 \end{array}$$

Thus, the average is 6.289.

11) Answer: A

Explanation:

To add $-\frac{1}{3} + \frac{2}{5}$, we must make their denominators similar first.

The LCD of these fractions is 15 since 5 x 3 = 15.

So, we divide 15 by the denominator of the fractions and then multiply the result by the numerator to get the new numerator of the fractions.

For -⅓ :
$15 \div 3 = 5 \times 1 = 5$

Thus, -⅓ will be 5/15

For ⅖:

$15 \div 5 = 3 \times 2 = 6$

Thus, ⅖ will be 6/15.

So, we have the fractions -5/15 and 6/15

We can now add these fractions:

$$\frac{-5}{15} + \frac{6}{15} = \frac{1}{15}$$

Thus, the answer is 1/15.

12) Answer: B

Explanation: We can interpret this problem as: _____% of 1 ⅓ is ⅓ . From here, we can see that we are looking for the rate given that the base is 1 ⅓ and the percentage is ⅓ .

The formula for rate is

Rate = Percentage ÷ Base

Using the given values:

$$Rate = Percentage \div Base$$

$$Rate = \frac{1}{3} \div 1\frac{1}{3}$$

We can rewrite 1 ⅓ as 4/3.

$$Rate = \frac{1}{3} \div \frac{4}{3}$$

$$Rate = \frac{1}{3} \times \frac{3}{4}$$

$$Rate = \frac{3}{12} \; or \; \frac{1}{4}$$

From our calculation, ⅓ is $\frac{1}{4}$% of 1 ⅓. 1/4 is 0.25 in decimal form which is equal to 25%.

Therefore, the answer is 25%.

13) Answer: D

Explanation: This question can be answered quickly using the fact that the product of a number and its reciprocal is 1. So, if we multiply by 2 ½ by its reciprocal, the result is automatic. If we double this product, we have 2(1) = 2.

Thus, the answer is 2.

14) Answer: C

Explanation: We can interpret the statement "⅕ of what number is 16" as:

$\frac{1}{5}$ of _____ = 16

Since "of" means multiplication:

$\frac{1}{5} \times$ _____ = 16

Let *k* be the number that must be placed in the blank space:

$\frac{1}{5} \times k = 16$

The equation above can be written as:

$\frac{k}{5} = 16$

Multiplying both sides of the equation by 5:

$5(\frac{k}{5}) = 5(16)$

$k = 80$

15) Answer: D

Explanation: Let *x* be Dona's age at the present. It states that Ariel is 17 years younger than Dona. Thus, Ariel's age can be expressed as *x - 17*.

The respective ages of Dona and Ariel 12 years ago can be derived by subtracting 12 to their respective ages. Thus, we have:

Dona's age (12 years ago) = x - 12
Ariel's age (12 years ago) = x - 17 - 12 = x - 29

It states that 12 years ago, the sum of Dona's and Ariel's age was 23. Therefore, we have this equation:

(x - 12) + (x - 29) = 23
2x - 41 = 23 *Combining like terms*
2x = 41 + 23 *Transposition method*
2x = 64
2x/2 = 64/2
x = 32

Since *x* represents Dona's age at the present, then Dona is currently 32 years old.

16) Answer: A

Explanation: If it takes 350 square feet of tiles to cover a living room, this means that the room has an area of 350 square feet. Furthermore, it states that the room's length is 25 feet.

Using the formula for the area of a rectangle to solve for the width (w):

A = lw *Area of a rectangle*
350 = 25(w) *Since the area of the room is 350 square feet and its length is 25 ft.*
350 = 25w
350/25 = 25w/25 *Divide both sides of the equation by 25*
14 = w
w = 14

From our calculation above, the width of the rectangle is 14 feet.

17) Answer: A

Explanation: Based on the given problem, Farmer Julio's farm has a perimeter of 252 meters since it takes 252 meters of fencing material to enclose it. Moreover, it is given in the problem that the width of this farm is 30 meters. Our task in this problem is to calculate the length of Farmer Julio's farm.

The formula for the perimeter of a rectangle is P = 2l + 2w where l is the length and w is the width.

Since we have already identified that the perimeter of the rectangle is 252 meters and its width is 30 meters, then we can solve for the length (l) using the formula:

P = 2l + 2w	
252 = 2l + 2(30)	*Substitute known values*
252 = 2l + 60	
252 - 60 = 2l	*Transposition method*
192 = 2l	
192/2 = 2l/2	*Divide both sides by 2*
96 = l	

From our calculation above, the length of the rectangle is 96 meters.

18) Answer: B

Explanation:

3 + 2(x - 4) - 8 = 17	
2(x - 4) - 5 = 17	*Combining like terms*
2x - 8 - 5 = 17	*Distributive property*
2x - 13 = 17	*Combining like terms*
2x = 13 + 17	*Transposition method*
2x = 30	
2x/2 = 30/2	*Divide both sides by 2*
x = 15	

Thus, the value of x is 15.

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19) Answer: D

Explanation: ⅓ raised to fourth power can be derived by multiplying ⅓ to itself four times:

$$(\frac{1}{3})^4 = \frac{1}{3} \times \frac{1}{3} \times \frac{1}{3} \times \frac{1}{3} = \frac{1}{81}$$

This means that ⅓ raised to the fourth power is equivalent to 1/81.

To identify how many 8's are there in 1/81, we divide 1/81 by 8:

$$\frac{1}{81} \div 8 = \frac{1}{81} \times \frac{1}{8} = \frac{1}{648}$$

Thus, there are 1/648 8's in ⅓ raised to the fourth power (or 1/81).

20) Answer: C

Explanation: If the original price of an item is Php 1200, then a 15% discount means that the original price will be decreased by the 15% of 1200:

Discount = 1200 x 0.15 = 180

Based on our calculation above, 15% of 1200 is 180. This implies that the original price of Php 1200 must be decreased by Php 180 to get the discounted price.

Discounted price: 1200 - 180 = 1020

This means that an item with an original price of Php 1200 and a 15% discount will cost Php 1020.

So, if you pay Php 2000 for the item, your change will be 2000 - 1020 = Php 980

Thus, the answer is Php 980.