



How To Solve Word Problems in Algebra

Answer Key

1) B

Explanation:

Let x be Carla's age in the present.

Since John is 3 years older than Carla, we can express John's age as $x + 3$.

This means that we can represent Carla's age 3 years ago as $x - 3$ while John's age 3 years ago as $x + 3 - 3 = x$.

To summarize:

	Present	Past (3 years ago)
Carla's age	x	$x - 3$
John's age	$x + 3$	x
Sum		45

The problem states that the sum of Carla's age and John's age 3 years ago was 45.

Thus, we can form our equation as follows:

$$\text{Carla's age (3 years ago) + John's age (3 years ago) = 45}$$

$$(x - 3) + (x) = 45$$

Now, let us solve the resulting linear equation above:

$$(x - 3) + (x) = 45$$



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$$2x - 3 = 45$$

$$2x = 3 + 45$$

Transposition method

$$2x = 48$$

$$\frac{2x}{2} = \frac{48}{2}$$

Dividing both sides of the equation by 2

$$x = 24$$

Since x represents Carla's age in the present (look at our table above), then **Carla is 24 years old in the present.**

2) D

Explanation:

Let n represent the unknown number in the given problem.

Twice that unknown number can be represented by $2n$ (since "twice" means "multiply by 2").

Now, the sum of twice the unknown number ($2n$) and 72 is 88. So, we can form our equation as follows:

$$2n + 72 = 88$$

Let us solve for the value of n in the equation we have derived above:

$$2n + 72 = 88$$



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$$2n = -72 + 88$$

Transposition method

$$2n = 16$$

$$\frac{2n}{2} = \frac{16}{2}$$

Dividing both sides of the equation by 2

$$n = 8$$

Thus, the value of the unknown number is 8.

3) B

Explanation:

Let x represent the smallest integer in the list of five consecutive integers that Bea thought.

Since the integers are consecutive, it follows that the second integer in the list should be $x + 1$, the third integer can be represented by $x + 2$, the fourth by $x + 3$, and the fifth by $x + 4$.

The problem states that the sum of the five consecutive integers that Bea thought is 165. Thus, we can form our equation as follows:

$$(\text{first integer}) + (\text{second integer}) + (\text{third integer}) + (\text{fourth integer}) + (\text{fifth integer}) = 165$$

$$x + (x + 1) + (x + 2) + (x + 3) + (x + 4) = 165$$

Simplifying the linear equation we have derived above:

$$5x + 10 = 165$$



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$$5x = -10 + 165$$

Ttransposition method

$$5x = 155$$

$$\frac{5x}{5} = \frac{155}{5}$$

Dividing both sides by 5

$$x = 31$$

Since x represents the smallest integer in the list, then 31 is the first and smallest integer. Since Bea's numbers are consecutive numbers, then the second integer would be 32, the third integer is 33, the fourth integer is 34, and the fifth integer is 35.

Hence, **the largest integer in the list is 35.**

4) A

Explanation:

Let t represent the number of hours it takes for Alicia and Bela to finish cleaning the room.

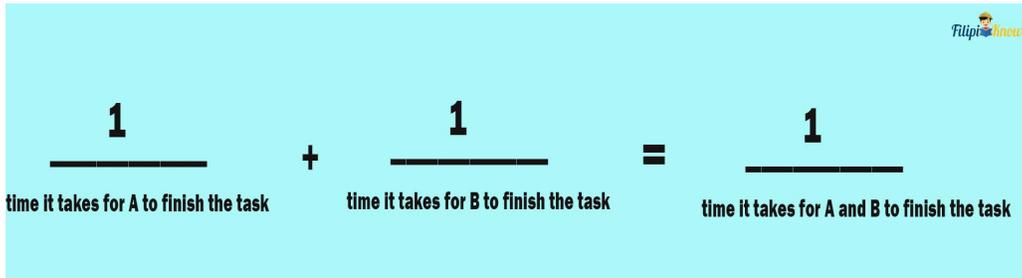
The problem states that Alicia alone can finish cleaning the room in 3 hours. On the other hand, Bela can finish cleaning the same room in 4 hours.

In this kind of work problem, our general formula is:



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$$\frac{1}{\text{time it takes for A to finish the task}} + \frac{1}{\text{time it takes for B to finish the task}} = \frac{1}{\text{time it takes for A and B to finish the task}}$$

We can modify the formula as follows:

$$\frac{1}{\text{number of hours it takes for Alice to finish the task}} + \frac{1}{\text{number of hours it takes for Bela to finish the task}} = \frac{1}{\text{number of hours it takes for Alice and Bela to finish the task}}$$

Using the given values in the problem:

$$\frac{1}{3} + \frac{1}{4} = \frac{1}{t}$$

Let us solve for the value of t in the equation above:

$$\frac{1}{3} + \frac{1}{4} = \frac{1}{t}$$

First, eliminate or remove the denominators. To do so, multiply both sides of the equation by the LCD.

The LCD is $12t$ so we multiply both sides of the equation by $12t$:



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$$12t\left(\frac{1}{3} + \frac{1}{4}\right) = 12t\left(\frac{1}{t}\right)$$

$$4t + 3t = 12$$

Let us continue solving for the value of t in the resulting equation above.

$$4t + 3t = 12$$

$$7t = 12$$

$$\frac{7t}{7} = \frac{12}{7}$$

Dividing both sides of the equation by 7

$$t = 12/7$$

The computed value of t is $12/7$. If we write this improper fraction to its mixed number form, we have $1 \frac{5}{7}$.

Thus, if Alicia and Bela decide to work together, they can finish cleaning the room in $1 \frac{5}{7}$ hours.

5) B

Explanation:

Let x be the number of pigs that Mang Tasyo can take care of.

Since the number of chickens in the farm should be twice the number of pigs, we can express the number of chickens as $2x$.



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The total number of chickens and pigs in the farm can be represented by $x + 2x$.

The problem states that there must be at most (“at most” means “less than or equal to”) 1200 animals in the farm.

Hence, we have this [inequality](#):

$$x + 2x \leq 1200$$

Let us solve the inequality we have derived:

$$x + 2x \leq 1200$$

$$3x \leq 1200$$

$$\frac{3x}{3} \leq \frac{1200}{3}$$

$$x \leq 400$$

The solution set we have obtained is $x \leq 400$. This means that any value less than or equal to 400 will satisfy the inequality.

Recall that x represents the number of pigs in the farm. Based on our computation on the inequality above, the possible number of pigs in the farm can be any number less than or equal to 400. This implies that the maximum number (or highest number) of pigs in the farm should be 400 to meet the given conditions in the problem.



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