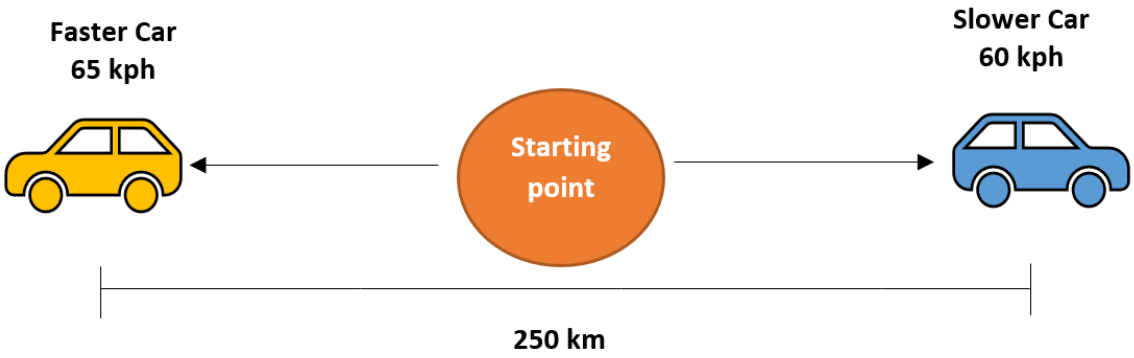
1 . Answer: B
Explanation:
We can illustrate the problem as:



As seen from the diagram, the total distance covered by each car is 250 km.

We need to determine the amount of time such that the cars will be 250 km from each other.

Let *x* be the number of hours such that the cars meet each other.

	Rate	Time	Distance
Faster Car	65	*x*	65*x*
Slower Car	60	*x*	60*x*

Recall that $distance = rate \times time$

The sum of distances covered by the faster and the slower car is 250 km.
Thus,

$$65x + 60x = 250$$
$$125x = 250$$
$$x = 2$$

Thus, the cars will meet in 2 hours.

2. Answer: B
Explanation:
Let *x* be Benny's age. Since Lily is 4 years older than Benny, then Lily's age can be expressed as *x + 4*.

We just need to add 3 to their respective ages to obtain their ages in 3 years.

	Present	**Future (+3 years)**
Lily	*x + 4*	*x + 7*
Benny	*x*	*x + 3*

The sum of their ages three years from now is 58. Thus,

$$(x + 7) + (x + 3) = 58$$
$$2x + 10 = 58$$
$$2x = 48$$
$$x = 24$$

Since *x* represents Benny's age in the present, so Benny is 24 years old in the present.

3. Answer: B
Explanation:
Recall that $distance = rate \times time$
Car A moves at a rate of 60 kph. In 4 hours, it will cover a distance of $60 \times 4 = 240\ km$
Meanwhile, Car B moves at a rate of 72 kph. In 4 hours, it will cover a distance of $72 \times 4 = 288\ km$
Thus, Car B will be $288 - 240 = 48\ km$ far from Car A in 4 hours.

4. Answer: A
Explanation: Given the individual rates of persons in performing a task, the rate of these persons together performing the same task is given by this formula:

$$\frac{t}{rate\ of\ person\ A} + \frac{t}{rate\ of\ person\ B} = 1$$

Where *t* is the time it takes for the persons working together to finish the task.
We can use the formula above for the problem.

$$\frac{t}{rate\ of\ Shawn} + \frac{t}{rate\ of\ Frank} = 1$$

$$\frac{t}{1} + \frac{t}{\frac{3}{2}} = 1$$

Note that for Frank's rate (which is 1.5 hours), we converted it in fraction form $\frac{3}{2}$ *for easier computation.*

Simplifying the equation:

$$t + \frac{2}{3}t = 1$$
$$3t + 2t = 3$$
$$5t = 3$$
$$t = \frac{3}{5}$$

Thus, Shawn and Frank can finish cleaning the backyard in $\frac{3}{5}$ hour.

5. Answer: B
Explanation:
Using algebraic method
Let *x* be the price of the dress.
The price of the cake is 40 more than half the price of the dress. Then, we can express the price of the cake as $\frac{1}{2}x + 40$.

The total cost of the cake and the dress is Php 670.00. We can set our equation as:

$$(x) + (\frac{1}{2}x + 40) = 670$$
$$\frac{3}{2}x + 40 = 670$$

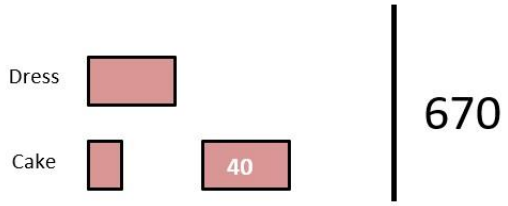
$$\frac{3}{2}x = 630$$
$$3x = 1260$$
$$x = 420$$

Since *x* represents the price of the dress, then the dress costs Php 420.00
To determine the price of the cake, divide 420 by 2 then add 40.

$$\frac{420}{2} = 210 + 40 = 250$$

Thus, the cake is Php 250.00.

Using diagram:



Subtracting 40 from 70

There are 1 ½ units left. Thus, we need to divide 630 by 1 ½ or 1.5:

$$630 \div 1.5 = 420$$

Thus, the dress costs Php 40.00. Meanwhile, the cake costs:

$$\frac{1}{2}(420) + 40 = 210 + 40 = 250$$

6. Answer: D

Explanation:
Let *x* be the age of Monica in the present.
Since the sum of the ages of Monica and Celeste in the present is 57, we can express Celeste's age as $57 - x$

To determine their ages in three years, we just add 3 to their respective present ages.

	Present	**Future (+3 years)**
Monica	*x*	*x + 3*
Celeste	*57 - x*	*60 - x*

In three years, Monica will be 7 years younger than Celeste. We can write an equation as:

$$x + 3 = (60 - x) - 7$$
$$x + 3 = 53 - x$$
$$2x = 50$$
$$x = 25$$

Since *x* represents the present age of Monica, then Monica is 25 years old in this year.

7. Answer: D
Explanation:
Let *x* be the number of marbles that Martin initially had.
Grace gave Martin 6 more than half the number of marbles that Martin has. Thus, Grace gave Martin $\frac{1}{2}x$+ 6 marbles.
Paul gave Martin half the number of marbles that Grace gave. Then, Paul gave
$\frac{1}{2}(\frac{1}{2}x + 6) =$
$\frac{1}{4}x + 3$

The final number of marbles that Martin has is 30. Therefore,

$$x + (\frac{1}{2}x + 6) + (\frac{1}{4}x + 3) = 30$$

Multiplying both sides of the equation by the LCD of 4:

$$4[x + (\frac{1}{2}x + 6) + (\frac{1}{4}x + 3)] = 4(30)$$

$$4x + 2x + 24 + x + 12 = 120$$
$$7x + 36 = 120$$
$$7x = 84$$
$$x = 12$$

Since *x* represents the number of marbles that Martin had. Then, Martin has 12 marbles.

8. Answer: C
Explanation: Recall that $distance = rate \times time$.
We can use this formula to determine the distance covered by the cyclist.
The rate of the cyclist is 13 kph. It travels from 9:25 AM to 10:40 Am. Thus, the duration of the cyclist's travel is 1 hour and 15 minutes or 1.25 hours.

To compute the distance covered by the cyclist.

$$distance = 13 \times 1.25$$
$$distance = 16.25 \text{ km}$$

Hence, the cyclist covered 16.25 km throughout his trip.

9. Answer: B
Explanation:
Let *x* be the price of the non-student ticket.
The student ticket is Php 100.00 cheaper than the non-student ticket. Then, we can express the price of the student ticket as *x* - 100.

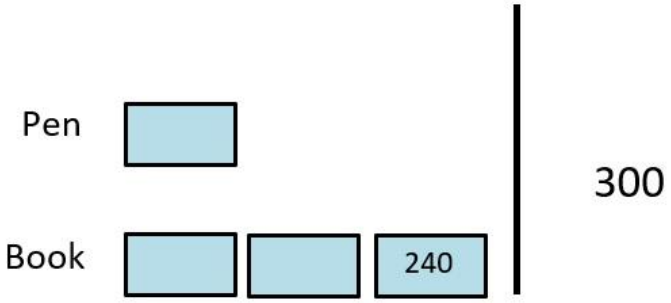
If 300 non-students and 400 students bought tickets for the play, the total revenue from ticket sales is Php 170 000.

We can express the revenue from ticket sales as:
$Revenue = (number\ of\ students)(price\ of\ student\ tickets) + (number\ of\ non-students)(price\ of\ non-$
Using the expressions and values above:

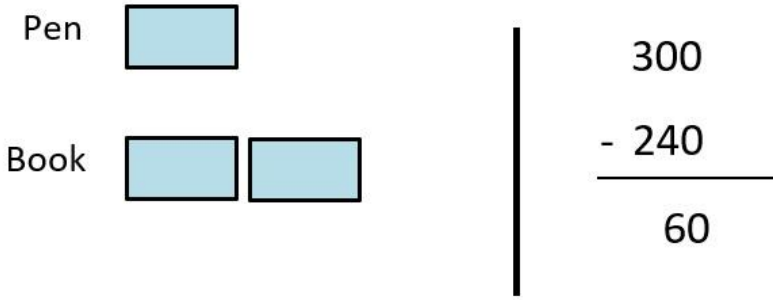
$$170000 = (400)(x - 100) + (300)(x)$$
$$170000 = 400x - 40000 + 300x$$
$$210000 = 700x$$
$$x = 300$$

Since *x* represents the price of the non-student ticket, then the price of a non-student ticket is Php 300.00

10. Answer: D
Explanation:
Using diagram



Subtrating 240 from 300



There are 3 units remaining. Thus, we divide 60 by 3:

$$60 \div 3 = 20$$

Therefore, each pen costs Php 20.00

Meanwhile, a book costs 2(20) + 240 = Php 280.00.

Using algebraic method
Let *x* be the price of the pen.
A book costs Php 240.00 more than twice the price of a pen. Thus, the price of the book can be expressed as: $2x + 240$

If you buy a book and a pen, you have to pay Php 300.00.

$$x + (2x + 240) = 300$$

SImplifying and solving for *x*:

$$3x + 240 = 300$$
$$3x = 60$$
$$x = 20$$

Since *x* represents the price of the pen, then the pen costs Php 20.00

11. Answer: B
Explanation: This year, the sum of the ages of Andy and Missy is 47. Andy is 5 years older than Missy (last year, Andy is 5 years older than Missy. Andy is still 5 years older in the present).

If we let *x* to be Missy's age in the present and *x + 5* to be Andy's age in the present. Then:

$$x + (x + 5) = 47$$
$$2x = 42$$
$$x = 21$$

Since *x* represents Missy's age in the present, then Andy is 26 years old in the present (21 + 5 = 26).

Therefore, Andy was 25 yrs. old last year.

12. Answer: C
Explanation: The distance between Station A and Station B is equal to the distance covered by the train as it moves from Station A to Station B.

The train left Station A at 8:00 AM and it reached Station B at 9:30 AM. Thus, the train travels for 1 hour and 30 minutes or 1.5 hours.

The train's rate is 52 mph. Thus,

$$distance = rate \times time$$
$$distance = 52 \times 1.5$$
$$distance = 78\,miles$$

Thus, the distance between Station A and Station B is 78 miles.

13. Answer: A
Explanation:
Let's begin by determining how many words Candy can type per hour if she can type 38 words per minute.
There are 60 minutes in one hour. Thus, Candy can type $38 \times 60 = 2280$words per hour.
In 2 hours, Candy can type $2280 \times 2 = 4560$ words.

Alternative method:
If there are 60 minutes in 1 hour, then there are 120 minutes in 2 hours.
If Candy can type 38 words per minute. In 2 hours, Candy can type $38 \times 120 = 4560$words.

14. Answer: D
Explanation:
Let *x* be Brian's age two years ago.
Rick's age was five more than twice of Brian's age. Then, we can express Rick's age two years ago as 2*x* + 5.

To determine how old they are in the current year, we just need to add two to the respective ages of Brian and Rick.

	Past	**Present (+ 2 years)**
Brian	*x*	*x* + 2
Rick	2*x* + 5	(2*x* + 5) + 2 = 2*x* + 7

In this year, the sum of their ages is 39. Thus, we can write this equation:

$$(x + 2) + (2x + 7) = 39$$

$$3x + 9 = 39$$
$$3x = 30$$
$$x = 10$$

Since *x* represents Brian's age two years ago, then Brian was 10 years old two years ago.

15. Answer: C
Explanation:
Each day Mang Berto sold 10 kg of mangoes. In 3 days, Mang Berto will be able to sell $10 \times 3 = 30$ kg of mangoes.

For every 7 kg of Mangoes, Mang Berto earns Php 378.00. It means that for every kilo of mangoes, Mang Berto earns $\frac{378}{7} =$ Php 54.00.

Recall that in 3 days, Mang Berto will be able to sell $10 \times 3 = 30$ kg mangoes. Thus, Mang Berto will earn 30×54 = Php 1620.00 in three days.

16. Answer: C
Explanation: Recall that there is a formula we can use to determine the rate in which two persons can finish a task by working together:

$$\frac{t}{rate\ of\ person\ A} + \frac{t}{rate\ of\ person\ B} = 1$$

Where *t* is the time such that persons A and B can finish a task working together.

We can use this formula in this problem.

Alvin alone can fix an automobile in 3 hours.
Meanwhile, if Simon helps Alvin, they can fix an automobile in 1 hour.

Therefore, we have *t* = *1*.

$$\frac{t}{rate\ of\ Alvin} + \frac{t}{rate\ of\ Simon} = 1$$

Let *x* be the time it takes for Simon to finish the task.

Simplifying and solving the equation:

$$\frac{1}{3} + \frac{1}{x} = 1$$

$$\frac{x+3}{3x} = 1$$

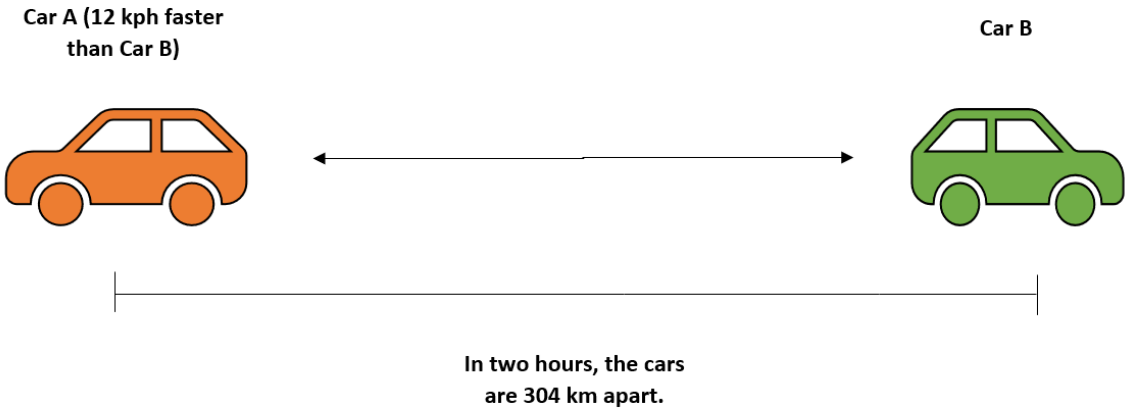
$$x + 3 = 3x$$

$$2x = 3$$

$$x = \frac{3}{2}$$

Since *x* represents the time it takes for Simon to fix an automobile, then Simon can finish fixing an automobile in $\frac{3}{2}$hours or 1.5 hours.

17. Answer: B
Explanation:
Shown below is an illustration of the problem:



Based on our illustration, the total distance covered by the cars in two hours is equal to 304 km.

Let *x* be the speed or rate of Car B.

Since Car A is 12 kph faster than Car B, then Car A's rate can be expressed as *x* + 12

We can use a table to show easily the relationship between the rates, time, and distance of each car.

	Rate	**Time**	**Distance**
Car A	*x* + 12	2	2(*x* + 2)
Car B	*x*	2	2*x*

As we have stated earlier, the total distance covered by the cars is 304 km.

Thus,

$$2(x + 12) + 2x = 304$$
$$2x + 24 + 2x = 304$$
$$3x + 24 = 304$$
$$4x = 280$$
$$x = 70$$

Since *x* represents the rate of Car B, then Car B is moving at a rate of 70 kph.

18. Answer: D
Explanation:
Let *x* be Ana's age in the present.
Patty is 4 years older than Ana. Thus, we can express Patty's age as *x* + 4.

	Present	**Future (+ 10 years)**
Ana	*x*	*x* + 10

Patty	*x* + 4	*x* + 14

In ten years, their respective ages will be *x + 10* for Ana and *x + 14* for Patty.

The sum of Ana's and Patty's age in 10 years will be 80. So, our equation is:

$$(x + 10) + (x + 14) = 80$$
$$2x + 24 = 80$$
$$2x = 56$$
$$x = 28$$

Since *x* represents Ana's age in the present. Ana is 28 years old at the present.

19. Answer: C
Explanation: We can apply the concept of inverse variation (or relationship) in solving this problem. Since the number of days to finish the task is inversely related to the number of workers (Apparently, the more workers who will perform the task, the less days it takes to finish it and vice versa).

$$number\ of\ days\ to\ finish\ the\ task = \frac{x}{number\ of\ workers}$$

Where *x* is a constant.

If 5 workers can finish a task in 10 days:

$$5 = \frac{x}{10}$$
$$x = 50$$

We obtained *x = 50*. This is not the answer. We will use this value of *x* to determine how many workers can finish the same task in 2 days.

$$2 = \frac{50}{number\ of\ workers}$$

Let *y* be the number of workers.

$$2 = \frac{50}{y}$$

$$2y = 50$$
$$y = 25$$

Thus, it needs 25 workers to finish the task in 2 days.

Alternative method:
A quicker way to solve this problem is to multiply the number of workers by the number of days.

$$5 \times 10 = 50$$

Afterwards, divide the result by 2:

$$50 \div 2 = 25$$

Thus, it requires 25 workers to finish the task in 2 days.

20. Answer: D
Explanation:
Recall that:

$$\frac{t}{rate\ of\ person\ A} + \frac{t}{rate\ of\ person\ B} = 1$$

Where *t* is the time it takes for person A and person B to finish the task.

In our problem, *t* = 2 hours

$$\frac{t}{rate\ of\ Myrna} + \frac{t}{rate\ of\ Lea} = 1$$

Let *x* be the time it takes for Lea alone to finish the report:

$$\frac{2}{3} + \frac{2}{x} = 1$$

Simplifying the equation and solving for equation:

$$\frac{2x+6}{3x} = 1$$
$$2x + 6 = 3x$$
$$x = 6$$

Since *x* represents the time it takes for Lea alone to finish the report: Then, Lea can finish the report in 6 hours.