



Solutions

1 Method 1 : Use algebra.

The average of a ; b ; c and d is 8. So $a + b + c + d = 32$. ----- 1st equation

The average of b ; c ; d and e is 11. So $b + c + d + e = 44$. ----- 2nd equation

Replacing e with $3a$, the second equation reads:

$$\therefore b + c + d + 3a = 44$$

Replacing 1st equation into it,

$$\therefore (a + b + c + d) + 2a = 44$$

$$\therefore 32 + 2a = 44$$

$$\therefore 2a = 12$$

$$\therefore a = 6$$

$$e = 3 \times 6 = 18$$

The average of a and e is $(6 + 18) \div 2 = 12$.

Method 2 :

The average of a ; b ; c and d is 8. So $a + b + c + d = 32$. ----- ①

The average of b ; c ; d and e is 11. So $b + c + d + e = 44$. ----- ②

Given that $e = 3a$,

$$\text{②} - \text{①}, e - a = 12$$

$$3a - a = 12$$

$$2a = 12$$

$$a = 6$$

So, $e = 3a = 3 \times 6 = 18$

The average of a and e is $(6 + 18) \div 2 = 12$.



Solutions

2 Method 1: Make a table and use multiple of 9.

The fact that the grandfather's age is a multiple of Jerry's age both now and also 9 years from now suggests that each age is originally a multiple of 9.

AGE NOW	Jerry	9	18
	Grandfather (7 times as much)	63	162
AGE IN 9 YEARS	Jerry	18	27
	Grandfather	72	171
Is grandfather 4 times Jerry's age?		Yes	No

Jerry is 9 years old now.

Method 2: Make a table and assume Jerry is 1 year old this year.

Instead of 9 years, suppose 1 year elapses. The first two columns show some related possible ages now for Jerry and his grandfather. The next two columns show their ages one year from now. The last column, setting aside common sense for the moment, checks if his grandfather will then be 4 times as old as Jerry.

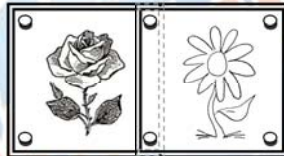
Ages now		Ages in 1 year		Is grandfather's age 4 times Jerry?
Jerry	his grandfather	Jerry	his grandfather	
1	7	2	8	Yes
2	14	3	15	No

To increase the elapsed time from 1 year to 9, while preserving the ratios of the ages (i. e. Grandfather is now 7 times as old and will be 4 times as old), multiply each age by 9. If Jerry is now 9 and his grandfather is 63, then in 9 years Jerry will be 18 and his grandfather will be 72, which is 4 times as old.

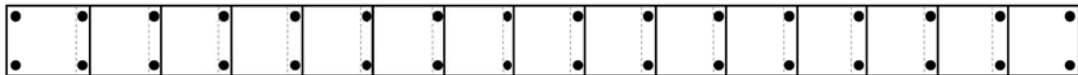
Jerry now is 9.

Solutions

3 Method : Draw the pictures.

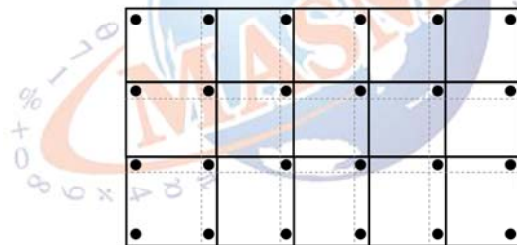


Arrange 15 pictures in a row.



In this way, he uses 32 pins.

To save on pins he should arrange the pictures in shape of 3×5 rectangle. In this way **he uses only 24 pins.**





Solutions

- 4 **Method** : Divide the hours into days to find the remaining hours.

$$\begin{array}{r} 45 \\ 24 \overline{) 1100} \\ \underline{96} \\ 140 \\ \underline{120} \\ 20 \end{array}$$

Notice that 1100 hours = 45 days and 20 hours (1 day has 24 hours).
The answer is $1400 + 2000 = 3400$.
Subtract 24 hours, $3400 - 2400 = 1000$.

After 1100 hours, the clock will show 1000.



Solutions

5 **Method** : Find the distance travelled for each speed.

At 10 km/h, the man travels 5km in half an hour, which means 5000m in 30 minutes, or 500m in 3 minutes.

At 50 km/h, the man travels 25000m in half an hour, which means 2500m in 3 minutes, or 500m in 0.6 minutes.

At 35 km/h, the man travels 70000m in 120 minutes, or 700m in 1.2 minutes.

In total, **the man needs** $3 + 0.6 + 1.2 = 4.8$ minutes during his journey.

