Data sufficiency

1.Find the distance travelled by Rajdhani express in two hours if it travels with its original speed?

Statement I: The train started from the origin station 20.25 hours later than the scheduled time towards its destination which is 750 km away from the origin.

Statement II: To reach the destination station in the scheduled time the loco – piolet of the train increases the speed of the train to 125% of the original speed.

A. The data in statements I alone is sufficient to answer the question, while the data in statement II alone is not sufficient to answer the question.

B. The data in statements II alone is sufficient to answer the question, while the data in statement I alone is not sufficient to answer the question.

C. Either Statement I or Statement II alone is sufficient to answer the question.

D. The data in both the statements I and II is not sufficient to answer the question.

E. The data in both the statements I and II together is necessary to answer the question.

Answer : E

From I and II:

Let the original speed of the train is '100x' km/h

Increased speed = 125% of 100x = 125x km/h

According to question-

$$\Rightarrow \frac{750}{100x} - \frac{750}{125x} = 20.25$$

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

Original speed of the train = 100x = $100 \times \frac{2}{3} = \frac{200}{3}$ km

Hence the distance travelled by train in 2 hours = $2 \times \frac{200}{3} = \frac{400}{3}$ km

Hence statements I and II together are sufficient.

2.What should be the selling price of washing machine so as to make a profit of 25%?

Statement I : An electronic shop dealer marks washing machine 80% above the cost price and after allowing a discount of 25% he claims a profit of Rs. 3500.

Statement II : A shopkeeper sold the same washing machine for Rs. 15000 on the condition that shopkeeper will pay the transportation cost of Rs 2000 and he gets a profit of 25%.

A. The data in statements I alone is sufficient to answer the question, while the data in statement II alone is not sufficient to answer the question.

B. The data in statements II alone is sufficient to answer the question, while the data in statement I alone is not sufficient to answer the question.

C. Either Statement I or Statement II alone is sufficient to answer the question.

D. The data in both the statements I and II is not sufficient to answer the question.

E. The data in both the statements I and II together is necessary to answer the question.

Answer : C

From Statement I : Let the cost price of the working machine be x.

then the marked price of washing machine

$$= x + \frac{80}{100} \times x = 1.8x$$

Selling price $= 1.8x \times \frac{100 - 25}{100} = 1.35x$

Now, profit $= 1.35x - x$

Profit $= 0.35 x$

but

$0.35x = 3500$

$\therefore x = 10,000$

So, the cost price of the washing is Rs. 10000. Selling price in order to earn 25% profit

$$= \frac{125}{100} \times 10000 = 12,500$$

Hence, statement I alone is sufficient

From Statement II: Let the cost price of the washing machine be x then,

Cost price after paying transportation = x + 2000 then

$$\Rightarrow \frac{x + 2000}{15000} = \frac{100}{125}$$

$\Rightarrow x + 2000 = 12000$

$\Rightarrow x = 10000$

Cost price is Rs. 10000

Selling price in order to earn 25% profit $= \frac{125}{100} \times 10000 = $ Rs. 125000

Hence, statement II alone is also sufficient. Here, Statement I or II alone is sufficient.

3. How many years old will Anuj be p years from now?

Statement I : Ankur is 14 years older than Anuj.

Statement II : The sum of the ages of Ankur and Anuj is p years.

A. The data in statements I alone is sufficient to answer the question, while the data in statement II alone is not sufficient to answer the question.

B. The data in statements II alone is sufficient to answer the question, while the data in statement I alone is not sufficient to answer the question.

C. Either Statement I or Statement II alone is sufficient to answer the question.

D. The data in both the statements I and II is not sufficient to answer the question.

E. The data in both the statements I and II together is necessary to answer the question.

Answer : D

From Statement I :

Using the information given in above statement.

Anuj + 14 = Ankur

Here, we have no information about p and the actual age of Anuj.

So, we cannot find the answer.

Hence, statement I alone is not sufficient.

From Statement II:

Using the information given in above statement, we can say that

Anuj + ankur = p

Here, we have no information about the present age of Anuj

So, we cannot find the answer.

Both Statement I and II :–

From statement I : Anuj + 14 = Ankur

From Statement II : Anuj + Ankur = p

2 Anuj + 14 = p

Here, cannot find the actual age of Anuj and the real value of p.

So, we cannot find the answer.

Hence, Both statement I and II together are not sufficient.

4.If a rope is cut into three pieces of unequal length, what is the length of the shortest of these pieces of rope?

Statement I : The combined length of the longer two pieces of rope is 17 meters.

Statement II : The combined length of the shorter two pieces of rope is 15 meters.

A. The data in statements I alone is sufficient to answer the question, while the data in statement II alone is not sufficient to answer the question.

B. The data in statements II alone is sufficient to answer the question, while the data in statement I alone is not sufficient to answer the question.

C. Either Statement I or Statement II alone is sufficient to answer the question.

D. The data in both the statements I and II is not sufficient to answer the question.

E. The data in both the statements I and II together is necessary to answer the question.

Answer : D

Let the length of layer piece, middle piece and shorter piece be l, m and s respectively.

From Statement I :

Using the information given in above statement.

l + m = 17

Here, we have no information about the total length of the rope or the length of shorter piece.

So, we cannot find the answer.

Hence, statement I alone is not sufficient.

From Statement II:

Using the information given in above statement,

s + m = 19

Here, we have no other information about the length of these pieces.

So, we cannot find the answer.

Hence, statement II alone is not sufficient.

Both Statement I and II :–

From statement I : l + m = 17

From Statement II : s + m = 15

Combining both statement I and II we get

l – s = 2

At this point, we have no information about total length or the length of any of these pieces of the rope. So, we cannot find the answer.

Hence, Both statement I and II together are not sufficient.

5. At present, the age of A is 1/3rd of the age of B then what are their ages?

Statement I : After 10 years, the ratio of their ages will become 5 : 11.

Statement II : 5 years age, the age of A was 25% of the age of B.

A. The data in statements I alone is sufficient to answer the question, while the data in statement II alone is not sufficient to answer the question.

B. The data in statements II alone is sufficient to answer the question, while the data in statement I alone is not sufficient to answer the question.

C. Either Statement I or Statement II alone is sufficient to answer the question.

D. The data in both the statements I and II is not sufficient to answer the question.

E. The data in both the statements I and II together is necessary to answer the question.

Answer : C

From the question, A : B = 1 : 3

Statement I : after 10 years, the ratio will become 5 : 11

Statement II : 5 years ago, the ratio was 1 : 4

Therefore, statement I or Statement II alone is sufficient to get our answer, and their ages will be 15 years and 45 years respectively

6. Find the value of (a + b), given that a > b, and 'a' and 'b' are positive integers.

Statement I : $a^3 + b^3 = 1729$

Statement II : $a^2 + b^3 = 145$

A. The data in statements I alone is sufficient to answer the question, while the data in statement II alone is not sufficient to answer the question.

B. The data in statements II alone is sufficient to answer the question, while the data in statement I alone is not sufficient to answer the question.

C. Either Statement I or Statement II alone is sufficient to answer the question.

D. The data in both the statements I and II is not sufficient to answer the question.

E. The data in both the statements I and II together is necessary to answer the question.

Answer : E

Statement I: $a^3 + b^3 = 1729$

By trail and error method, we can conclude that

a = 10 and b = 9

a = 12 and b = 1

There are two possible values of 'a' and 'b'.

So, statement I alone is not sufficient to answer the question.

Statement II: $a^2 + b^3 = 145$

By trial and error method, we can conclude that

a = 9 and b = 4

a = 12 and b = 1

There are two possible values of 'a' and 'b'.

So, statement II alone is not sufficient to answer the question.

Combining statement I and statement II:

$a^3 + b^3 = 1729$

By hit and trial method, we can conclude that

a = 10 and b = 9

a = 12 and b = 1

Also,

$a^2 + b^3 = 145$

By hit and trial method, we can conclude that

a = 9 and b = 4

a = 12 and b = 1

So, a = 12, and b = 1

(a + b) = 12 + 1 = 13

7. Kunal takes 'a' days to complete a work while Sandeep takes 'b' less days than Kunal to complete the same work. Ravi takes 'b'

more days than Kunal to complete the same work. Rahul takes 'ab' days to complete the work while Shyam takes 'ab2' days to complete it. Is the combined efficiency of Sandeep and Ravi together less than that of Rahul and Shyam together?

Statement I : b ≥ 1
Statement II : b ≤ 1

A. The data in statements I alone is sufficient to answer the question, while the data in statement II alone is not sufficient to answer the question.
B. The data in statements II alone is sufficient to answer the question, while the data in statement I alone is not sufficient to answer the question.
C. Either Statement I or Statement II alone is sufficient to answer the question.
D. The data in both the statements I and II is not sufficient to answer the question.
E. The data in both the statements I and II together is necessary to answer the question.

Answer : A

Statement I: Time taken by Sandeep and Ravi alone to complete the work is $(a - b)$ days and $(a + b)$ days, respectively.

Therefore, time taken by Sandeep and Ravi together to complete the work

$$= \frac{(a - b)(a + b)}{a - b + a + b}$$

$$= \frac{a^2 - b^2}{2a} = \frac{a}{2} - \frac{b^2}{2a} \text{ days}$$

Therefore, time taken by Rahul and Shyam together to complete the work

$$= \frac{abab^2}{ab + ab^2} = \frac{ab^2}{1 + b} \text{ days}$$

Since, $b \geq 1$

So, $b^2 \geq b \geq 1$

$1 + b \leq 2b^2$

$$\frac{(1 + b)}{ab^2} \leq \frac{2b^2}{ab^2}$$

$$\frac{ab^2}{1 + b} \geq \frac{a}{2}$$

And, $\dfrac{a}{2} - \dfrac{b^2}{2a} < \dfrac{a}{2}$

$$\frac{a^2 - b^2}{2a} < \frac{ab^2}{1 + b}$$

So, statement I alone is sufficient to answer the question.

Statement II:

Time taken by Sandeep and Ravi alone to complete the work is $(a - b)$ days and $(a + b)$ days, respectively.

Therefore, time taken by Sandeep and Ravi together to complete the work

$$= \frac{(a - b)(a + b)}{a - b + a + b}$$

$$= \frac{a^2 - b^2}{2a} = \frac{a}{2} - \frac{b^2}{2a} \text{ days}$$

Therefore, time taken by Rahul and Shyam together to complete the work

$$= \frac{abab^2}{ab + ab^2} = \frac{ab^2}{1 + b} \text{ days}$$

Since, $b \leq 1$

$b^2 \leq b \leq 1$

$1 + b \geq 2b^2$

$$\frac{(1 + b)}{ab^2} \geq \frac{2b^2}{ab^2}$$

$$\frac{ab^2}{1 + b} \leq \frac{a}{2}$$

And, $\frac{a}{2} - \frac{b^2}{2a} < \frac{a}{2}$

We cannot say about whether the combined efficiency of Sandeep and Ravi together is less/more than that of Rahul and Shyam together using the above information.

So, statement II alone is not sufficient to answer the question.

8. A solid wooden cone of radius 7 cm is cut vertically from the middle to form two halves. Find the volume of the wooden cone. [Use π = 3]

Statement I: If the curved surface area of one half of the cone is 82% of the curved surface area of the whole wooden cone.

Statement II: If the total surface area of the one half is 504 cm2.

A. The data in statements I alone is sufficient to answer the question, while the data in statement II alone is not sufficient to answer the question.

B. The data in statements II alone is sufficient to answer the question, while the data in statement I alone is not sufficient to answer the question.

C. Either Statement I or Statement II alone is sufficient to answer the question.

D. The data in both the statements I and II is not sufficient to answer the question.

E. The data in both the statements I and II together is necessary to answer the question.

Answer : C

Statement I: Radius of wooden cone = 7 cm.

Diameter = 14 cm

Since, the wooden cone is cut from middle.

So, curved surface area of the cut half = $(1/2) \times \pi \times r \times l$ + Area of triangle formed with sides (l, l and d), where 'l' is slant height of the cone and 'd' is the diameter of the cone.

Given,

$$[(1/2) \times \pi \times r \times l + \sqrt{[s(s-l)(s-l)(s-d)]}] = 0.82 \times \pi \times r \times l --- (1)$$

Now, $s = \dfrac{(l+l+d)}{2}$

$$= \frac{(l + l + 14)}{2}$$

$$= (l + 7)$$

Now, putting the value of 's' in equation (1), we get

$$0.5 \times \pi \times r \times l + \sqrt{[(l + 7)(l + 7 - l)(l + 7 - l)(l + 7 - 14)]} = 0.82 \times \pi \times r \times l$$

$$\sqrt{[(l + 7)(7)(7)(l - 7)]} = 0.32 \times \pi \times r \times l$$

$$l^2 - 49 = 0.9216 \times l^2$$

$$l^2 = 625$$

$$l = 25 \text{ cm}$$

So, height of cone, $h = \sqrt{(l^2 - r^2)} = \sqrt{(25^2 - 7^2)} = 24 \text{ cm}$

Volume of wooden cone $= \frac{1}{3} \times \pi \times r^2 \times h$

$$= \frac{1}{3} \times 3 \times 7^2 \times 24 = 1176 \text{ cm}^3$$

So, Statement I alone is sufficient to answer the question.

Statement II :

Radius of wooden cone = 7 cm.

Diameter = 14 cm

Since, the wooden cone is cut from middle.

So, total surface area of the cut half = $(1/2) \times \pi \times r \times l + [(\pi r^2) / 2]$ + Area of triangle formed with sides (l, l and d), where 'l' is slant height of the cone and 'd' is the diameter of the cone.

Given,

$$(1/2) \times \pi \times r \times l + [(\pi r^2)/ 2] + \sqrt{[s(s - l)(s - l)(s - d)]} = 504 - - - (1)$$

Now, $s = \frac{(l + l + d)}{2}$

$$= \frac{(l + l + 14)}{2}$$

$$= (l + 7)$$

Now, putting the value of s in eq. (1), we get

$$0.5 \times 3 \times 7 \times l + \sqrt{[(l + 7)(l + 7 - l)(l + 7 - l)(l + 7 - 14)]} + [(3 \times 7^2) / 2] = 504$$

$$10.5 \times l + \sqrt{[(l + 7)(7)(7)(l - 7)]} + 73.5 = 504$$

$$10.5 \times l + \sqrt{[(l + 7)(7)(7)(l - 7)]} = 430.5$$

$$\sqrt{[(l + 7)(l - 7)]} = [430.5 - 10.5 \times l] / 7$$

Solving the above equation, we get

$$l = 25 \text{ cm}$$

So, height of cone, $h = (l^2 - r^2)0.5 = (25^2 - 7^2)^{0.5} = 24 \text{ cm}$

Volume of wooden cone $= \frac{1}{3} \times \pi \times r^2 \times h$

$$= \frac{1}{3} \times 3 \times 7^2 \times 24 = 1176 \text{ cm}^3$$

So, Statement II alone is sufficient to answer the question.

9. 'x' boys can complete a work in 15 days and 'y' girls can complete the same work in 24 days. Find the number of days taken to complete the work by (x − 8) boys and (y − 7) girls together.

Statement I: If the efficiency of boys is twice than that of girls and (x + y) = 27.

Statement II: If x = y, then the number of days taken by all the boys is half the number of days taken by all the girls.

A. The data in statements I alone is sufficient to answer the question, while the data in statement II alone is not sufficient to answer the question.

B. The data in statements II alone is sufficient to answer the question, while the data in statement I alone is not sufficient to answer the question.

C. Either Statement I or Statement II alone is sufficient to answer the question.

D. The data in both the statements I and II is not sufficient to answer the question.

E. The data in both the statements I and II together is necessary to answer the question.

Answer : A

Statement I: Let the efficiency of each boy be 2e unit/day.

Then, the efficiency of each girl = e unit/day.

According to question,

$15 \times x \times 2e = 24 \times y \times e$

$30x = 24y$

$x : y = 4 : 5$

Also, $x + y = 27$

So, $x = \dfrac{4}{9} \times 27 = 12$

$y = 27 - 12 = 15$

Let the number of days taken by $(x - 8)$ boys and $(y - 7)$ girls together to complete the same work be 'D' days.

Then,

$[(12 - 8) \times 2e + (15 - 7) \times e] \times D = 15 \times 12 \times 2e$

$(8e + 8e) \times D = 360e$

$D = 360e \div 16e$

$D = 22.5$ days

So, Statement I alone is sufficient to answer the question.

Statement II:

Since, $x = y$, then the number of days taken by all the boys is half the number of days taken by all the girls.

This means, that the efficiency of boys is twice the efficiency of girls.

Let the efficiency of each boy be $2e$ unit/day.

Then, the efficiency of each girl = e unit/day.

According to question,

$15 \times x \times 2e = 24 \times y \times e$

$30x = 24y$

$x : y = 4 : 5$

So, Statement II alone is not sufficient to answer the question.

10. A shopkeeper marked an article somewhat above the cost price and sold it after two consecutive discounts. Find the difference in the cost price and the marked price of the article.

Statement I: The shopkeeper marked the article 50% above the cost price and sold it after two consecutive discounts of 'd'% and '2d'% respectively. In this transaction the shopkeeper had a profit of 8%.

Statement II: The shopkeeper marked the article 'm'% above the cost price and sold it after two consecutive discounts of 10% and 20% respectively. In this transaction the shopkeeper had a profit of Rs. 1,248.

A. The data in statements I alone is sufficient to answer the question, while the data in statement II alone is not sufficient to answer the question.

B. The data in statements II alone is sufficient to answer the question, while the data in statement I alone is not sufficient to answer the question.

C. Either Statement I or Statement II alone is sufficient to answer the question.

D. The data in both the statements I and II is not sufficient to answer the question.

E. The data in both the statements I and II together is necessary to answer the question.

Answer : E

Statement I: Let the cost price of the article = Rs. 100x

Marked price of the article = $1.50 \times 100x = 150x$

Selling price of the article = $150x \times (100 - d)(100 - 2d) \div 100 \div 100 = 100x \times 1.08$

$(100 - d)(100 - 2d) = 7200$

$10000 + 2d^2 - 300d = 7200$

$d^2 - 150d + 1400 = 0$

$d^2 - 140d - 10d + 1400 = 0$

$d(d - 140) - 10(d - 140) = 0$

$(d - 140)(d - 10) = 0$

$d = 10, 140$

Here x is eliminated. So the cost price and the marked price of the article can't be determined

So statement I alone is not sufficient to answer the question.

Statement II: Let the cost price of the article = Rs. 100x

Marked price of the article = $100x \times (100 + m) \div 100$ = Rs. 100x + xm

Selling price of the article = $(100x + xm) \times 0.80 \times 0.90 = 72x + 0.72 \times xm$

Profit earned = $72x + 0.72 \times xm - 100x = 1248$

$0.72 \times xm - 28x = 1248$

Here we have two variables so the equation can't be solved

So statement II alone is not sufficient to answer the question.

Now combining statement I and statement II

Let the cost price of the article = 100x

So the profit earned = $100x \times 0.08 = 1248$

$8x = 1248$

$x = 156$

So the cost price of the article = Rs. 15,600

Marked price of the article = 15600×1.50 = Rs. 23,400

Difference in the cost price and marked price = $23400 - 15600$ = Rs. 7,800
So data in statement I and statement II together are sufficient to answer the question

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