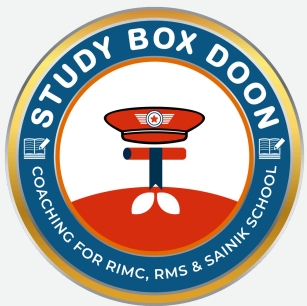


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**RIMC  
MATHS  
ANSWER KEY  
DEC-2025**



## StudyBox Doon - India's Exclusive Online Coaching for RIMC, RMS & Sainik School.

Q.1 भिन्न  $\frac{12x}{48}$ ,  $\frac{20}{30}$ ,  $\frac{28}{42x}$  का HCF  $\frac{1}{6}$  दिया गया है। 'x' का मान ज्ञात कीजिए। प्रश्न. The HCF of the fraction  $\frac{12x}{48}$ ,  $\frac{20}{30}$ ,  $\frac{28}{42x}$  is given to be  $\frac{1}{6}$ . Find the value of 'x'.



(19-1)

Q 1

$$\frac{12x}{48} = \frac{x}{4}$$

$$\frac{20}{30} = \frac{2}{3}$$

$$\frac{28}{42x} = \frac{4}{6x} = \frac{2}{3x}$$

Numerator  $x, 2, 2$

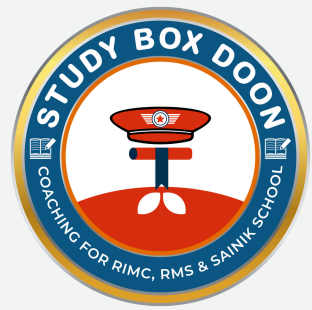
Denominator  $4, 3, 3x$

$$HCF = \frac{HCF \text{ of } N^r}{LCM \text{ of } D^r} = \frac{1}{12x}$$

$$\frac{1}{12x} = \frac{1}{6}$$

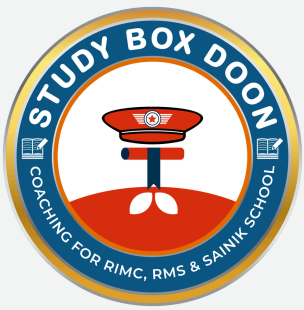
$$6x = 12x$$

$$\boxed{\frac{1}{2} = x}$$



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Q.2 यदि पाँच अंकों की संख्या 74abc (ध्यान दें: a, b और c अलग-अलग अंक हैं) 13, 11 और 7 से पूरी तरह से विभाज्य है, तो  $a^2 + b^2 + c^2$  का मान ज्ञात कीजिए। / Find the value of  $a^2 + b^2 + c^2$ , if it is given that the five digit number 74abc (Note : a, b & c are distinct digits) is exactly divisible by 13, 11 & 7?



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Q2

74abc

$$\text{LCM}(11, 13, 7) = 1001$$

$$74abc = 74000 + 100a + 10b + c$$

$$74 \times 1001$$

$$= 74074$$

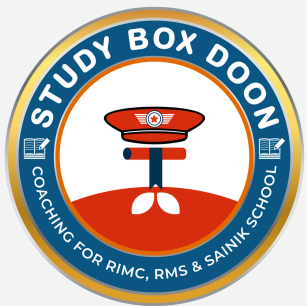
$$\Rightarrow a=0, b=7, c=4$$

$$a^2 + b^2 + c^2$$
$$= 0^2 + 7^2 + 4^2$$

$$= 49 + 16$$

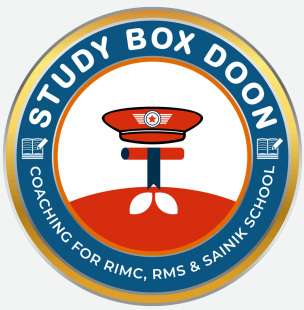
$$= 65$$

Confirm



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Q.3 मान ज्ञात कीजिए / Find the value of  $\frac{1}{15} + \frac{1}{35} + \frac{1}{63} + \frac{1}{99} + \frac{1}{143}$



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Q3

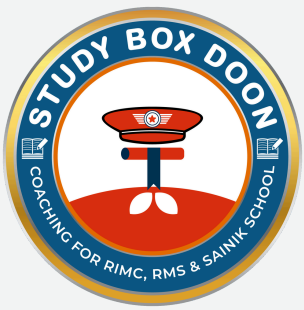
$$\frac{1}{15} + \frac{1}{35} + \frac{1}{63} + \frac{1}{99} + \frac{1}{143}$$

Ag-2

$$= \frac{2}{2} \left[ \frac{1}{3 \times 5} + \frac{1}{5 \times 7} + \frac{1}{7 \times 11} + \frac{1}{11 \times 13} \right]$$

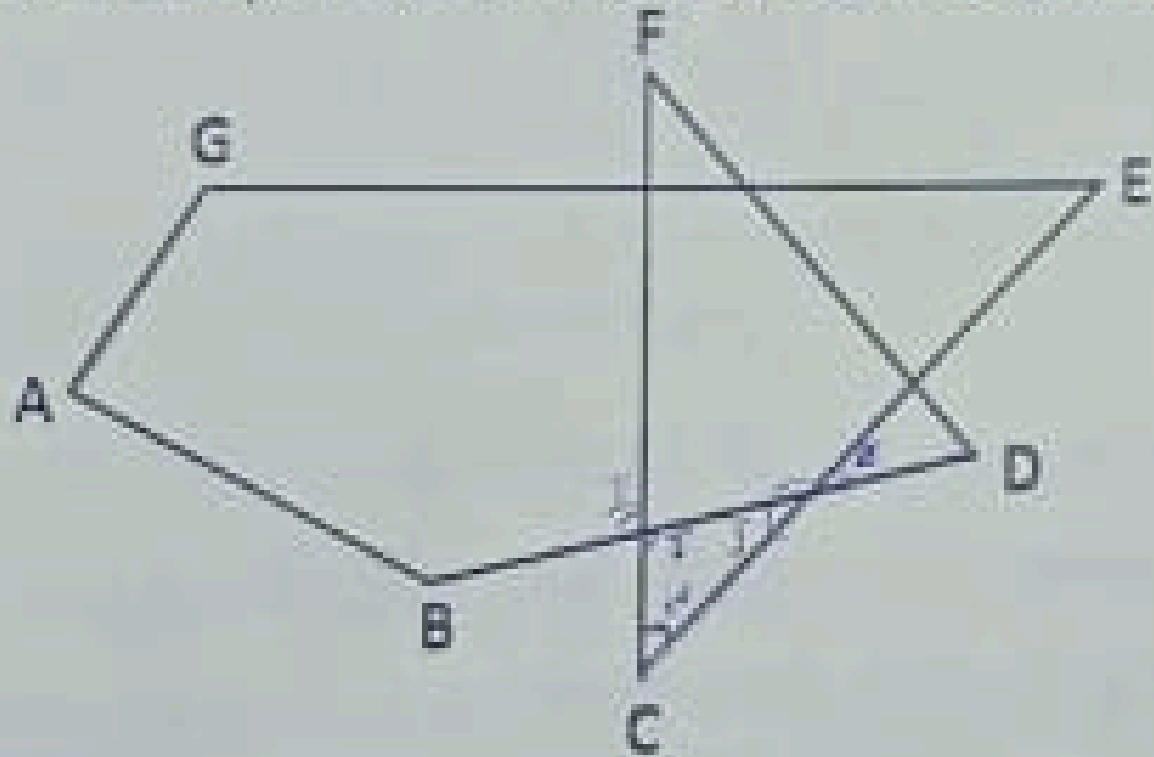
$$\frac{1}{2} \left[ \frac{1}{3} - \frac{1}{13} \right]$$

$$\frac{1}{2} \left[ \frac{13-3}{39} \right] = \frac{1}{2} \times \frac{10}{39} = \frac{5}{39}$$

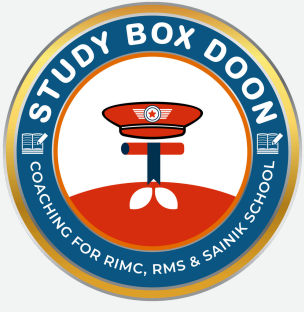


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Q.4 पता करें / Find  $\angle A + \angle B + \angle C + \angle D + \angle E + \angle F + \angle G =$

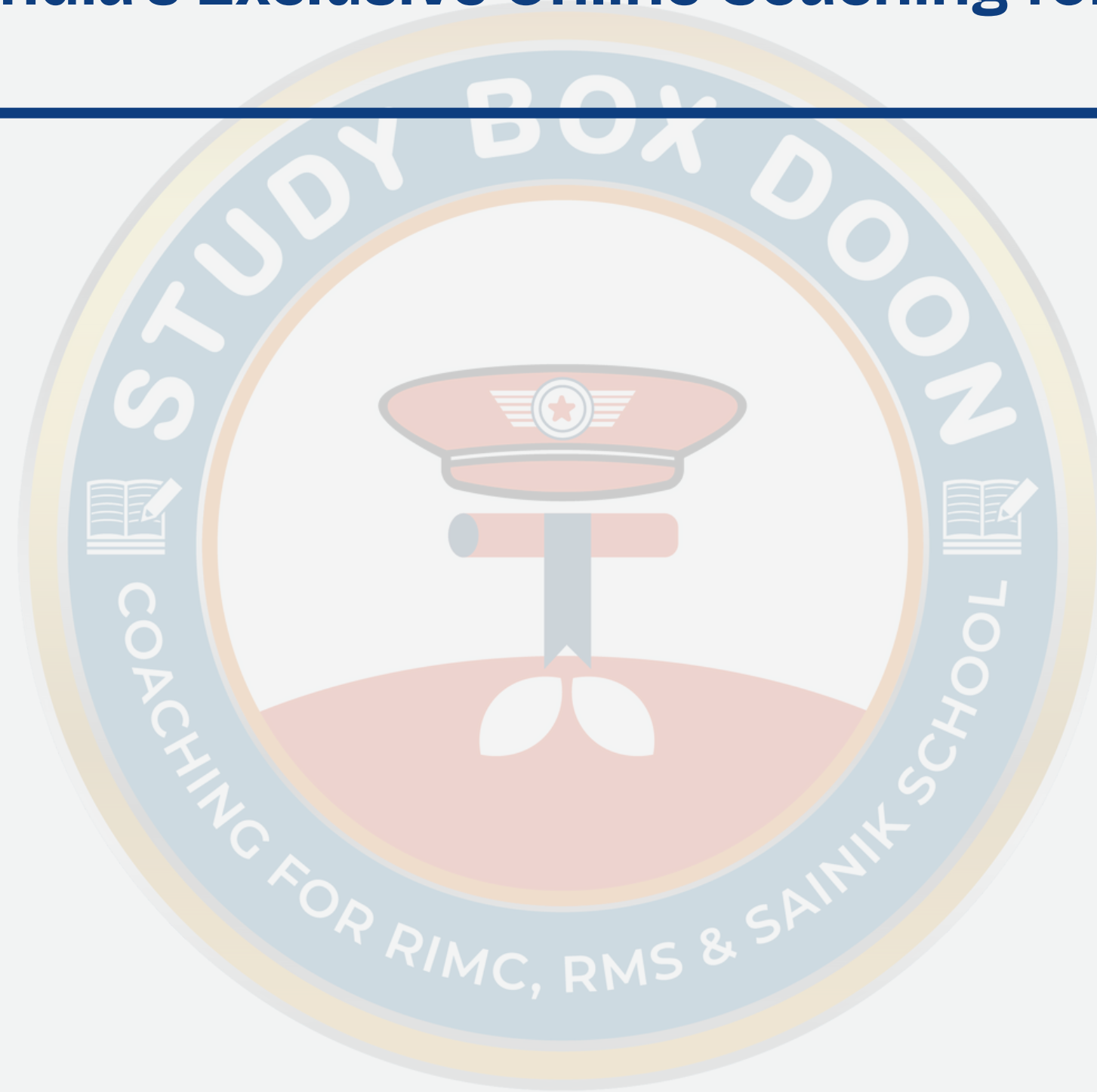


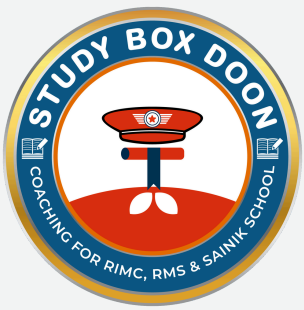




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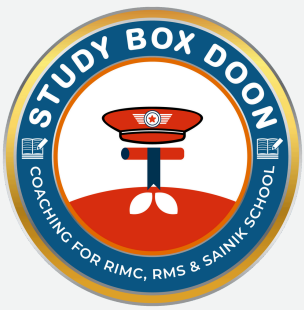




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Q.5. यदि / If  $(a+b) : (b+c) : (c+a) = 7 : 6 : 5$  &  $a+b+c=27$ , तो तब इसका मान क्या होगा / then what will be the value of  $\frac{1}{a} : \frac{1}{b} : \frac{1}{c}$ ?





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Ques Pg-3

$$a+b : b+c : c+a$$

$$7 \quad 6 \quad 5$$

$$a+b=7x$$

$$b+c=6x$$

$$c+a=5x$$

$$a+b+c=27$$

$$2(a+b+c)=18x$$

$$2 \times 27 = 18x$$

$$x=3$$

$$a+b=7 \times 3=21$$

$$b+c=6 \times 3=18$$

$$c+a=5 \times 3=15$$

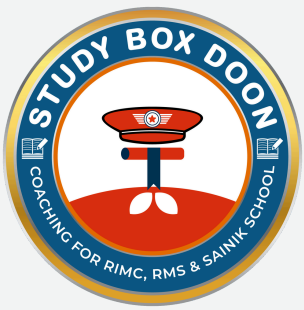
$a+b+c=27$ $21+c=27$ $c=27-21$ $c=6$	$a+b+c=27$ $a+18=27$ $a=27-18$ $a=9$	$a+b+c=27$ $15+b=27$ $b=27-15$ $b=12$
---	---	--

$$\frac{1}{a} : \frac{1}{b} : \frac{1}{c}$$

$$\frac{1}{9} : \frac{1}{12} : \frac{1}{6}$$

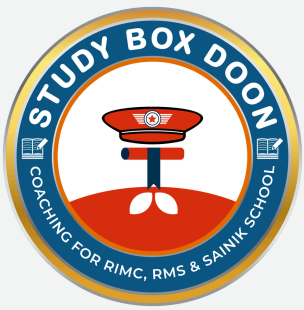
$$36 \left( \frac{1}{9} : \frac{1}{12} : \frac{1}{6} \right)$$

$$\frac{1}{a} : \frac{1}{b} : \frac{1}{c} \quad 4 : 3 : 6 \quad \text{Ans}$$



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Q.6 सबूत प्रस्तुत करें / Prove  $\frac{1}{1+p+q-1} + \frac{1}{1+q+r-1} + \frac{1}{1+r+p-1} = 1$ , if  $pqr = 1$ .



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Sol 6  $pqr = 1$

To prove

$$\frac{1}{1+p+q^{-1}} + \frac{1}{1+q+r^{-1}} + \frac{1}{1+r+p^{-1}}$$

$$\frac{1}{1+p+\frac{1}{q}} + \frac{1}{1+q+r^{-1}} + \frac{1}{1+r+p^{-1}}$$

$$\frac{\frac{1}{q} + pq + 1}{q} + \frac{1}{1+q+r^{-1}} + \frac{1}{1+r+p^{-1}}$$

$$\frac{q}{q+pq+1} + \frac{1}{1+q+r^{-1}} + \frac{1}{1+r+p^{-1}}$$

$$\frac{q}{1+q+r^{-1}} + \frac{1}{1+q+r^{-1}} + \frac{1}{1+r+p^{-1}}$$

$$\frac{q+1}{1+q+r^{-1}} + \frac{1}{1+r+p^{-1}}$$

$$\frac{q+1}{1+q+\frac{1}{r}} + \frac{1}{1+r+p^{-1}}$$

$$\frac{q+1}{\frac{1}{r} + \frac{1}{r} + \frac{1}{r}} + \frac{1}{1+r+p^{-1}}$$

$$\frac{q+1}{\frac{r+qr+1}{r}} + \frac{1}{1+r+p^{-1}}$$

$$\frac{r(q+1)}{1+r+qr} + \frac{1}{1+r+p^{-1}}$$

$$\frac{r(q+1)}{1+r+p^{-1}} + \frac{1}{1+r+p^{-1}} = \frac{r(q+1)+1}{1+r+p^{-1}}$$

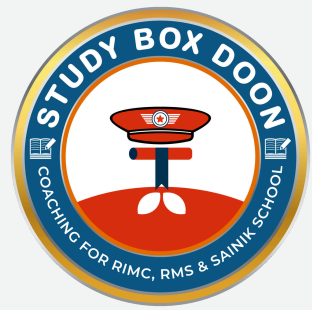
$$\frac{r(q+1)+1}{1+r+p^{-1}}$$

$$\frac{p^{-1}+r+1}{1+r+p^{-1}}$$

$$= 1$$

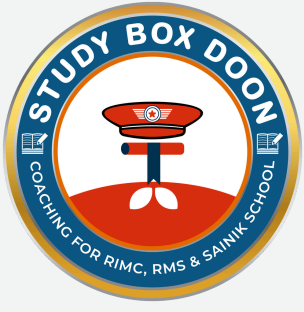
Hence proved

$$\frac{pq \cdot r = 1}{p \cdot r = \frac{1}{q} = r^{-1}}$$



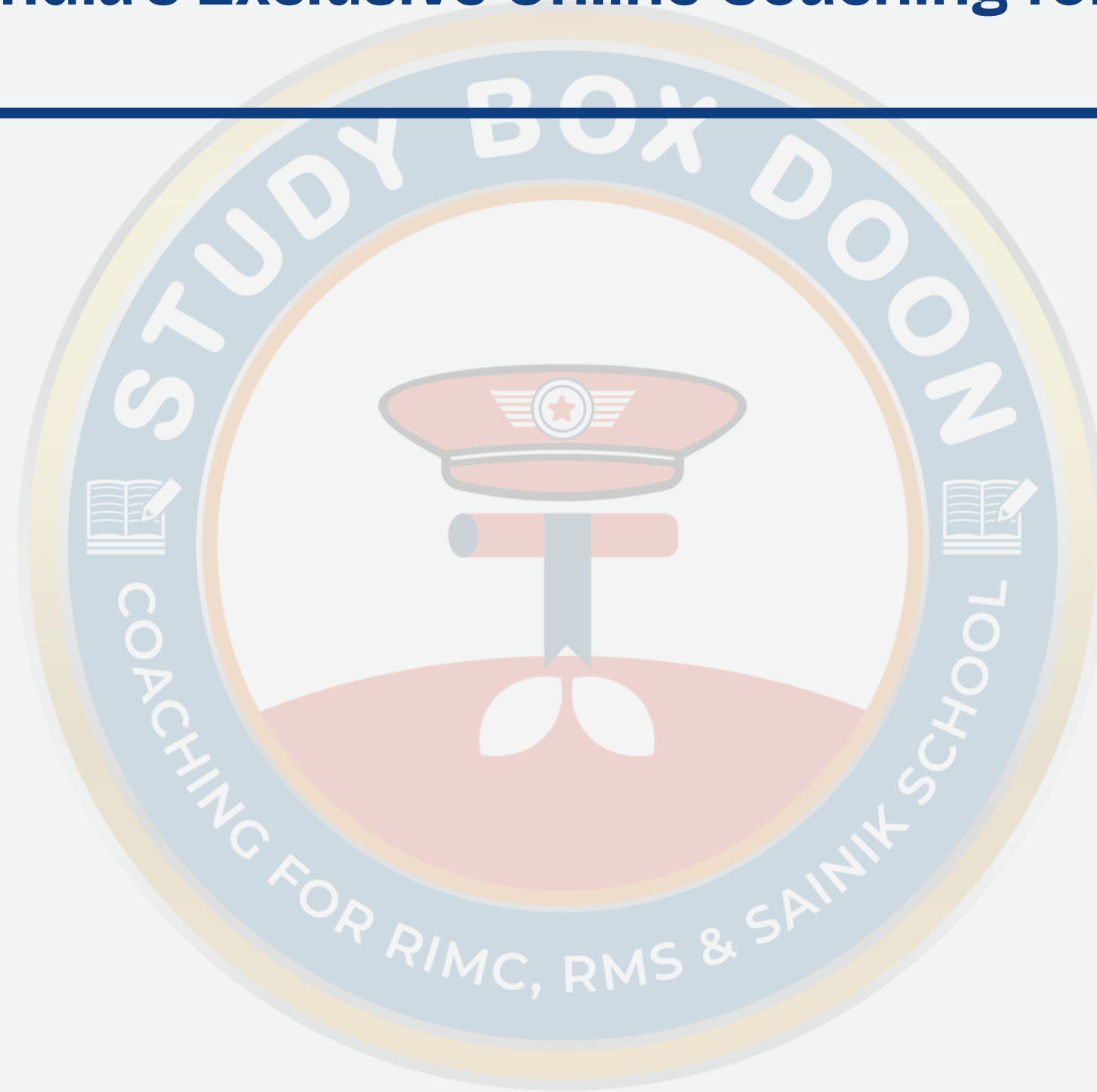
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✓ Q.7 150 लीटर के घोल में 60% दूध और शेष पानी है। ऊपर दिए गए घोल में कितने लीटर पानी मिलाना चाहिए ताकि पाए गए मिश्रण में 50% पानी हो? A solution of 150 litres contains 60% of milk & the rest is water. How much water must be added to the above solution such that the resulting mixture contains 50% of water (in litres)?

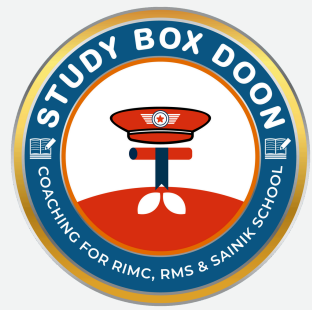


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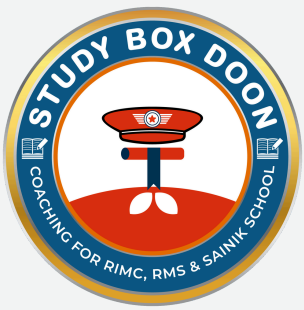




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Q.8 एक शहर की जनसंख्या हर वर्ष 5% बढ़ती है। यदि जनसंख्या 18522 है, तो यह एक साल पहले कितनी थी?  
The population of a town increases by 5% annually. If the population now is 18522, what was it a year ago?





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Sol<sup>n</sup>

$$r = 5\%$$

$$P = 18522$$

$$n = 1$$

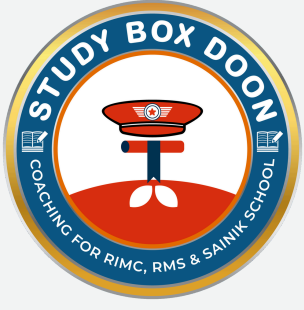
$$A = P \left( 1 + \frac{r}{100} \right)^n$$

$$= 18522 \times \left( 1 + \frac{5}{100} \right)^1$$

$$18522 \times \frac{105}{100}$$

$$\frac{1759590}{100}$$

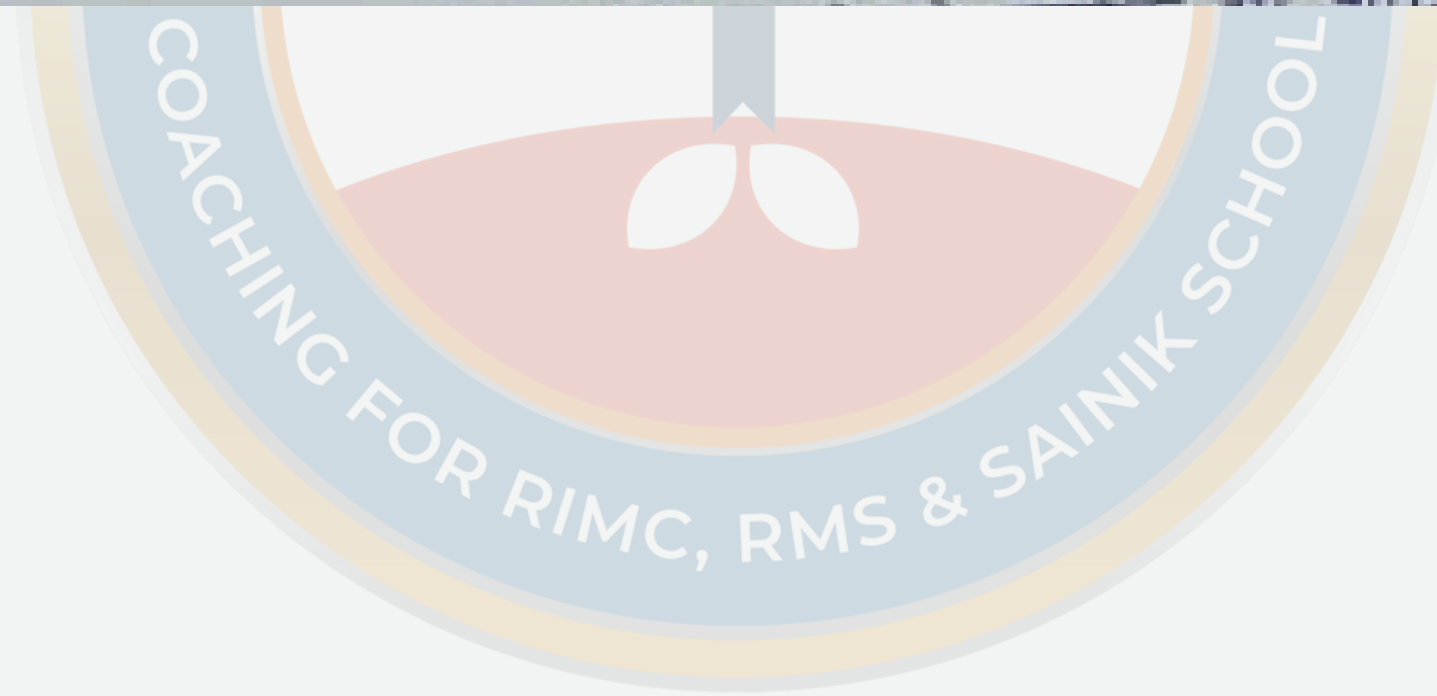
$$17595.90$$



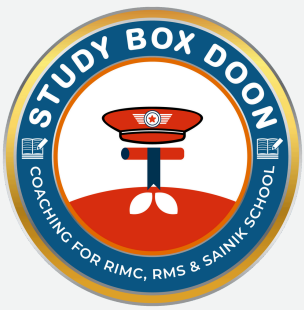
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Q.9 पाइप A, B और C क्रमशः 30 घंटे, 40 घंटे और 60 घंटे में एक टैंक भर सकते हैं। पाइप A, B और C उसी दिन सुबह 7 बजे, 8 बजे और 10 बजे खोले जाते हैं। टैंक कब भरा होगा? Pipes A, B & C can fill a tank in 30 hrs, 40 hrs & 60 hrs respectively. Pipes A, B & C are opened at 7 a.m, 8 a.m & 10 a.m respectively on the same day. When will the tank be full?

कोई भी शर्त नहीं दी है, तो औसत कितनी







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Sollg

Pipe A  $\rightarrow$  30 hrs

Rate A  $\rightarrow \frac{1}{30}$

Pipe B  $\rightarrow$  40 hrs

Rate B  $\rightarrow \frac{1}{40}$

Pipe C  $\rightarrow$  60 hrs

Rate C  $\rightarrow \frac{1}{60}$

Let  $t$  be the time required to fill the tank by pipe A. then

Work = Efficiency  $\times$  time.

Time A  $\rightarrow t$

Time B  $\rightarrow t-1$

Time C  $\rightarrow t-3$

$$\frac{1}{30} \times t + \frac{1}{40} (t-1) + \frac{1}{60} (t-3) = 1$$

$$\frac{4t + 3(t-1) + 2(t-3)}{120} = 1$$

$$\frac{4t + 3t - 3 + 2t - 6}{120} = 1$$

$$\frac{9t - 9}{120} = 1$$

$$9t - 9 = 120$$

$$9t = 129$$

$$t = \frac{129}{9}$$

Remaining 9<sup>th</sup>

$$t = \frac{129}{9} = 14 \frac{1}{3} \text{ hr}$$

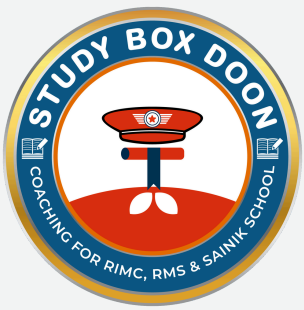
$$14 \frac{1}{3} \text{ hr}$$

$$= 14 \text{ hr } 20 \text{ min}$$

$$\text{Time} = 7:00 \text{ am} + 14 \text{ hr } 20 \text{ min}$$

$$9 \text{ pm} : 20 \text{ min}$$

$$9:20 \text{ pm}$$

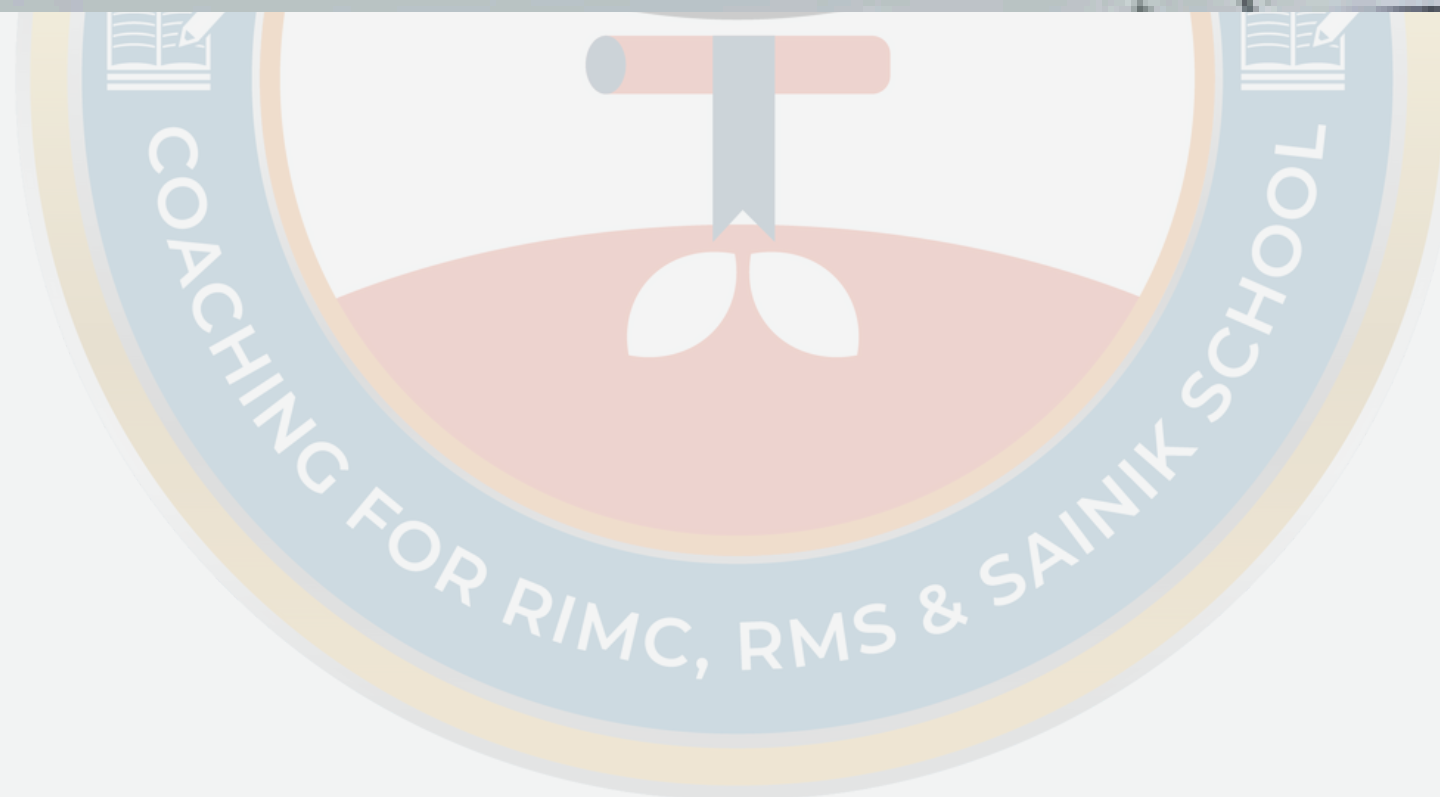


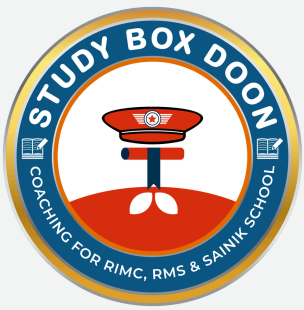
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the tank be full?

Q.10 5 लगातार धनात्मक पूर्णांकों का औसत  $x$  है। यदि अगले दो पूर्णांक भी शामिल किए जाएँ, तो औसत कितनी मात्रा में बढ़ जाएगा? The average of 5 consecutive positive integers is  $x$ . If the next two integers are also included, by how much the average will be increased?

2430  
+1  
2431





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Ques 10 let five consecutive integers are

$$n, n+1, n+2, n+3, n+4$$

$$\text{Average} = x$$

$$\frac{(n) + (n+1) + (n+2) + (n+3) + (n+4)}{5} = x$$

$$\frac{5n + 10}{5} = x$$

$$n + 2 = x$$

Now next two integers included ie  $(n+5)$  &  $n+6$ .  
then  $\text{Average} = \frac{n + (n+1) + (n+2) + (n+3) + \dots + (n+6)}{7}$

$$\frac{7n + 21}{7} = y$$

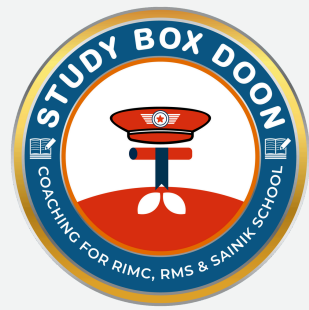
$$n + 3 = y$$

$$n + 2 + 1 = y$$

$$\boxed{n + 1 = y}$$

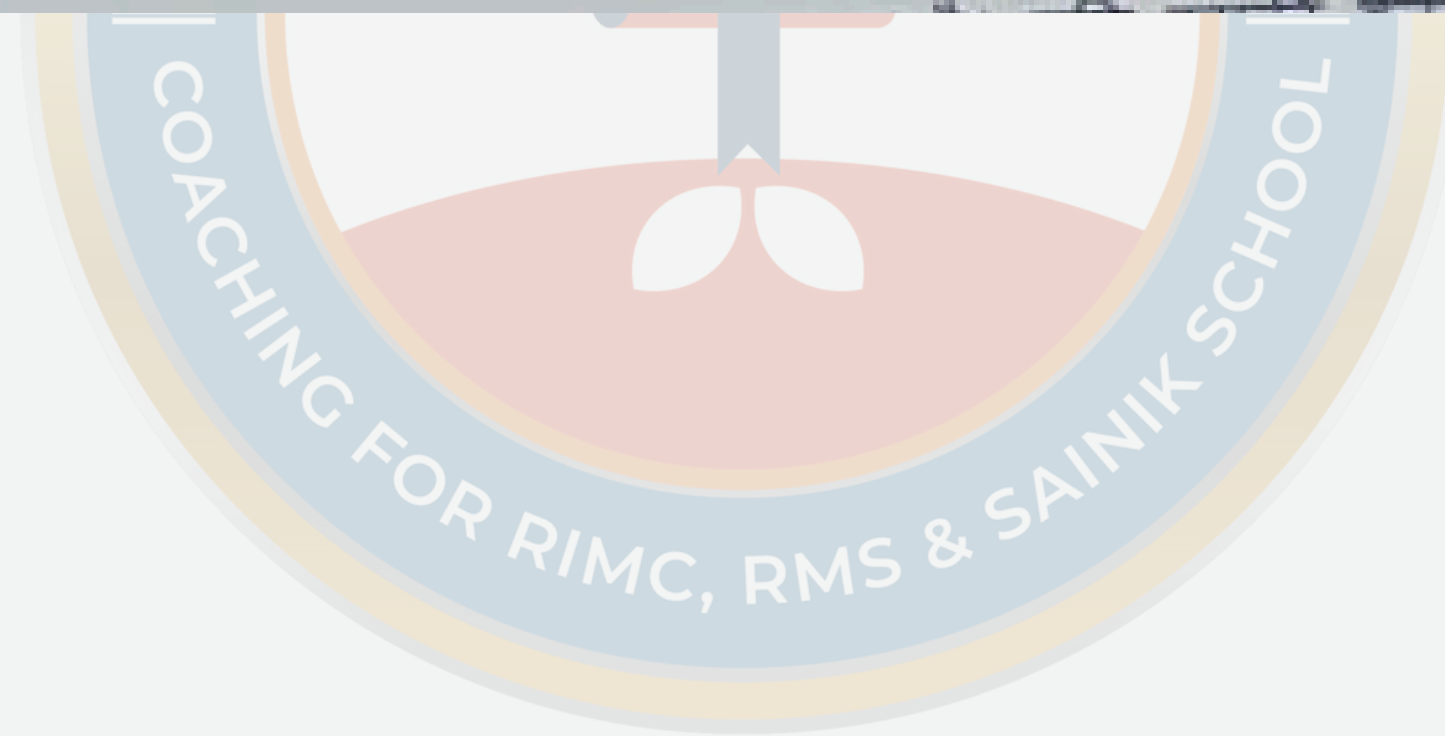
Average is increased by 1.

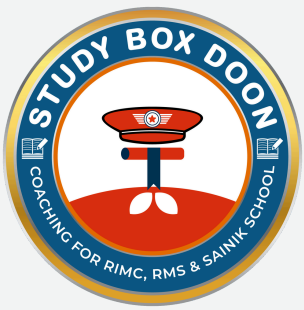




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Q.11 अपने स्कूल प्रोजेक्ट के लिए, मीरा को प्रत्येक 2 सेमी त्रिज्या वाले गोलाकार डिस्क का आवश्यकता है। उसके पास 17 सेमी लंबाई और 21 सेमी चौड़ाई का चार्ट पेपर है। वह उससे अधिकतम कितने डिस्क काट सकती है? साथ ही सभी डिस्क का संयुक्त क्षेत्रफल ज्ञात कीजिए। For her school project, Meera needs circular disks of radius 2 cm each. She has a chart paper of length 17 cm & breadth 21 cm. How many maximum disks can she cut out from it? Also find combined area of all the disks. ( $\pi=3.14$ )



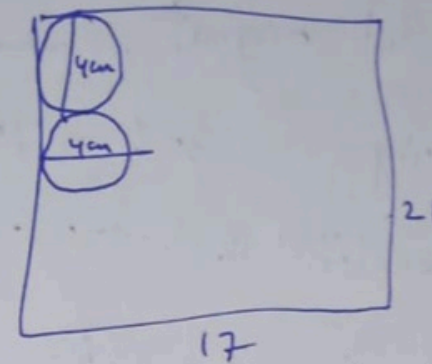


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Q11

$$r = 2 \text{ cm}$$

$$d = 4 \text{ cm}$$



Along length 17 cm

$$\text{no. of disk} = \left\lfloor \frac{17}{4} \right\rfloor = 4$$

$$\text{Along breadth} = \left\lfloor \frac{21}{4} \right\rfloor = 5$$

$$\text{Total disk} = 4 \times 5 = 20 \text{ disks.}$$

$$\text{Area of one disk} = \pi r^2$$

$$= 3.14 \times (2)^2$$

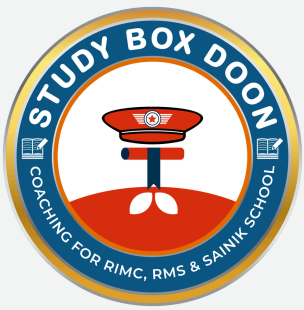
$$= 3.14 \times 4$$

$$= 12.56 \text{ cm}^2$$

Combined area for 20 disks

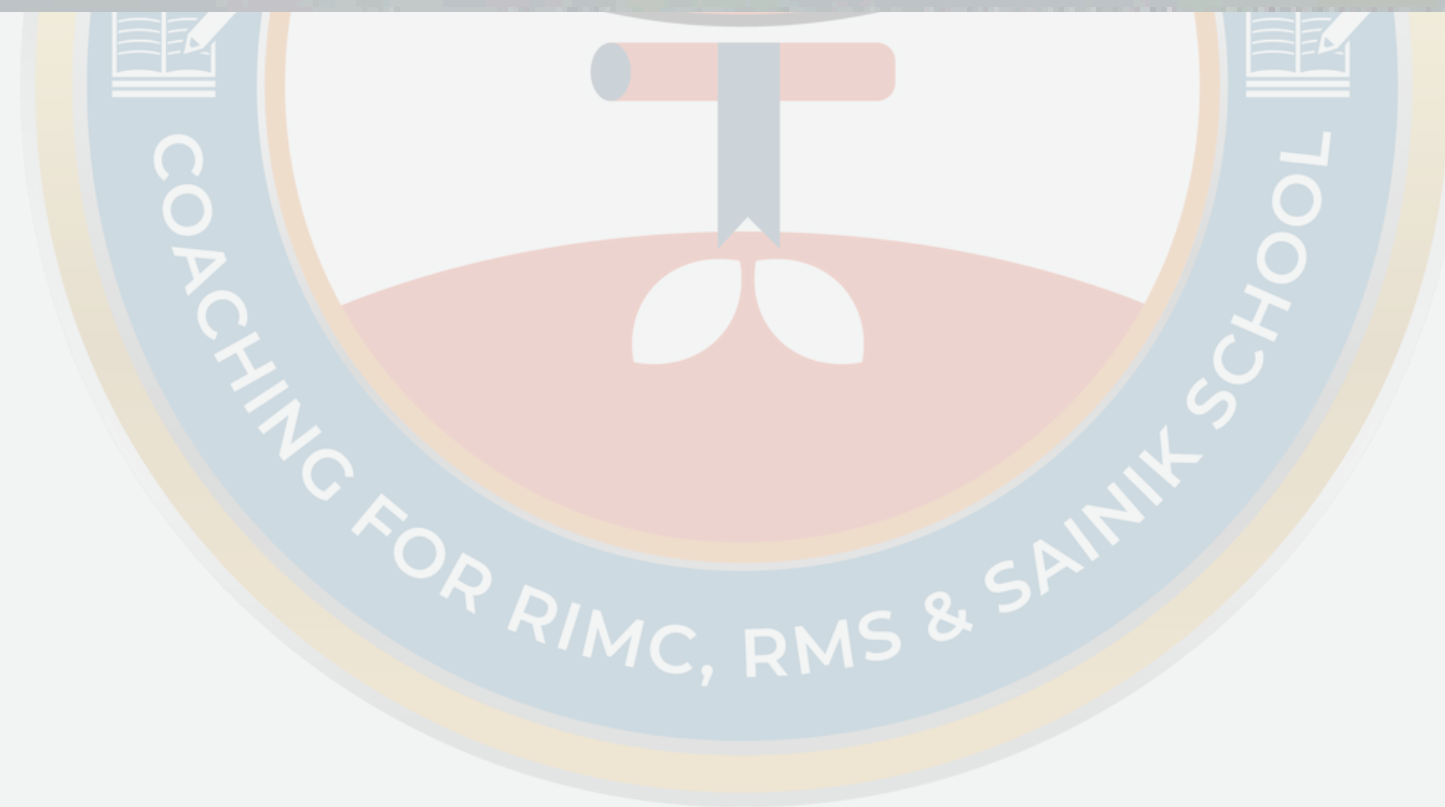
$$= 20 \times 12.56$$

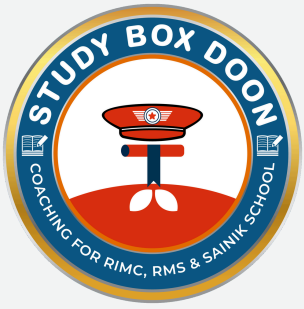
$$251.2 \text{ cm}^2$$



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Q.12 एक परिवार में, एक व्यक्ति अपनी आय का 30% बचाता है। यदि उसकी वेतन में 20% वृद्धि होती है और बचत 20% घट जाती है, तो खर्च में प्रतिशत वृद्धि ज्ञात कीजिए। In a family, a person saves 30% of his income. If his salary is increased by 20% & saving is decreased by 20%, then find the percentage increase in the expenditure?





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Soln

let original income = 100 unit

$$\text{Savings} = 30\% \text{ of } 100 = 30$$

$$\text{Expenditure} = 100 - 30 = 70$$

New income after 20% increase

$$= 100 + 20\% \text{ of } 100 \\ = 120$$

New saving after 20% decrease

$$30 - 20\% \text{ of } 30$$

$$30 - \frac{20}{100} \times 30$$

$$= 24$$

$$\text{New Expenditure} = \text{New income} - \text{New saving}$$

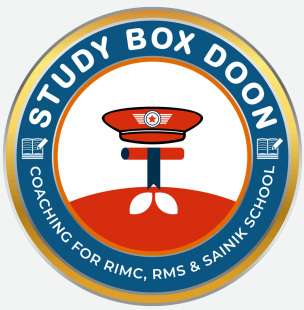
$$120 - 24$$

$$= 96$$

$$\text{Percentage increase in Expenditure} = \frac{26}{70} \times 100$$

$$= \frac{260}{7}$$

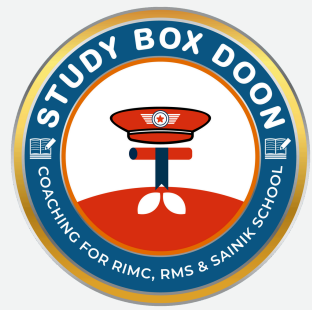
$$37.14\%$$



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Q.13 1 और  $(11)^{11}$  के बीच सभी अभाज्य संख्याओं के गुणनफल का इकाई अंक ज्ञात करें? Find the unit digit of the product of all prime numbers between 1 &  $(11)^{11}$  ?





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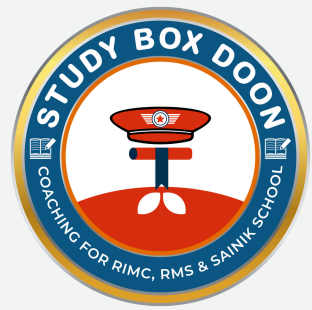
Soll 13

Prime no:- between 1 & 11"

= 2, 3, 5, - - - - -

Product is unit digit  $= 2 \times 5$   
 $= 10$

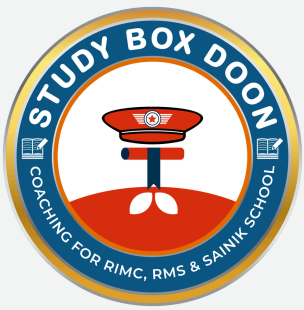
Unit digit = 0.



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Q.14 निम्नलिखित प्रश्नों के उत्तर दें:-Answer the following questions:-

- (a) जिस संख्या को आमतौर पर 'टैक्सी कैब संख्या' के रूप में जाना जाता है, उसके अंकों का योग क्या है? What is the sum of digits of the number popularly known as 'Taxicab Number'?
- (b)  $22/7$  एक परिमेय संख्या है या अपरिमेय संख्या?  $\frac{22}{7}$  is rational or irrational number?
- (c) पिरामिड के आधार का आकार कैसा होता है? What is the shape of the base of a pyramid?
- (d) पूर्ण संख्या क्या होती है? What is a perfect number?
- (e) पहले 10 प्राकृतिक संख्याओं का लघुतम समापवर्त्य (LCM) क्या है? LCM of first 10 natural number is?



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Q. 14 (a)

Taxi cab Number ~~1729~~  
= 1729

Sum of digit =  $1 + 7 + 2 + 9$   
= 19

(b)  $\frac{22}{7}$  is rational number ( $\frac{p}{q}$ ,  $q \neq 0$  form)

(c) A pyramid have different base according to its type

Type of pyramid	base
Square pyramid	Square-base
Triangular pyramid	Triangular.
Pentagonal pyramid	Pentagonal.

(d) Perfect number is a positive integer that equals to the sum of its own proper divisor  
Example: 6

divisor 1, 2, 3  
=  $1 + 2 + 3 = 6$

(e) LCM of 1, 2, 3, 4, 5, 6, 7, 8, 9, 10

LCM 2, 4, 8  $\rightarrow 8$

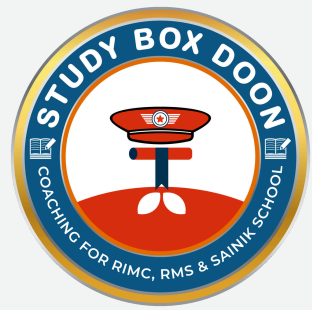
LCM 1, 3, 6  $\rightarrow 6$

LCM 5, 10  $\rightarrow 10$

LCM 7, 9  $\rightarrow 63$

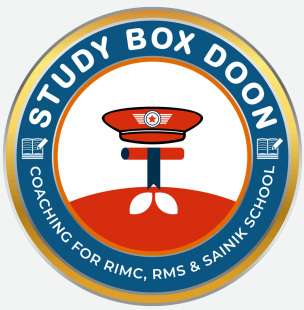
LCM (8, 6, 10, 63)  
=  $8 \times 9 \times 35$   
= 2520

2	8, 6, 10, 63
2	4, 3, 5, 63
2	2, 3, 5, 63
3	1, 3, 5, 63
3	1, 1, 5, 21
5	1, 1, 5, 7
7	1, 1, 1, 7
	1, 1, 1, 1



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Q.15 सुलझारै / Solve :  $2^{2x+3} - 9 \times 2^x + 1 = 0$ .



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Q15

$$2^{2x+3} - 9 \times 2^x + 1 = 0$$

$$2^{2x} \cdot 2^3 - 9 \times 2^x + 1 = 0$$

$$8 \cdot 2^{2x} - 9 \cdot 2^x + 1 = 0$$

$$8 \cdot (2^x)^2 - 9 \cdot 2^x + 1 = 0$$

$$\text{let } 2^x = t$$

$$8(t)^2 - 9t + 1 = 0$$

$$8t^2 - 9t + 1 = 0$$

$$8t^2 - 8t - t + 1 = 0$$

$$8t(t-1) - 1(t-1) = 0$$

$$(t-1)(8t-1) = 0$$

$$t = 1, \quad 8t = 1 \\ t = \frac{1}{8}$$

$$2^x = 1$$

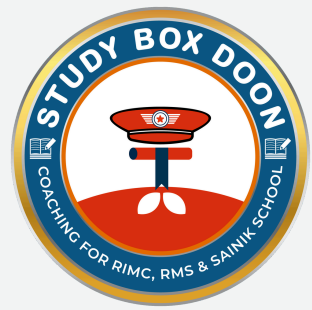
$$2^x = 2^0$$

$$\boxed{x = 0}$$

$$2^x = \frac{1}{8} = \frac{1}{2^3}$$

$$2^x = 2^{-3}$$

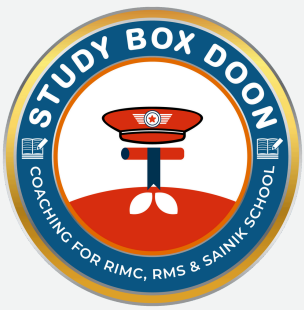
$$\boxed{x = -3}$$



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Q.16 एक आदमी को फरवरी 2009 के महीने के लिए टाइपिस्ट के रूप में नियुक्त किया गया था। उसे प्रति दिन ₹500 का वेतन दिया जाता था, लेकिन जिन दिनों वह अनुपस्थित रहता, उनके लिए प्रति दिन ₹100 की कटौती की जाती थी। उसे महीने के लिए ₹9100 वेतन प्राप्त हुआ। उसने कितने दिन काम किया? A man was engaged as typist for the month of February in 2009. He was paid Rs 500 per day, but Rs 100 per day were deducted for the days he remained absent. He received Rs 9100 as salary for the month. How many days did he work?





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Qall 16

February 2009 (not a leap year).  
Total day = 28

Pay per working day = 500

Deduction per day = 100

Total salary required = 9100

let  $x$  number of working

absent days =  $28 - x$

salary  $\rightarrow$

$$500x - (28 - x) \times 100 = 9100$$

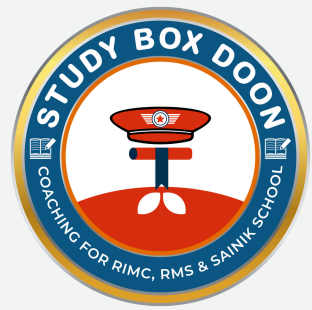
$$500x - 2800 + 100x = 9100$$

$$500x + 100x = 2800 + 9100$$

$$600x = 11900$$

$$x = \frac{119}{6}$$

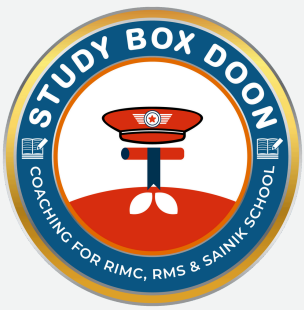
$$x = 19.83 \text{ days.}$$



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Q.17 आठ पुरुष 6 घंटे प्रतिदिन काम करके 14 दिनों में एक खेत खोद सकते हैं। 8 पुरुष उसी खेत को 8 घंटे प्रतिदिन काम करके कितने दिनों में खोद सकते हैं? Eight men can dig a field in 14 days working 6 hours a day. In how many days can 8 men dig the same field working 8 hours a day?





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Sol 17

$$M_1 = 8$$

$$D_1 = 14$$

$$H_1 = 6$$

$$M_2 = 8$$

$$D_2 = ?$$

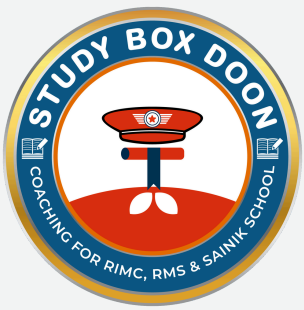
$$H_2 = 8$$

$$M_1 D_1 H_1 = M_2 D_2 H_2$$

$$8 \times 14 \times 6 = 8 \times D_2 \times 8$$

$$D_2 = \frac{8 \times 14 \times 6}{8 \times 8} = \frac{21}{2}$$

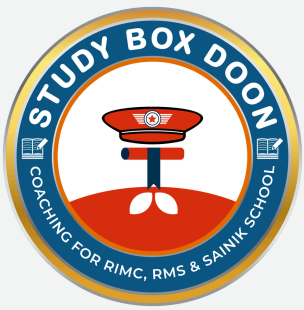
$$D_2 = 10.5 \text{ days}$$



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Q.18 एक कार के पहिए का व्यास 70 सेमी है। 77 किलोमीटर की दूरी तय करने के लिए यह कितने चक्कर लगाएगा? The diameter of a wheel of a car is 70 cm. How many revolutions will it make to travel 77 kms?





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Sol 18

$$D = 70 \text{ cm}$$

$$r = 35 \text{ cm}$$

$$= 0.35 \text{ m}$$

$$d = 77 \text{ kms} = 77 \times 1000 \text{ m} = 77000 \text{ m}$$

$$= 77000 \times 100 \text{ cm}$$

$$\text{distance covered in one revolution} = 2\pi r$$
$$= 2 \times \frac{22}{7} \times 0.35$$

$$44 \times 0.05$$

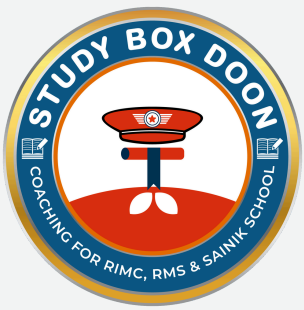
$$44 \times \frac{5}{100}$$

$$= \frac{220}{100}$$

$$= 2.2 \text{ m}$$

$$\text{Number of revolution} = \frac{77000}{2.2} \times 100$$

$$35000 \text{ revolutions.}$$

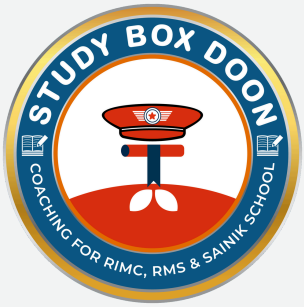


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- ✓ Q.19 अजय और विजय मिलकर एक शेड 12 दिनों में बना सकते हैं। अजय अकेला इसे 20 दिनों में बना सकता है। 523  
विजय अकेला वही काम करने में कितना समय लेगा? Ajay and Vijay together can erect a shed in 12 days. Ajay  
alone can do it in 20 days. How much time would Vijay alone take to do the same work?
- Q.20 259875 को सबसे छोटे संख्या में विभाजित करें।







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Soll 19

20 A → 3  
30 V → 2  
12 A+V → 5

60

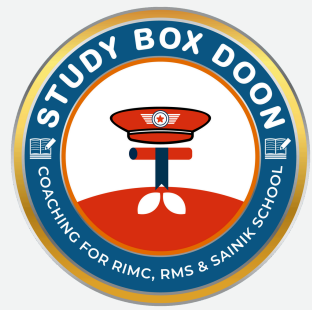
$\frac{4}{20, 12}$   
 $\frac{5}{5, 3}$   
 $\frac{3}{1, 3}$

~~20 days~~ = 30 days

Soll 19

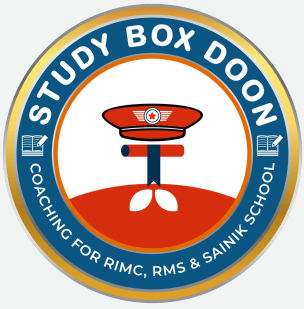
A + V → 12 days  
 $\text{Eff}_{A+V} \rightarrow \frac{1}{12}$   
A → 20 day  
 $E_A \rightarrow \frac{1}{20}$   
 $\text{Eff}_{A+V} \rightarrow E_A + E_V$   
 $\frac{1}{12} = \frac{1}{20} + E_V$   
 $\frac{1}{12} - \frac{1}{20} = E_V$   
 $\frac{5-3}{60} = E_V$   
 $\frac{2}{60} = E_V$   
 $\frac{1}{30} = E_V$   
 $T_V \rightarrow 30$  ✓





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Q.20 259875 को सबसे छोटे संख्या से विभाजित करें ताकि भागफल एक पूर्ण घन हो। इसके अलावा, भागफल का घनमूल निकालें। / Divide 259875 by the smallest number so that the quotient is a perfect cube. Also find the cube root of the quotient.



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Q 20 :-

Q. Given number = 259875

Prime factorization  
 $= 3^3 \times 5^3 \times 7 \times 11$

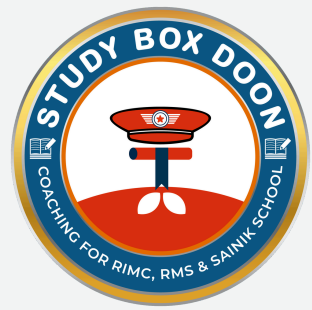
Required number ~~which is~~ for dividing  
the given number to get a  
perfect cube =  $7 \times 11 = 77$

3	259875
3	86625
3	28875
5	9625
5	1925
5	385
7	77
11	11
	1

$$\frac{259875}{77} = \frac{3^3 \times 5^3 \times 7 \times 11}{7 \times 11} = 3^3 \times 5^3 \rightarrow \text{quotient.}$$

cube root of  $\sqrt[3]{3^3 \times 5^3}$

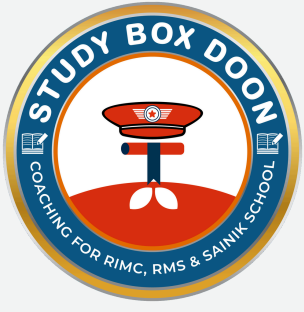
$$= 3 \times 5 = 15 \quad \underline{\underline{Ans}}$$



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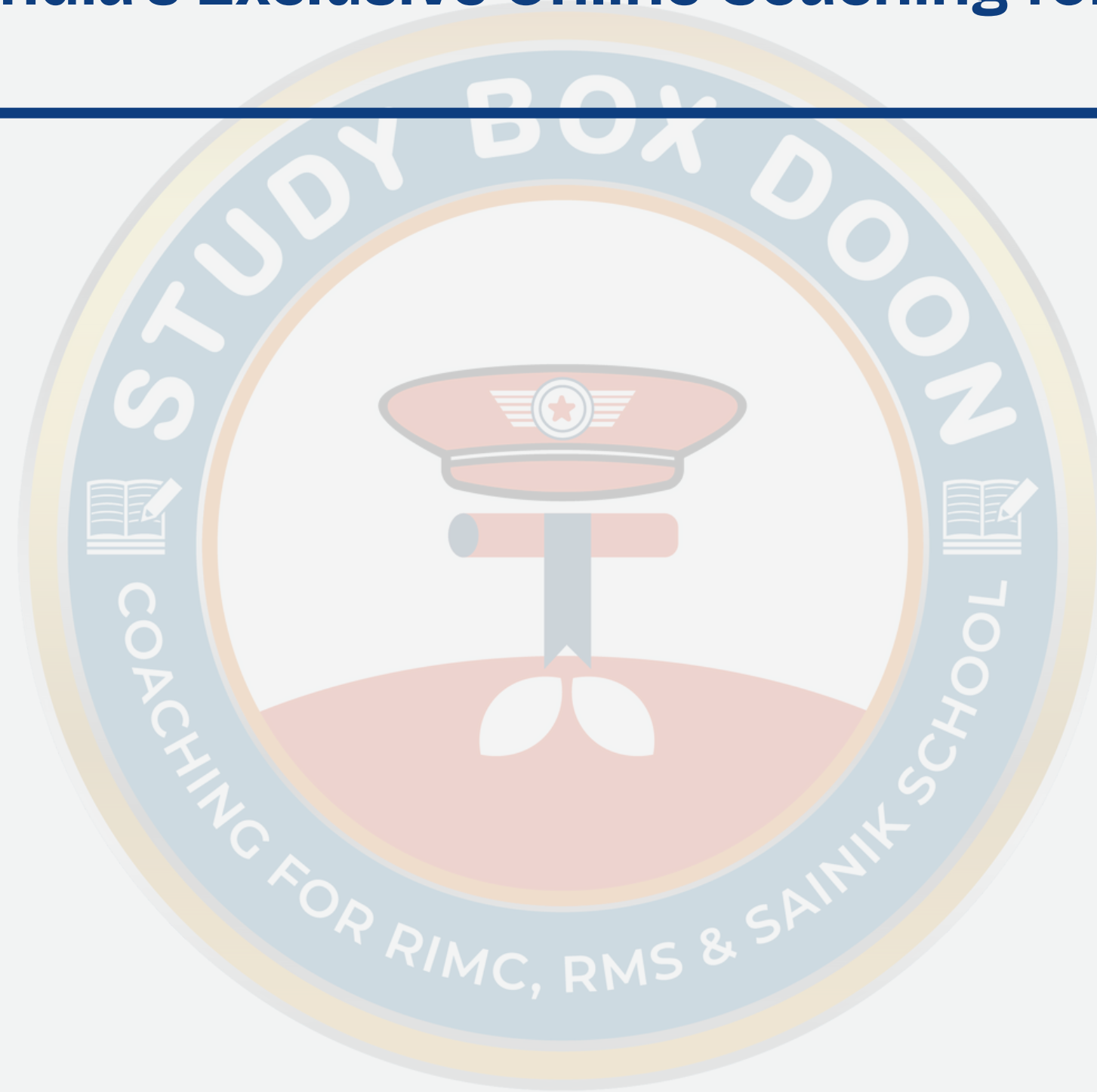
Q.21 केवल अंकों 1 और 0 से बने 225 से विभाज्य सबसे छोटे संख्या के अंकों का योग निकालें। Find the sum of the digits of the smallest number divisible by 225 & consisting of only the digits 1 & 0.

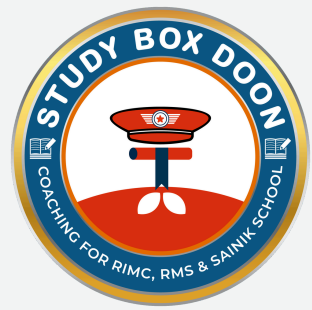




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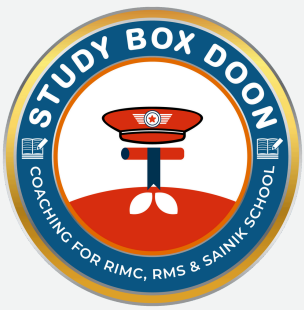




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Q.22 एक चोर ने 525 मीटर की दूरी से एक पुलिस वाले को देखा और 18 किमी/घंटा की गति से दौड़ना शुरू किया। पुलिस वाले ने तुरंत उसे 27 किमी/घंटा की गति से पीछा किया। चोर को पकड़ने के लिए पुलिस वाले द्वारा तय की गई दूरी का दोगुना कितना होगा? A thief seeing a policeman from a distance of 525 metres started running at a speed 18 km/hr. the policeman chased him immediately with a speed of 27 km/hr. What is twice the distance covered by the policeman to catch the thief?





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Soln

$$d = 525$$

$$\begin{aligned}\text{Thief's speed} &= 18 \text{ km/hr} \\ &= 18 \times \frac{5}{18} \text{ m/s} = 5 \text{ m/s}.\end{aligned}$$

$$\begin{aligned}\text{Police man's speed} &= 27 \text{ km/hr} \\ &= \frac{27 \times 5}{18} = 7.5 \text{ m/s}.\end{aligned}$$

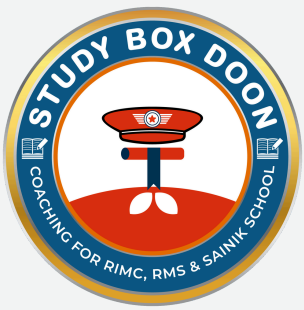
$$\text{Relative speed} = 7.5 \text{ m/s} - 5 \text{ m/s} = 2.5 \text{ m/s}$$

$$T = \frac{D}{S} = \frac{525}{2.5} = \frac{525}{2.5} \times 10 = 210 \text{ sec}$$

Distance covered by policeman = Speed  $\times$  Time

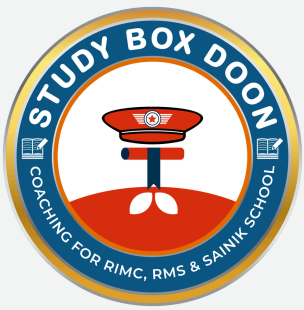
$$\begin{aligned}&7.5 \times 210 \\ &= 1575 \text{ m}\end{aligned}$$

$$\begin{aligned}\text{Twice the distance} &= 2 \times 1575 \\ &= 3150 \text{ m, } \underline{\underline{A_2}}\end{aligned}$$



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Q.23 दो वर्षों के लिए 10000/- रुपये पर वार्षिक  $R_s\%$  के कुल साधारण ब्याज और वार्षिक  $R_c\%$  के कुल चक्रवृद्धि ब्याज बराबर हैं। यदि  $R_s$  और  $R_c$  पूर्णांक हैं, तो  $R_s$  और  $R_c$  के बीच न्यूनतम अंतर ज्ञात करें। The total SI at  $R_s\%$  per annum and the total CI at  $R_c\%$  per annum for 2 years on Rs 10000/- are equal. If  $R_s, R_c$  are integers, then find the minimum difference between  $R_s$  &  $R_c$ .



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Ques 23

$$P = 10,000$$

$R_s \rightarrow$  Rate % of SI

$R_c \rightarrow$  Rate % of CI

$T = 2$  years.

$$CI = SI$$

$$P \left( 1 + \frac{R_c}{100} \right)^2 - P = \frac{P \times R_s \times T}{100}$$

$$P \left[ \left( 1 + \frac{R_c}{100} \right)^2 - 1 \right] = \frac{P \times R_s \times 2}{100}$$

$$\left( 1 + \frac{R_c}{100} \right)^2 - 1 = \frac{R_s \times 2}{100}$$

$$1 + \frac{R_c^2}{100^2} + \frac{2R_c}{100} - 1 = \frac{2R_s}{100}$$

$$\frac{R_c^2}{100^2} + \frac{2R_c}{100} = \frac{2R_s}{100}$$

$$\frac{R_c^2}{100} + 2R_c = 2R_s$$

$$R_c^2 + 200R_c = 200R_s$$

$$R_c^2 = 200(R_s - R_c)$$

$$\frac{R_c^2}{200} = R_s - R_c$$

$$R_c^2 = 200(R_s - R_c)$$

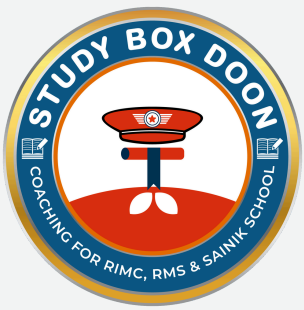
To get a integer

$$R_c^2 = 200 \times 2$$

$$R_c^2 = 400$$

$$R_c = 20$$

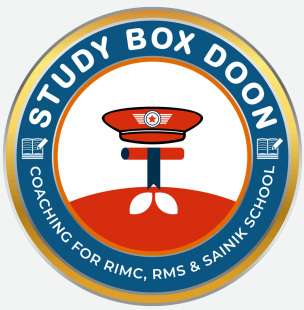
$$\Rightarrow \boxed{R_s - R_c = 2\%}$$



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Q.24 मान लें / Let  $x + \frac{1}{x} = \sqrt{3}$  ; फिर इसका मान ज्ञात करें: then find the value of:

- (a)  $x^3 + \frac{1}{x^3}$
- (b)  $x^6$
- (c)  $x^{50}$
- (d)  $x^{50} + \frac{1}{x^{50}}$



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Soll 24

(a)  $x + \frac{1}{x} = \sqrt{3}$

$$x^3 + \frac{1}{x^3} + 3x \times \frac{1}{x} \left( x + \frac{1}{x} \right) = (\sqrt{3})^3$$

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

$$\boxed{x^3 + \frac{1}{x^3} = 0}$$

(b)  $\frac{x^6 + 1}{x^3} = 0$

$$x^6 + 1 = 0$$

$$\boxed{x^6 = -1}$$

(c)  $x^{50} = ?$

we have  $x^6 = -1$

$$x = (-1)^{\frac{1}{6}}$$

$$x^{50} = (-1)^{\frac{50}{6}}$$

$$x^{50} = (-1)^{\frac{25}{3}}$$

$$(-1)^8 \times (-1)^{\frac{1}{3}}$$

$$x^{50} = (-1)^{\frac{1}{3}}$$

(d)  $x^{50} + \frac{1}{x^{50}}$

$$= x^{48} \cdot x^2 + \frac{1}{x^{48} \cdot x^2}$$

$$(x^6)^8 \cdot x^2 + \frac{1}{(x^6)^8 \cdot x^2}$$

$$(-1)^8 \cdot x^2 + \frac{1}{(-1)^8 \cdot x^2}$$

$$x^2 + \frac{1}{x^2}$$

we have  $x + \frac{1}{x} = \sqrt{3}$

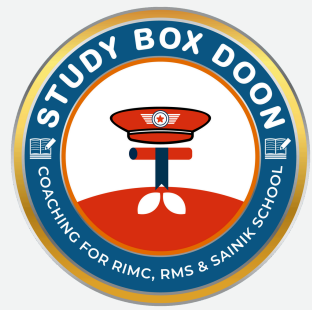
square

$$x^2 + \frac{1}{x^2} + 2x \times \frac{1}{x} = (\sqrt{3})^2$$

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

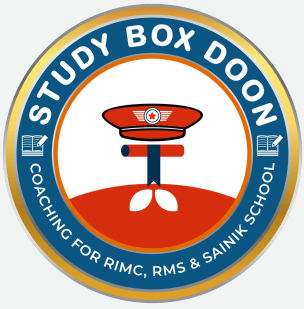
$$= 1 \text{ Ans}$$





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Q.25 रश्मि अपनी दो कलाई घड़ियाँ प्रत्येक ₹12,600/- में बेचती हैं। पहली घड़ी पर उसे 26% का लाभ होता है और दूसरी पर 10% का नुकसान होता है। कुल मिलाकर लाभ या नुकसान का प्रतिशत निकालें। Rashmi sells her two wrist watches for Rs 12,600/- each. On the first watch, she gains 26% & on the second, she loses 10%. Find the overall gain or loss percentage.



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Ques 26

$l \rightarrow$  Length  
 $B \rightarrow$  Breadth } original

$$2[L+B] = 240$$

$$L+B = 120 \rightarrow (i)$$

$L$  is increased by 10% |  $B$  is decreased by 20%

$$L' = \frac{110}{100} L$$

$$L' = 1.1 L$$

$$B' = \frac{80}{100} B$$

$$B' = 0.8 B$$

New new perimeter is same.

$$2[L'+B'] = 240$$

$$2[1.1L + 0.8B] = 240$$

$$1.1L + 0.8B = 120$$

$$\frac{11L}{10} + \frac{8B}{10} = 120$$

$$11L + 8B = 1200 \rightarrow (ii)$$

Multiply Eqn (i)  $\times 8$  and subtract from (ii)

$$11L + 8B = 1200$$

$$8L + 8B = 960$$

$$\frac{3L}{3} = \frac{240}{3}$$

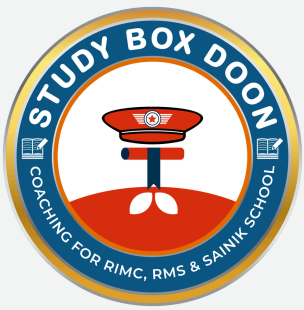
$$L = 80 \text{ cm}$$

$$L+B = 120$$

$$80+B = 120$$

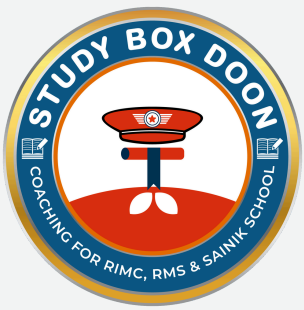
$$B = 120 - 80$$

$$B = 40 \text{ cm}$$



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Q.26 एक आयत का परिमाप 240 सेमी है। यदि इसकी लंबाई 10% बढ़ाई जाए और लंबाई को 20% घटाया जाए, तो हमें वही परिमाप मिलता है। आयत की लंबाई और चौड़ाई ज्ञात कीजिए। The perimeter of a rectangle is 240 cm. If its length is increased by 10% and breath is decreased by 20%, then we get the same perimeter. Find the length & breadth of the rectangle.



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Ques 26

$l \rightarrow$  Length  
 $B \rightarrow$  Breadth } original

$$2[L+B] = 240$$

$$L+B = 120 \quad \text{---(i)}$$

$L$  is increased by 10%       $B$  is decreased by 20%

$$L' = \frac{110}{100} L$$

$$L' = 1.1 L$$

$$B' = \frac{80}{100} B$$

$$B' = 0.8 B$$

New new perimeter is same.

$$2[L'+B'] = 240$$

$$2[1.1L + 0.8B] = 240$$

$$1.1L + 0.8B = 120$$

$$\frac{11L}{10} + \frac{8B}{10} = 120$$

$$11L + 8B = 1200 \quad \text{---(ii)}$$

Multiply Eqn (i)  $\times 8$  and subtract from (ii)

$$11L + 8B = 1200$$

$$8L + 8B = 960$$

$$\hline 3L = 240$$

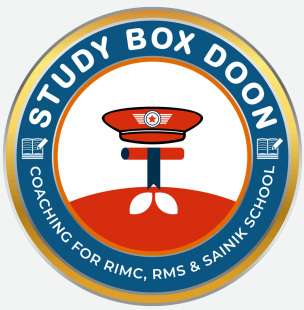
$$L = 80 \text{ cm}$$

$$L+B = 120$$

$$80+B = 120$$

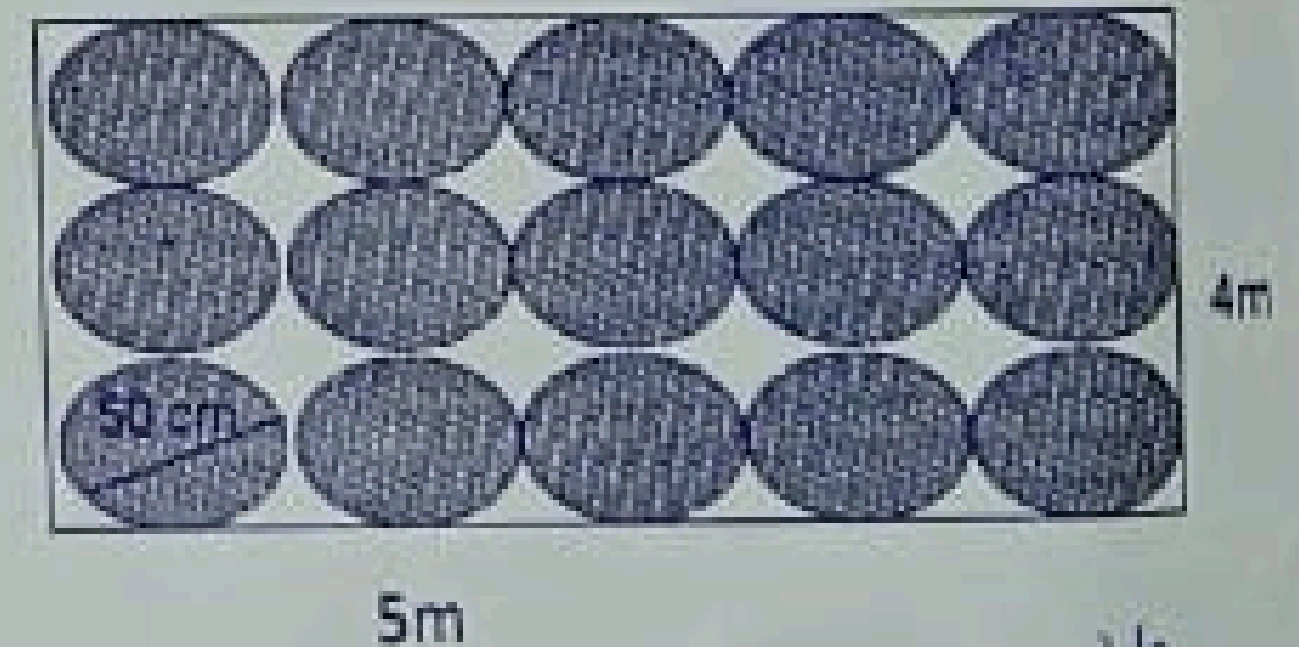
$$B = 120 - 80$$

$$B = 40 \text{ cm}$$

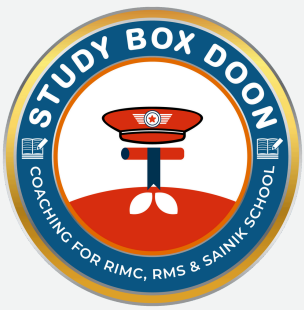


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Q.27 कक्ष का फर्श 5 मीटर x 4 मीटर के माप का है और यह 50 सेमी व्यास वाली गोल टाइलों से ढका हुआ है, जैसा कि चित्र में दिखाया गया है। फर्श का वह क्षेत्रफल ज्ञात करें जो टाइलों से ढका नहीं है। Floor of a room has dimensions 5m x 4m and it is covered with circular tiles of diameter 50 cm each as shown in figure. Find the area of the floor that remains uncovered with tiles?







Sol 27 Area of floor =  $5m \times 4m = 20m^2$

$$D = 50cm = 0.50m$$

$$r = \frac{0.50}{2} = 0.25m$$

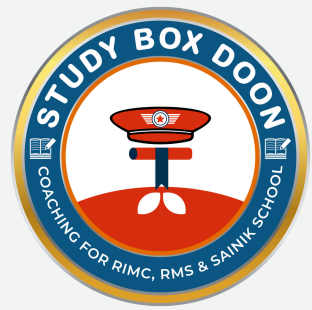
$$\begin{aligned} \text{Area of each tile} &= \pi r^2 \\ &= 3.14 \times (0.25)^2 \end{aligned}$$

$$\begin{aligned} \text{Area of 15 Tile} &= 3.14 \times 15 \times 0.0625 \\ &= 2.94 m^2 \end{aligned}$$

Area of floor that remain uncovered

$$= 20m^2 - 2.94m^2$$

$$= 17.06 m^2$$

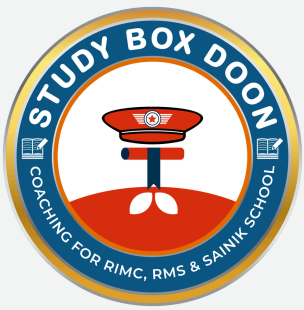


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Q.28 घटक करें / Factorize :

(a)  $3x^2y - 3xy + 12x - 12$

(b)  $15(x - 2y)^2 - 8(x - 2y) - 16$



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Sol 28

(a)  $3x^2y - 3xy + 12x - 12$

$$3xy(x-1) + 12(x-1)$$

$$(x-1)(3xy+12) \quad \star$$

(b)  $15(x-2y)^2 - 8(x-2y) - 16$

let  $x-2y = t$

$$\Rightarrow 15t^2 - 8t - 16$$

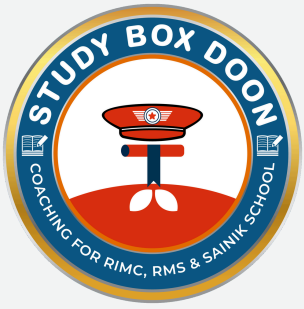
$$15t^2 - 20t + 12t - 16$$

$$5t(3t-4) + 4(3t-4)$$

$$(3t-4)(5t+4)$$

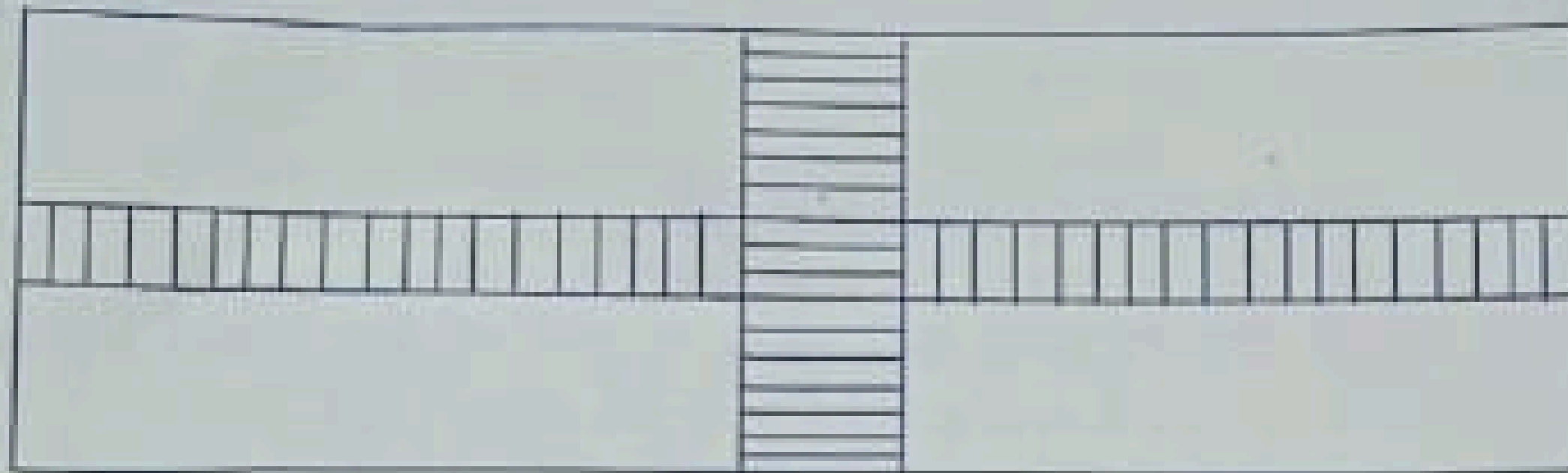
$$[3(x-2y)-4][5(x-2y)+4]$$

$$[3x-6y-4][5x-10y+4] \quad \star$$

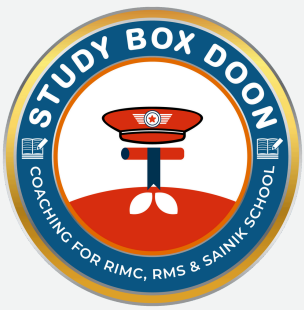


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Q.29. एक आयताकार बगीचा जिसकी लंबाई 90 मीटर और चौड़ाई 50 मीटर है, उसे दो क्रॉस-मार्गों द्वारा चार बराबर हिस्सों में बाँटा गया है, जिनकी चौड़ाई 3.5 मीटर है। क्रॉस मार्ग का क्षेत्रफल और चार बराबर हिस्सों का क्षेत्रफल ज्ञात कीजिए। A rectangular garden 90m by 50m is divided into four equal parts by two cross-paths 3.5m wide. Find the area of the cross path and the area of four equal parts.







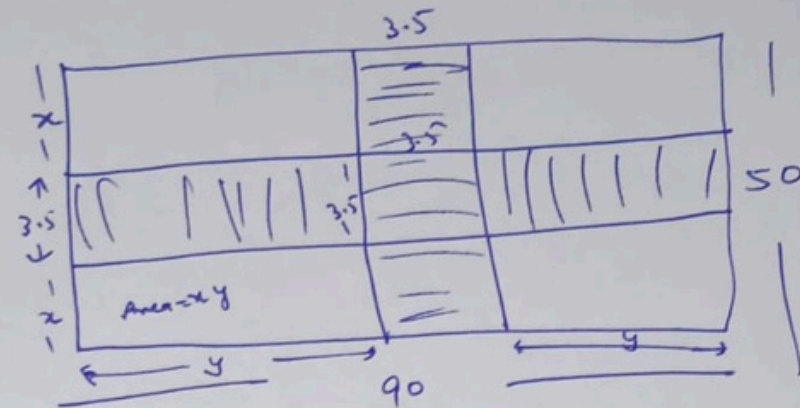
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Ques 29

$$2x + 3.5 = 50$$

$$2x = 46.5$$

$$x = 23.25$$



$$2y + 3.5 = 90$$

$$2y = 86.5$$

$$y = 43.25$$

$$\begin{aligned} \text{Area of cross path along length} &= 3.5 \times 90 \\ &= 315 \text{ m}^2 \end{aligned}$$

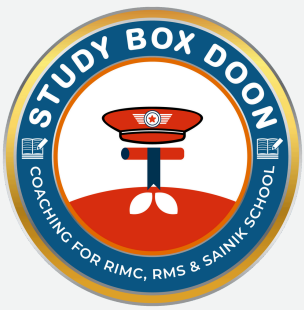
$$\begin{aligned} \text{Area of cross path along breadth} &= 3.5 \times 50 \\ &= 175 \text{ m}^2 \end{aligned}$$

$$\begin{aligned} \text{Area of region lie b/w along both along length \& breadth} &= (3.5)^2 \\ &= 12.25 \text{ m}^2 \end{aligned}$$

$$\begin{aligned} \text{Area of cross path} &= 315 + 175 - 12.25 \\ &= 477.75 \text{ m}^2 \end{aligned}$$

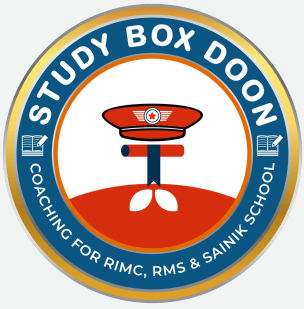
$$\begin{aligned} \text{Area of four equal parts} &= 4 \times x \times y \\ &= 4 \times 23.25 \times 43.25 \\ &= 4022.25 \text{ m}^2 \end{aligned}$$





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Q.30 एक कमरे का आकार 9 मी x 8 मी x 6.5 मी है। इसमें एक दरवाजा है जिसका आकार 2 मी x 1.5 मी है और तीन खिड़कियाँ हैं, प्रत्येक का आकार 1.5 मी x 1 मी है। दीवारों को सफेद रंग करने की लागत Rs 38 प्रति वर्ग मीटर दर से निकालिए।? A room is 9 m x 8m x 6.5 m. It has one door of dimensions 2 m x 1.5 m and three windows each of dimensions 1.5 m x 1 m. Find the cost of white washing the walls at the rate of Rs 38 per m<sup>2</sup>?



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Sol<sup>n</sup>

$$l = 9\text{ m}, b = 8\text{ m}, h = 6.5\text{ m}$$

$$\begin{aligned}\text{C.S.A of wall} &= 2(l+b) \times h \\ &= 2[9+8] \times 6.5 \\ &= 2 \times 17 \times 6.5 \\ &= 221\text{ m}^2\end{aligned}$$

$$\begin{aligned}\text{Area of white washing} &= \text{C.S.A of wall} - \text{Area of door} \\ &\quad - 3 \times \text{Area of window}\end{aligned}$$

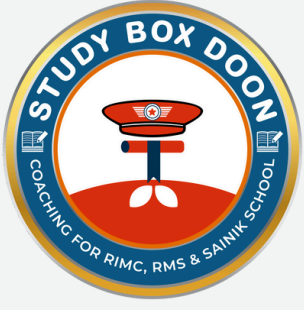
$$= 221 - 2 \times 1.5 - 3 \times 1.5 \times 1$$

$$= 221 - 3 - 4.5$$

$$= 213.5\text{ m}^2$$

$$\text{Rate of white washing} = \text{Rs } 30 \text{ per m}^2$$

$$\begin{aligned}\text{Total cost} &= 30 \times 213.5 \\ &= \text{Rs. } 6405\end{aligned}$$



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*Thank  
You*