$a : b = x : y$

1) $\frac{a}{b} = \frac{x}{y}$

2) $ay = bx$

* $\frac{a}{b} = \frac{x}{y} = \frac{a+x}{b+y}$ [Addends]

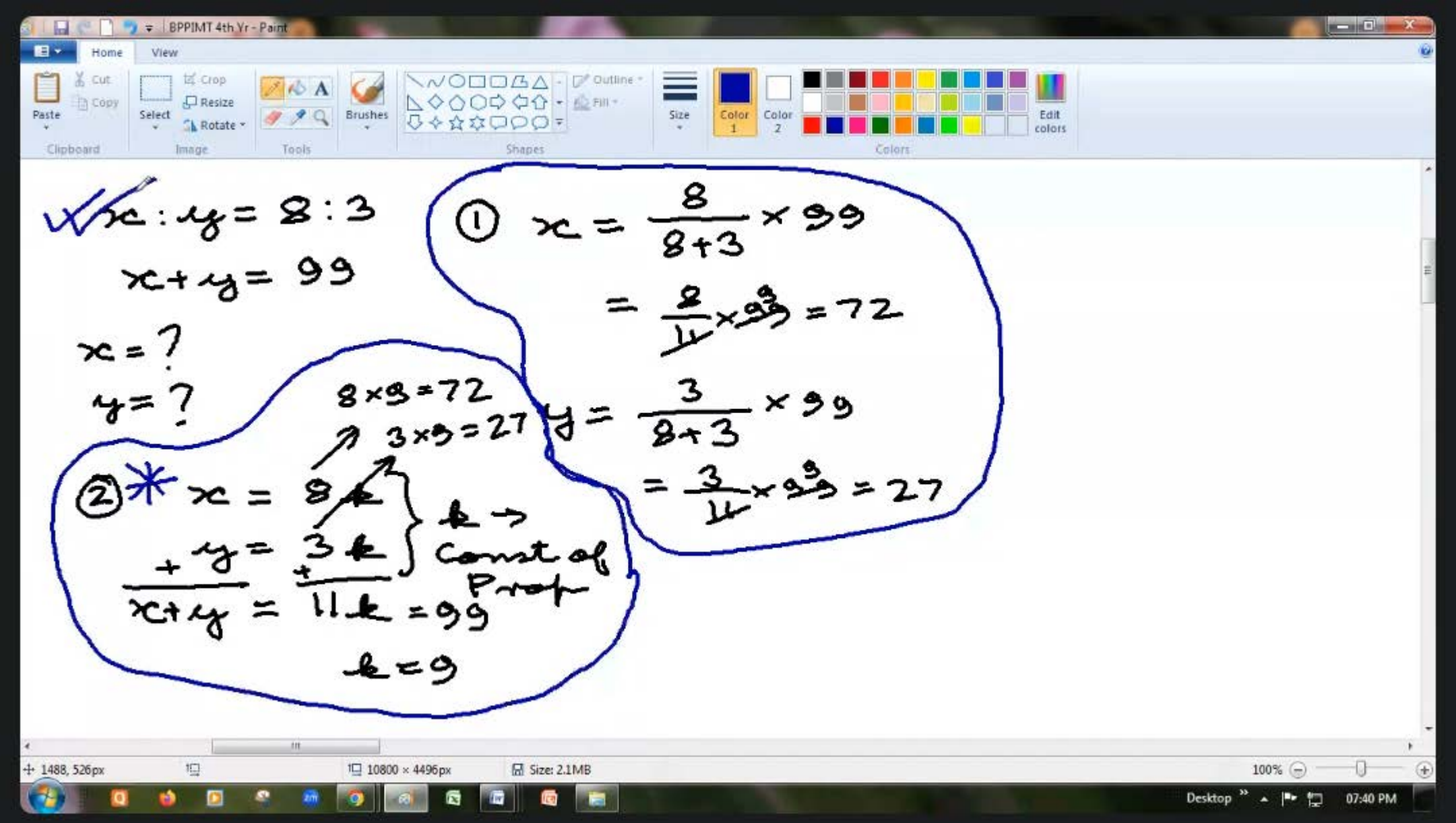
* $\frac{a-b}{a+b} = \frac{x-y}{x+y}$ [C & D]

$\frac{2}{3} = \frac{14}{21} = \frac{16}{24}$

$\frac{2}{3} = \frac{14}{21}$

$\frac{2-3}{2+3} = \frac{14-21}{14+21}$

$= \frac{-1}{5} \longleftrightarrow \frac{-7}{35}$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x : y = 8 : 3
x + y = 99
x = ?
y = ?
① x = 8/(8+3) × 99
= 8/11 × 99 = 72
y = 3/(8+3) × 99
= 3/11 × 99 = 27
② * x = 8k
y = 3k
x + y = 11k = 99
k = 9
8 × 9 = 72
3 × 9 = 27
k → Const of Prop
1488, 526px
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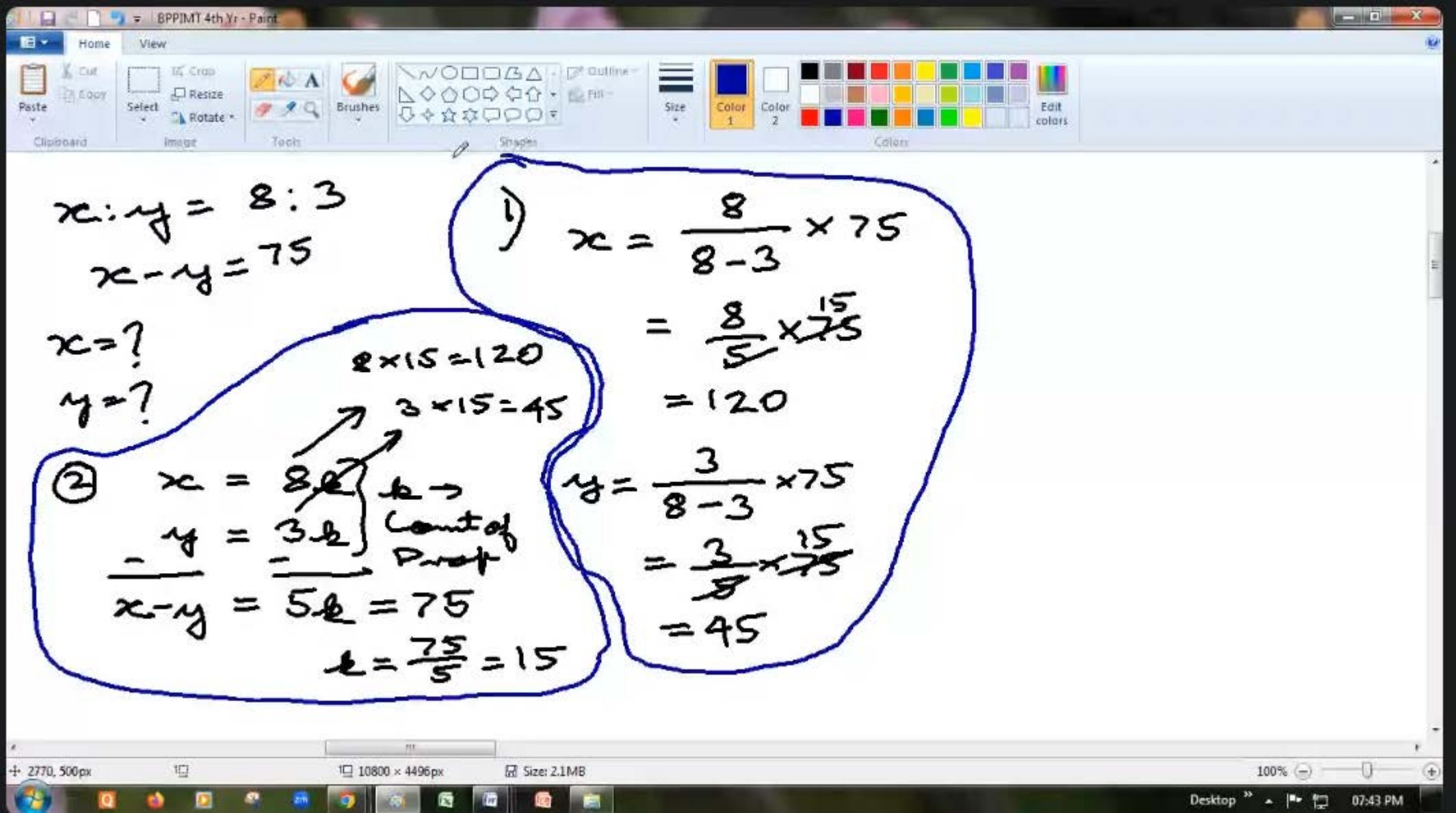
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Color 2
Edit colors
Clipboard
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Colors
x : y = 8 : 3
x - y = 75
x = ?
y = ?
1)
x = 8/(8-3) × 75
= 8/5 × 15 × 75
= 120
y = 3/(8-3) × 75
= 3/5 × 15 × 75
= 45
2)
8 × 15 = 120
3 × 15 = 45
x = 8k
y = 3k
k → Count of Part
x - y = 5k = 75
k = 75/5 = 15
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10800 × 4496px
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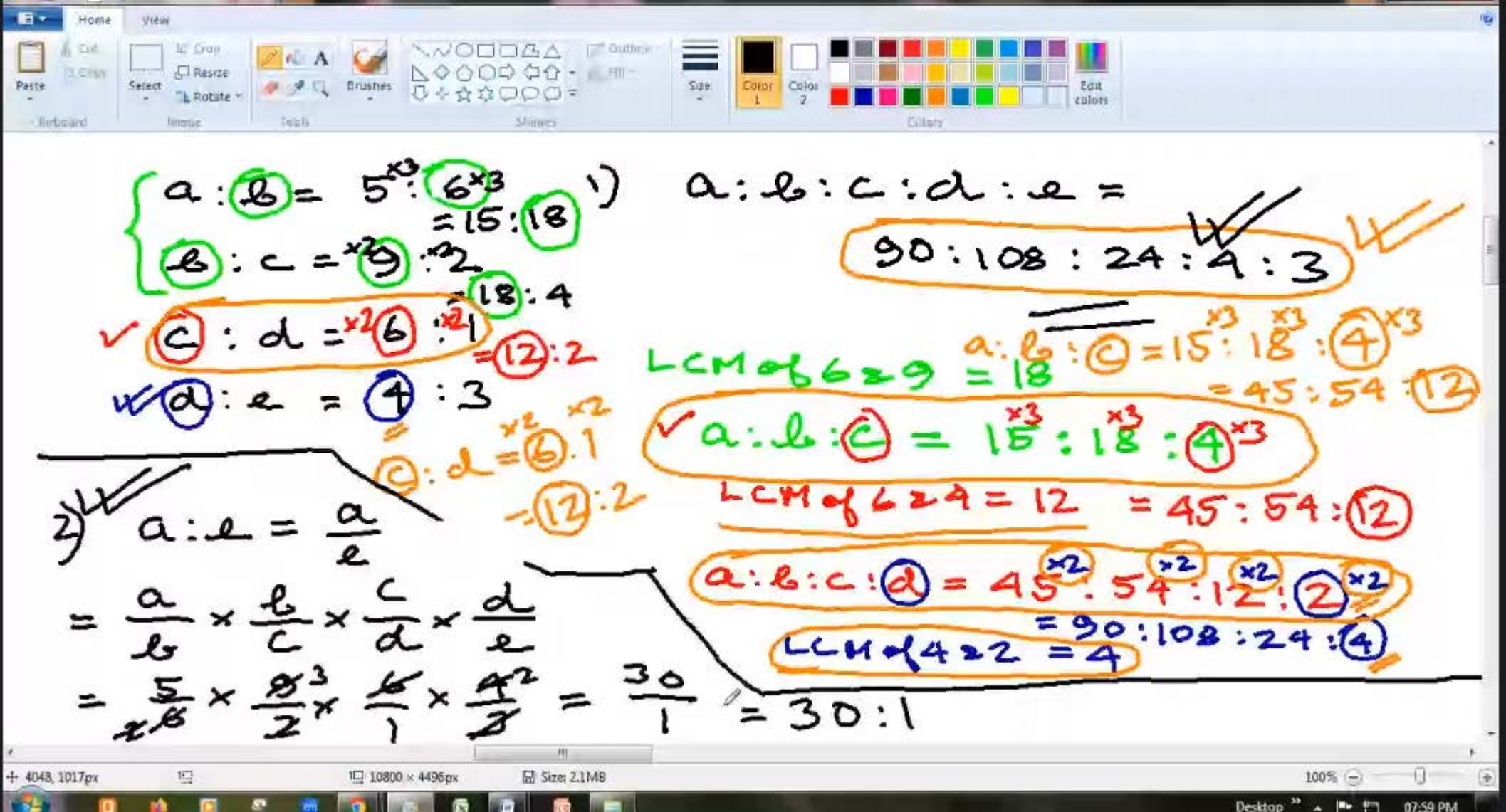

a : b = 5 : 6
= 15 : 18
b : c = 9 : 2
= 18 : 4
c : d = 6 : 1
= 12 : 2
d : e = 4 : 3
c : d = 6 : 1
= 12 : 2
a : e = a/e
= a/b × b/c × c/d × d/e
= 5/2b × 2b³/2 × 6/1 × 4²/3 = 30/1
= 30 : 1
a : b : c : d : e =
90 : 108 : 24 : 4 : 3
a : b : c = 15 : 18 : 4
= 45 : 54 : 12
LCM of 6 & 9 = 18
a : b : c = 15 : 18 : 4
LCM of 6 & 24 = 12
= 45 : 54 : 12
a : b : c : d = 45 : 54 : 12 : 2
= 90 : 108 : 24 : 4
LCM of 4 & 2 = 4

$3a = 4b = c = 6d = 2e$

$a : b : c : d : e$

$= 4 : 3 : 12 : 2 : 6$

LCM (3, 4, 1, 6, 2)

6 4 (12)

LCM = 12

$\frac{\text{LCM}}{\text{co-eff}}$

$x : y = 2 : 3$

1) Duplicate Ratio of $x : y$? :- $2^2 : 3^2 = 4 : 9$
2) Triplicate Ratio of $x : y$? :- $2^3 : 3^3 = 8 : 27$
3) Sub-Duplicate Ratio of $x : y$? :- $\sqrt{2} : \sqrt{3}$
4) Sub-Triplicate Ratio of $x : y$? :- $\sqrt[3]{2} : \sqrt[3]{3}$

1) Find the Third Prop. of 2 & 3 ?

↳ x

$2 : 3 = 3 : x$ (1, 2, 3) or, $2x = 9$ or, $x = 4.5$

2) Find the Mean Prop. of 2 & 3 ? G.M.

↳ y

$2 : y = y : 3$ or, $y^2 = 6$ or, $y = \sqrt{6}$

3) Find the Fourth Prop. of 2, 3 & 5 ?

↳ z

$2 : 3 = 5 : z$ (1, 2, 3, 4) or, $2z = 15$ or, $z = 7.5$

$P \propto Q$

$P = k_1 \times Q$

$P \propto \frac{1}{R}$

$P = k_2 \times \frac{1}{R}$

Th of Joint Variation

$$P \propto \frac{Q}{R}$$

- Given $a : b = 3 : 4$, find $\frac{2a + 3b}{3a + 4b}$

  (A) 14 : 25 (B) 16 : 25 (C) 9 : 25 (D) 18 : 25

- P, Q, R, S, T and U are natural numbers. $P : Q = 4$, $Q : R = \frac{1}{2}$, $R : S = \frac{1}{9}$, $S : T = 3$ and $T : U = \frac{1}{8}$. Find the value of PQR : STU.

  (A) 1 : 324 (B) 1 : 216
  (C) 1 : 432 (D) 1 : 648

- A bag has coins in the denominations of 50 p, 25 p and 20 p in the ratio 4 : 2 : 1. If the total value of the coins is ₹54, find the number of 25 p coins in the bag.

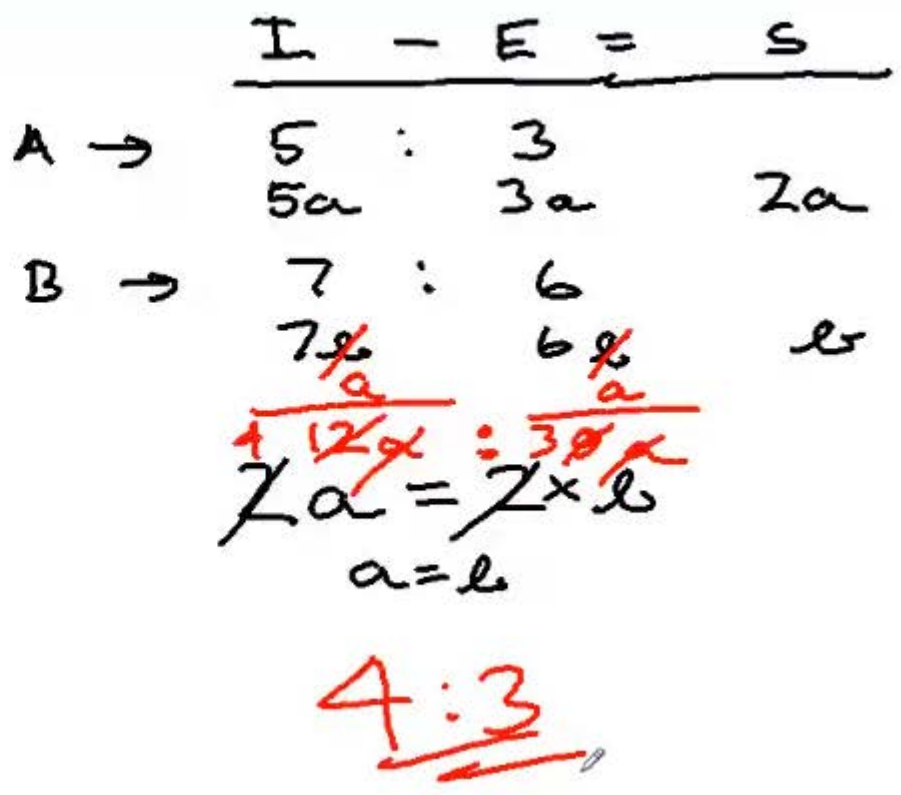
  (A) 20 (B) 30 (C) 40 (D) 50

- The ratio of earnings to expenditure of A is 5 : 3 and that of B is 7 : 6. If the savings of A is twice that of B, then what could be the ratio of total earnings of A and B together to the total expenditure of A and B together?

  (A) 4 : 3 (B) 3 : 5 (C) 5 : 3 (D) 2 : 1

- Number 85 is divided into two parts such that thrice the first part and twice the second part are in the ratio 18 : 5. Find the first part.

  (A) 48 (B) 55 (C) 45 (D) 60



- Anitha divided some chocolates among her three sons such that for every 4 chocolates that her eldest son got, her second son got 3 chocolates. For every 2 chocolates that her second son got, her third son got 3 chocolates. If her second son got 12 chocolates, find the total number of chocolates received by the other two sons.
  (A) 46 (B) 18 (C) 34 (D) 51

- An old man makes a will to divide his property among his wife and his two sons such that his wife gets half of the total amount received by his sons. His younger son gets a third of the total amount received by his wife and his elder son. If his wife gets ₹60000 worth of property more than the youngest son, find the total value of the property of the man. (in lakhs of rupees).
  (A) 5.40 (B) 6.00 (C) 4.80 (D) 7.20

- A number is divided into five parts. Twice the first part, thrice the second part and four times the fourth part are equal. Twice the second part, five times the third part and six times the last part are equal. Which of the following is always true if all the parts are integers?
  (A) The first part is a multiple of 72.
  (B) The second part is divisible by the fourth part.
  (C) The first part is a factor of the last part.
  (D) The product of the first and fourth parts is divisible by 30.

TCS

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$W + S_1 + S_2 = 240K + 300K + 180K$

$720K$

$2W = S_1 + S_2$ $\quad 3S_2 = W + S_1 = 7.2L$

$W - S_2 = 60K$

$W - \frac{3}{4}W = 60K$ $\quad \frac{1}{4}W = 60K$

$W = 240K$

$2W - S_2 = 3S_2 - W$

$3W = 4S_2$ $\quad W : S_2 = 4 : 3$

$S_2 = 180K$

$S_1 = 300K$

TCS

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TCS

A B C D E

$2A = 3B = 4D$

$2B = 5C = 6E$

LCM

2	4	6	15	8	18
2	2	3	15	4	9
3	1	3	15	2	9
	1	1	5	2	3

360

$4A = 6B = 15C = 8D = 18E$

$A : B : C : D : E = 90 : 60 : 24 : 45 : 20$

- There are five vessels, with equal capacities, each containing some milk. The quantities of milk in the 5 vessels are in the ratio 4 : 5 : 6 : 7 : 8. The total quantity of milk in the five vessels is equal to 75% of the total capacities of the 5 vessels. How many of the vessels are at least 64% full of milk?
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- A string is cut into two parts such that the ratio of the lengths of the complete string and the smaller part is 20 times the ratio of the lengths of the smaller part and the larger part. Find the ratio of the length of the string and the square of the length of the smaller part (taken in cm) if the longer part is 4 cm long
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(A) 1
(B) −1
(C) 2
(D) Either (B) or (C)

- The mean proportional between two numbers is 12. The third proportional of the same numbers is 96. Find the greater of the two numbers.
(A) 18
(B) 24
(C) 12
(D) 36

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- The volume of a cube varies directly with the cube of its side. If three cubes of sides 6 cm, 8 cm and 10 cm are taken together and melted to form a fourth cube, find the side of the fourth cube.
(A) 10 cm (B) 12 cm
(C) 14 cm (D) 16 cm

- The time taken by a group of workers to complete a piece of work varies directly with the amount of work to be done by them when the number of workers is constant and inversely as the number of workers in the group when the amount of work is constant. If 8 workers take 1/2 a day to plough 2 acres of a field, find the time taken by 16 workers to plough 8 acres of the field.
(A) 1/2 days (B) 1/4 days
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- The value of a diamond varies directly with the square of its weight. A diamond broke into three pieces whose weights were in the ratio 32 : 24 : 9. The loss caused due to the breakage was ₹25.44 lakhs. Find the initial value of the diamond (in lakhs of rupees).
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1. If incomes of A and B are in the ratio 4 : 5 and their expenditures are in the ratio 5 : 6, then who saves more?

2. Amar, Akbar and Antony were in a cold country. They wanted to make a bonfire. Amar contributed 5 wood logs, Akbar contributed 4 wood logs. Antony had no wood logs, so he contributed Rs 9 to Amar and Akbar. What money Amar should get?

3. I have one rupee coins, fifty paise coins and twenty-five paisa coins. The number of coins are in the ratio 2.5 : 3 : 4. If the total amount with me is Rs 210, find the number of one rupee coins

4. If x is one more than 3 times a and y is 7 less than twice of a and z is 3 less than a. If 6 times square of z is 7 less than x multiplied by y, then the value of a is

5. Divide Rs 5130 among P, Q, R and S such that 3 times P's share = 4 times Q's share = 5 times R's share = 6 times S's share. What is the share of Q (in Rs)?

6. The incomes of A and B are in the ratio 4 : 7 and their spending are in the ratio 6 : 11. If A saves $1/3^{rd}$ of her income, then the savings of A and B are in the ratio of _____ ?

7. The cost of a diamond varies as the square of its weight. A diamond weighing 10 decigrams costs Rs 1600. The diamond broke down into two pieces weighing 7 and 3 decigrams. What would be the loss owing to its breakage?

8. An engine without compartments can move with a speed of 60 kmph. Reduction in speed of the engine varies as the square-root of number of compartments attached. With 4 compartments, the engine can move with a speed of 40 kmph. Find the minimum number of compartments to be attached so that engine fails to move?

9. To hold a tea party, the expenses are partly constant and party varies as number of guests. When there are 50 guests, the expenses are Rs 1850. When there are 150 guests, the expenses are Rs 4350. Find the cost when there are 200 guests.

10. The ratio of the ages of A and B is 7 : 12. Which of the following cannot be the ratio of their ages after 15 years ?

    a) 5 : 8 b) 9 : 14 c) 18 : 23 d) 22 : 37

11. A number of coins were distributed among A, B and C. If the ratio in which the coins were given was 2 : 3 : 4, then 1 coin was left over. However, if the coins were divided as 3 : 5 : 3, there was no coin left. What could be the sum of digits of the minimum number of coins?

12. A group of five dacoits, after stealing some gold coins from the King's treasury, escaped. Four of them killed their fifth partner and decided to share the money equally between them. However, 1 coin was found to be left over, which they donated to a beggar. Three of the remaining four dacoits killed their fourth partner and decided to divide the coins equally between them. Again, they found that 1 coin was left over, which they donated to the beggar. Two of the remaining three dacoits killed their third partner, and again while dividing equally, donated to the beggar the single coin which was left over. The last two dacoits left the place peacefully after dividing the coins equally between them. Which of the following could be the number of coins that had been stolen from the King's treasury ?

    a) 237 b) 301 c) 389 d) 435

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$-p = -1$ $-q = -1$ $-r = -1$

$k = \frac{p+q}{r} = \frac{q+r}{p} = \frac{p+r}{q}$

or, $k = \frac{2(p+q+r)}{(p+q+r)}$ [Addendo]

$(p+q+r) \neq 0$ | $*(p+q+r) = 0$

$k = \frac{2(p+q+r)}{(p+q+r)}$ | $p+q = -r$ $k = -1$

$= 2$ | $q+r = -p$

$p+r = -q$

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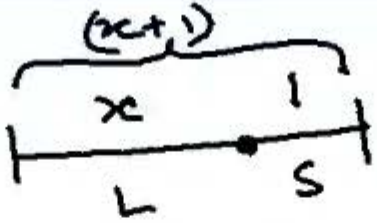

$$\frac{x+1}{1^2}$$

$$\frac{x+1}{1} = 20 \times \frac{1}{x} = \frac{x+1}{1}$$

$$\frac{x+1}{1} = \frac{20}{x} = \frac{20}{4} = \frac{5}{1}$$

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C A: 8k, 4k ✗ | C B: 8k, 5k ✗ | C C: 8k, 6k ✓ | C D: 8k, 7k ✓ | C E: 8k, 8k ✓

Q of M :- 4k, 5k, 6k, 7k, 8k

TQ :- 30k

T Cap :- $30k \times \frac{100}{75} = 40k$

$8k \times \frac{64}{100} = \frac{512}{100}$

$= 5.12$

At least ⇒ Min ✓

Below 64% & above ✗

- The volume of a cube varies directly with the cube of its side. If three cubes of sides 6 cm, 8 cm and 10 cm are taken together and melted to form a fourth cube, find the side of the fourth cube.
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$V \propto Wt^2$

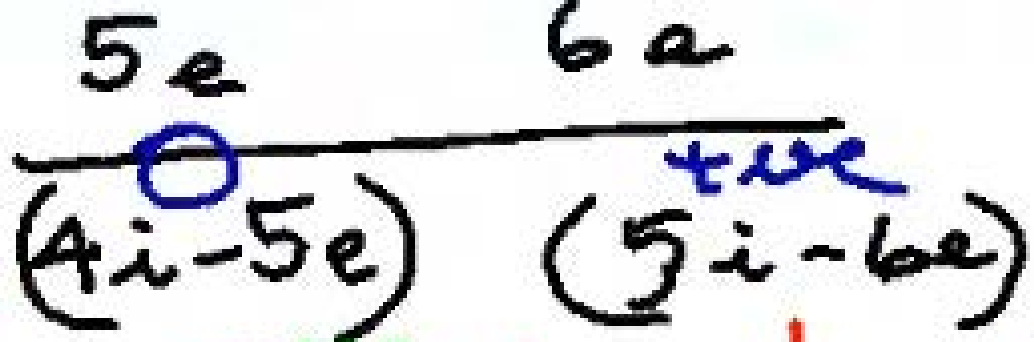
Wt :- 65 : 32 : 24 : 9

Value :- 4225 : 1024 : 576 : 81

$1681 = 2544$

2544 m → Rs 25.44 L

4225 m → Rs 42.25 L //



Sol :-

let $4i-5e=0$ (−ve)

$i=\frac{5}{4}e$

$= \frac{e}{4}$ → quant

$5i-6e=0$ (+ve)

↓ 0

$5\times\frac{5}{4}e-6e$

$=\frac{25}{4}e-6e$

$=\frac{25e-24e}{4}$

$4\times\frac{6}{5}e-5e$

$=\frac{24e-25e}{5}$

$=-\frac{e}{5}$

$5i-6e=0$

$i=\frac{6}{5}e$

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7. The cost of a diamond varies as the square of its weight. A diamond weighing 10 decigrams costs Rs 1600. The diamond broke down into two pieces weighing 7 and 3 decigrams. What would be the loss owing to its breakage?
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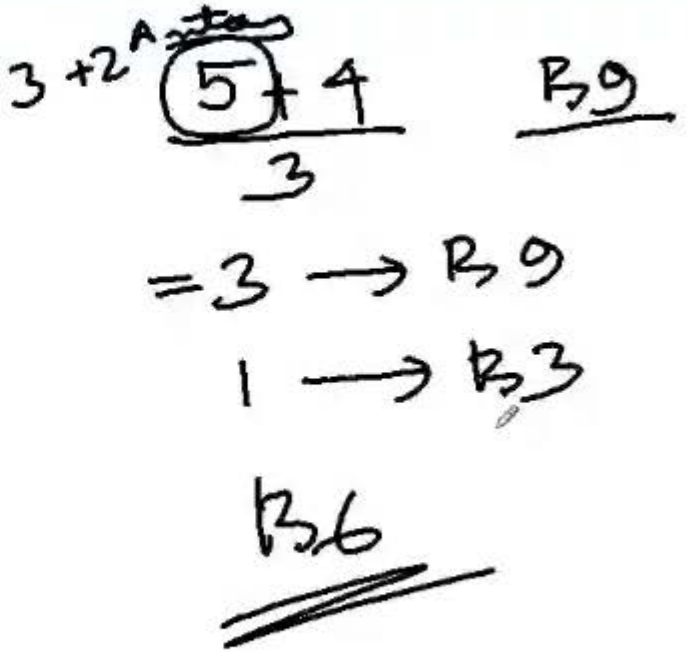

$y = 2$

Constant = 2

Fract

Prop	Improp
1) $\frac{3}{5} \overset{\times 2}{\times 2} = \frac{6}{10}$	1) $\frac{5}{3} \overset{\times 2}{\times 2} = \frac{10}{6}$
2) $\frac{3}{5} \overset{+2}{+2} < \frac{5}{7}$ $\frac{21}{35}$ $\frac{25}{35}$	2) $\frac{5}{3} \overset{+2}{+2} > \frac{7}{5}$ $1\frac{2}{3}$ $1\frac{2}{5}$
3) $\frac{3}{5} \overset{-2}{-2} > \frac{1}{3}$	3) $\frac{5}{3} \overset{-2}{-2} < \frac{3}{1}$

To hold a tea party, the expenses are partly constant and party varies as number of guests. When there are 50 guests, the expenses are Rs 1850. When there are 150 guests, the expenses are Rs 4350. Find the cost when there are 200 guests.

The ratio of the ages of A and B is 7 : 12. Which of the following cannot be the ratio of their ages after 15 years ?

a) 5 : 8 b) 9 : 14 c) 18 : 23 d) 22 : 41

A number of coins were distributed among A, B and C. If the ratio in which the coins were given was 2 : 3 : 4, then 1 coin was left over. However, if the coins were divided as 3 : 5 : 3, there was no coin left. What could be the sum of digits of the minimum number of coins?

A group of five dacoits, after stealing some gold coins from the King's treasury, escaped. Four of them killed their fifth partner and decided to share the money equally between them. However, 1 coin was found to be left over, which they donated to a beggar. Three of the remaining four dacoits killed their fourth partner and decided to divide the coins equally between them. Again, they found that 1 coin was left over, which they donated to the beggar. Two of the remaining three dacoits killed their third partner, and again while dividing equally, donated to the beggar the single coin which was left over. The last two dacoits left the place peacefully after dividing the coins equally between them. Which of the following could be the number of coins that had been stolen from the King's treasury ?

a) 237 b) 301 c) 389 d) 435

PF

$\frac{7}{12}$ $+15$ $+15$ → Larger than $\frac{7}{12}$

↓

0.58

$\frac{5}{8} = 0.62$ ✓

$\frac{9}{14} = 0.64$ ✓

$\frac{18}{23} = 0.7$ ✓

$\frac{22}{41}$ = ~~0.53~~ 0.54

9. To hold a tea party, the expenses are partly constant and party varies as number of guests. When there are 50 guests, the expenses are Rs 1850. When there are 150 guests, the expenses are Rs 4350. Find the cost when there are 200 guests.

10. The ratio of the ages of A and B is 7 : 12. Which of the following cannot be the ratio of their ages after 15 years ?

a) 5 : 8 b) 9 : 14 c) 18 : 23 ✓ d) 22 : 41

11. A number of coins were distributed among A, B and C. If the ratio in which the coins were given was 2 : 3 : 4, then 1 coin was left over. However, if the coins were divided as 3 : 5 : 3, there was no coin left. What could be the sum of digits of the minimum number of coins?

12. A group of five dacoits, after stealing some gold coins from the King's treasury, escaped. Four of them killed their fifth partner and decided to share the money equally between them. However, 1 coin was found to be left over, which they donated to a beggar. Three of the remaining four dacoits killed their fourth partner and decided to divide the coins equally between them. Again, they found that 1 coin was left over, which they donated to the beggar. Two of the remaining three dacoits killed their third partner, and again while dividing equally, donated to the beggar the single coin which was left over. The last two dacoits left the place peacefully after dividing the coins equally between them. Which of the following could be the number of coins that had been stolen from the King's treasury ?

a) 237 b) 301 c) 389 d) 435

A B C

Int :- 2 : 3 : 4
2k 3k 4k
1 coin left

No of coins were = 9k+1

2nd :- 3 : 5 : 3
3m 5m 3m

No of coins = 11m

5+5 = 10

9k+1 11m → 11/22/33/44/55/-

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$\frac{x-1}{4}(R)=0$

$\frac{x-1-1}{3}(R)=0$ $\frac{x-2}{3}(R)=0$

$\frac{x-1-1-1}{2}(R)=0$ $\frac{x-3}{2}(R)=0$

$389-1=\frac{388}{4}(R)=0$ ✓

$237-1=\frac{236}{4}(R)=0$ ✓

$237-2=\frac{235}{3}(R)\neq 0$ ×

$301-1=\frac{300}{4}(R)=0$ ✓

$301-2=\frac{299}{3}(R)\neq 0$ ×

$389-2=\frac{387}{3}(R)=0$ ✓

$389-3=\frac{386}{2}(R)=0$ ✓