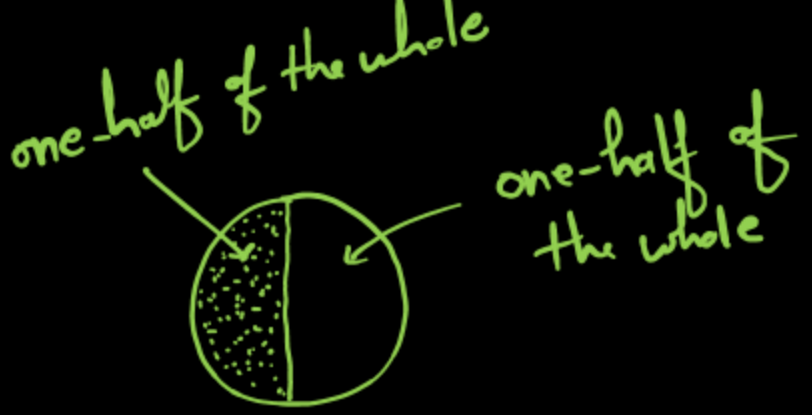
Fractions

Grade 4: Number System

Fractions

Fraction mean "a part" or "a fragment"

Part of a whole



Divide it into two equal parts

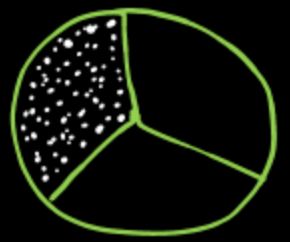
$\frac{1}{2}$ → 1 by 2 or 1 over 2

2 equal parts

1 part out of 2 equal parts ← 1| we are considering 1 part out of the 2 equal parts, that is called one-half.

3 equal parts

1 part is shaded out of 3 equal parts.



Thirds

1 out of 3

$\frac{1}{3}$

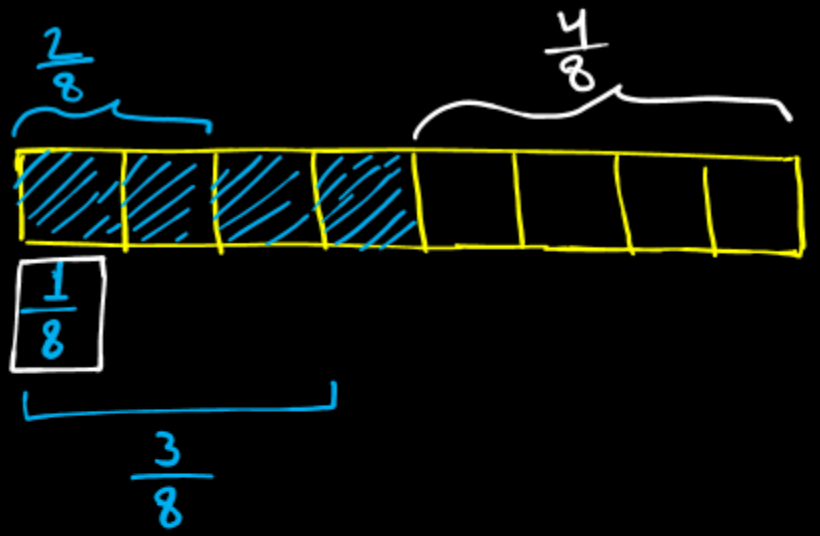
Unshaded fraction is $\frac{2}{3}$

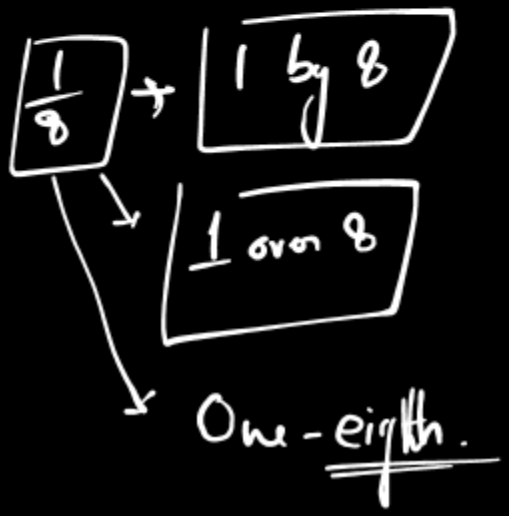
2 out of 3

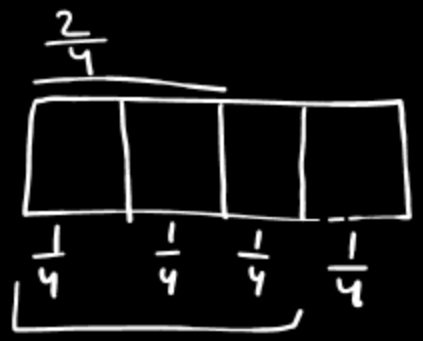
Shaded fraction is $\frac{1}{4}$] → Quarter

Unshaded is $\frac{3}{4}$

Divided a rectangle into 8 equal parts







$\frac{3}{4}$

$\frac{4}{4} = 1$

$\frac{8}{8} = 1$

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

$\frac{7}{7} \Rightarrow 1$

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

$\frac{5}{5} = 1$

Shade $\frac{4}{6}$ four-sixth

Fractional numbers and fractions

Fronctional number	Fraction
one-half	$\frac{1}{2}$
one-third	$\frac{1}{3}$
two-fifths	$\frac{2}{5}$
three-fourths	$\frac{3}{4}$

Numerator and Denominator of a fraction

Eg: $\frac{2}{5}$ is a fraction. $\Rightarrow$ 2 → Numerator (Dividend), 5 → Denominator (Divisor)

$\frac{2}{3} \times \frac{2}{2} = \frac{4}{6}$ ($\frac{2}{2} = 1$)

$\frac{14}{7} = 2$

$7 \overline{)14} \; 2$

$\frac{7}{7} = 1$

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

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

$\frac{9}{9} = 1$

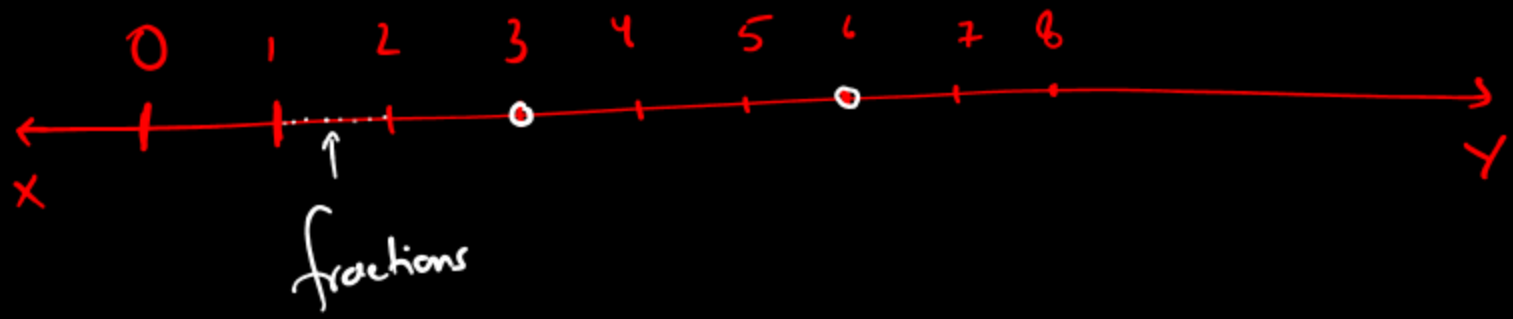
$\frac{99}{99} = 1$

$\frac{25}{51}$ → Nu, De

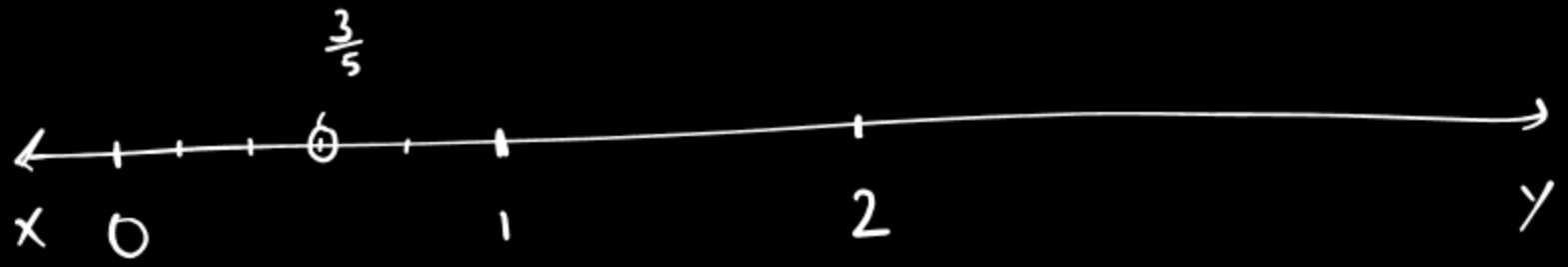
$\frac{25}{25} = 1$

Numbers: 0, 1, 2, 3, 4, 5, 6, 7, 8, ... ∞ [Whole number]

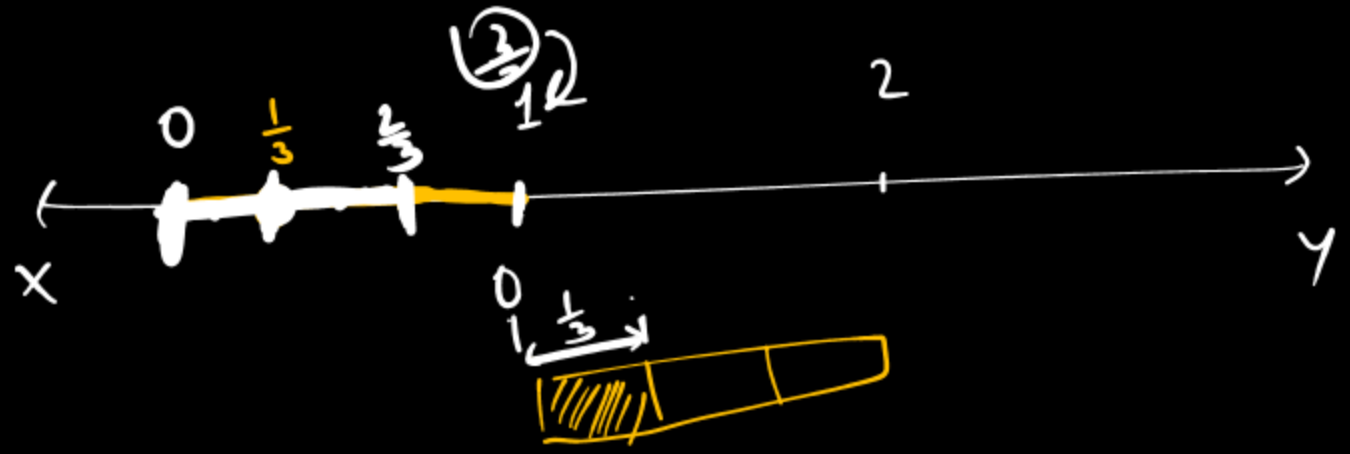
Number line:



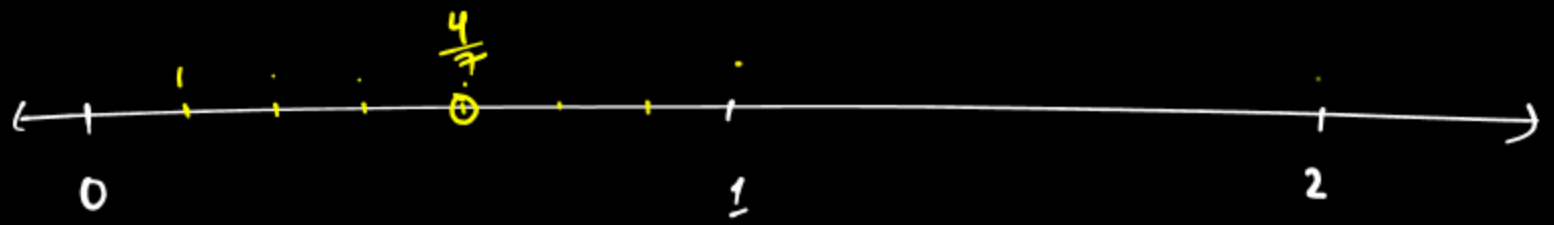
Represent $\frac{3}{5}$ on number line.



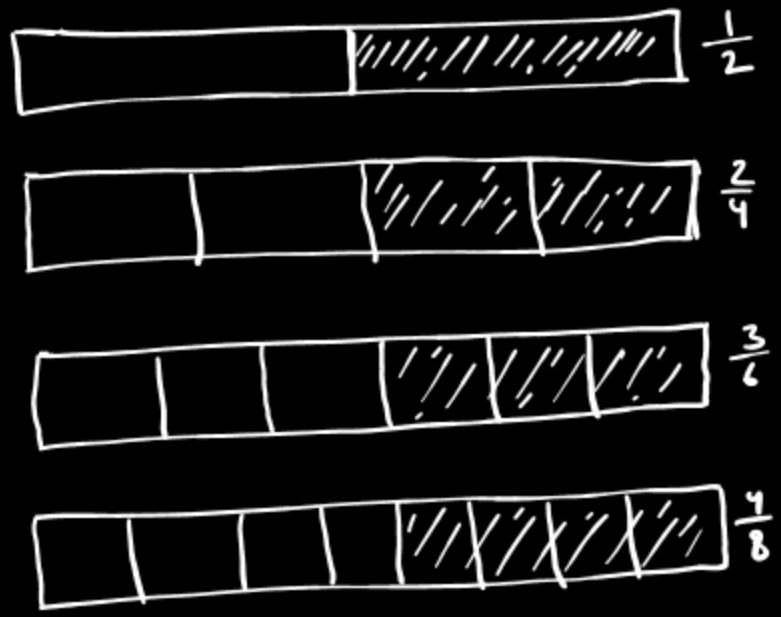
Represent $\frac{1}{3}$ on a number line.



$\frac{4}{7}$



Equivalent Fractions



→ All Shaded portion are equal.

→ fractions represented by shaded portion are also equal.

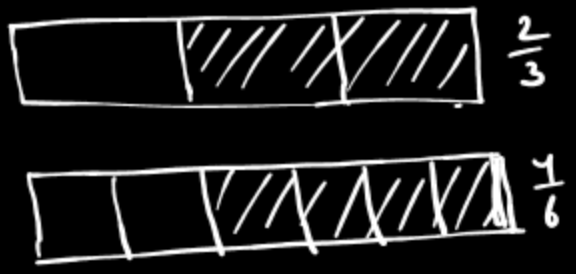
$$\frac{1}{2} = \frac{2}{4} = \frac{3}{6} = \frac{4}{8} = \underline{\text{et.}}$$

[These fractions are called equivalent fraction]

$\frac{1}{2} = \frac{1\times2}{2\times2} = \frac{2}{4} = \frac{1\times3}{2\times3} = \frac{3}{6} = \frac{1\times4}{2\times4} = \frac{4}{8} = \frac{1\times5}{2\times5} = \frac{5}{10}$

We can determine equivalent fractions of a given fraction by multiplying its numerator and denominator with same number.

eg: Find Equivalent fractions of $\frac{2}{3}$.



$\frac{2}{3}\times\frac{2}{2} = \frac{4}{6}$

$\frac{2}{3}\times\frac{3}{3} = \frac{6}{9}$

$\frac{2}{3}\times\frac{4}{4} = \frac{8}{12}$

$\frac{2}{3}\times\frac{5}{5} =$

$\frac{2}{3} = \frac{4}{6} = \frac{6}{9} = \frac{8}{12}$ Equivalent fraction

Hard

1. Write next ~~two~~ three fractions equivalent to $\frac{4}{7}$.

$$\frac{4}{7}, \frac{4\times2}{7\times2}, \frac{4\times3}{7\times3}, \frac{4\times4}{7\times4}$$

$$\frac{4}{7} = \frac{8}{14} = \frac{12}{21} = \frac{16}{28}$$

2. Write five fractions equivalent to $\frac{3}{5}$.

$$\frac{3}{5} = \frac{6}{10} = \frac{9}{15} = \frac{12}{20} = \frac{15}{25} = \frac{18}{30}$$

Equivalent fractions

Write next 5 equivalent fractions of $\boxed{\frac{2}{3}}$

$\frac{2}{3} \times \frac{2}{2}$

$\frac{2}{3} \times 2$, $\frac{2 \times 3}{3 \times 3}$ $\frac{2}{3} \times \frac{4}{4}$, $\frac{2}{3} \times \frac{5}{5}$, $\frac{2}{3} \times \frac{6}{6}$ $\frac{4}{6} \times$ ~~4~~ $\times$ ~~4~~

$\Rightarrow \underline{\frac{4}{6} = \frac{6}{9} = \frac{8}{12} = \frac{10}{15} = \boxed{\frac{12}{18}} = \frac{2}{3}}$

* Equivalent fraction can also be obtained by dividing the nu. & de. of the given fraction by the same number.

eg. equivalent fractions of $\frac{12}{18}$

$\frac{12 \div 2}{18 \div 2}$ $\quad \frac{12 \div 3}{18 \div 3}$ $\quad \frac{12 \div 6}{18 \div 6}$

$\frac{12}{18} = \boxed{\frac{6}{9}} = \boxed{\frac{4}{6}} = \boxed{\frac{2}{3}}$

Find 3 equivalent fractions of $\frac{32}{40}$.

$\frac{32 \div 2}{40 \div 2}$ $\frac{32 \div 4}{40 \div 4}$ $\frac{8 \div 2}{10 \div 2}$

$\frac{16}{20} = \frac{8}{10} = \frac{4}{5}$

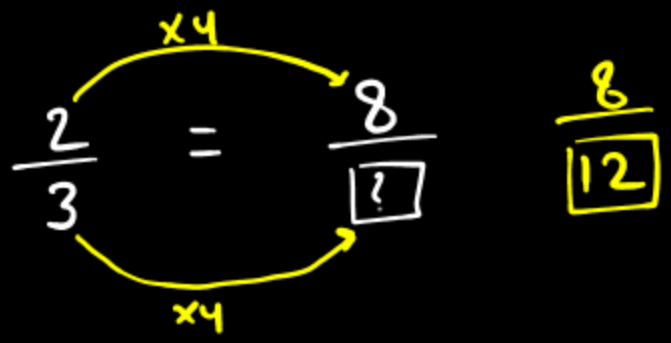
$4 \times 10 =$

$4 \times 7 = 28$

$2\overline{)32}$ 16

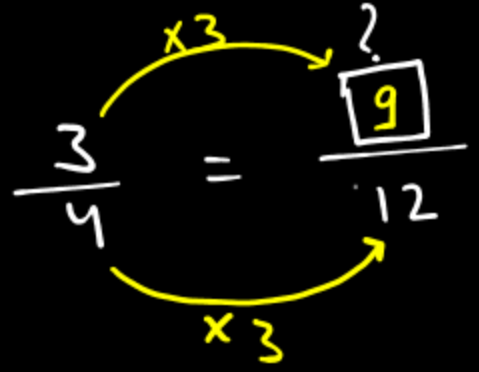
Finding Equivalent fraction with given numerator or denominator:

Eg: Write an equivalent fraction of $\frac{2}{3}$ with numerator 8.

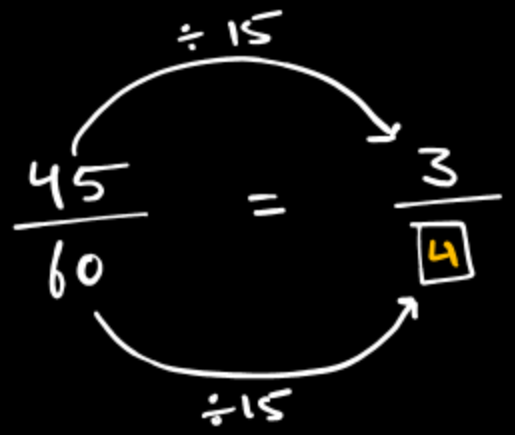


$\frac{8}{12}$

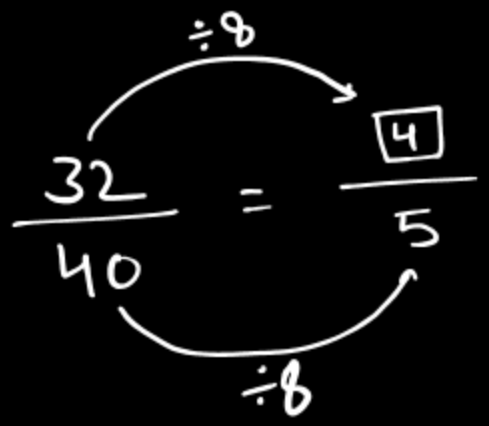
Eg: With an equivalent fraction of $\frac{3}{4}$ with denominator 12.

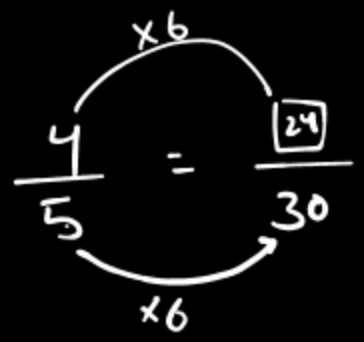


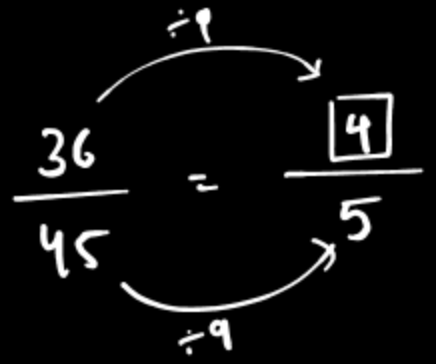
Q. Write an equivalent fraction of $\frac{45}{60}$ with numerator 3.



Q. Write an equivalent fraction of $\frac{32}{40}$ with denominator 5.

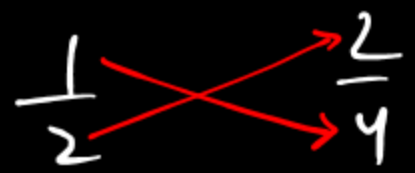



×6
4
5
=
24
30
×6


÷9
36
45
=
4
5
÷9

Test whether two given fractions are equivalent or not.

eg. $\frac{1}{2}$ and $\frac{2}{4}$

Cross multiply. 

$1 \times 4 = \boxed{4}$ $2 \times 2 = \boxed{4}$

If cross products are equal, then fractions are equivalent.

Q. $\frac{2}{3}$ and $\frac{12}{18}$

$\frac{2}{3} \rightarrow \frac{12}{18}$

$2 \times 18 = 36$

$12 \times 3 = 36$

$\therefore$ $\frac{2}{3}$ and $\frac{12}{18}$ are equivalent fractions.

Q. $\frac{3}{7}$ and $\frac{8}{21}$ are equivalent or not.

$(3 \times 21 = 63) \neq (8 \times 7 = 56)$

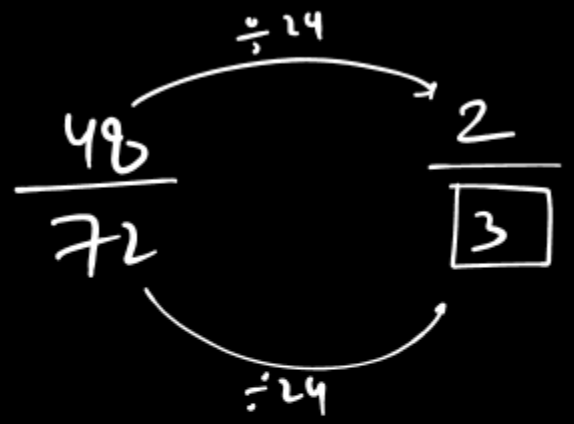
$\therefore$ Not equivalent fractions.

Q. $\frac{16}{24}$ and $\frac{2}{3}$

$(16 \times 3 = 48) = (24 \times 2 = 48)$

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

Q. find an equivalent fraction of $\frac{48}{72}$ with numerator 2.



Find 4 equivalent fraction of $\frac{5}{9}$

$$\frac{10}{18} = \frac{15}{27} = \frac{20}{36} = \frac{25}{45}$$

Comparison of Fractions with same denominator

$$\frac{1}{5} < \frac{2}{5} < \frac{3}{5}$$

$\frac{4}{7}$ and $\frac{6}{7}$

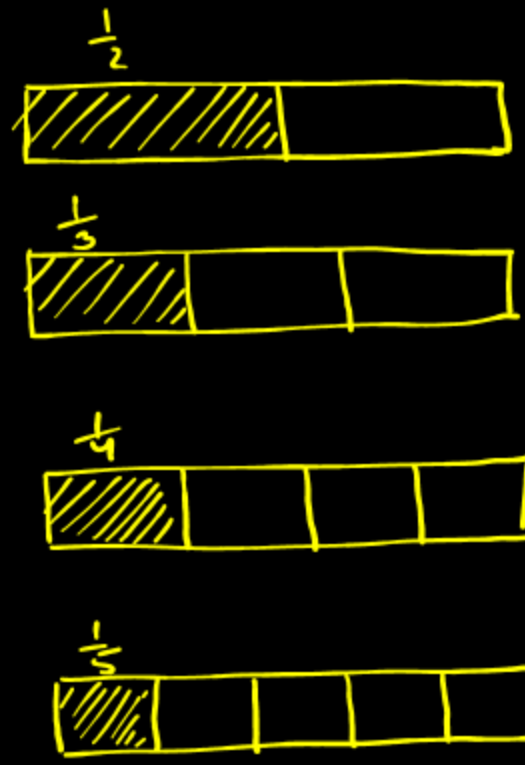
$\Rightarrow$ Out of two or more fractions with same denominator, the one having smaller numerator is smaller than the other.

Greater than	$>$
Smaller than	$<$

$\frac{4}{5} \square \frac{2}{5}$

Comparison of fractions with same numerator.

Eg:



$\frac{1}{2}$

$\frac{1}{3}$

$\frac{1}{4}$

$\frac{1}{5}$

⇒ Out of two or more fractions with same numerator, the one having the smaller denominator is the greater fraction than others.

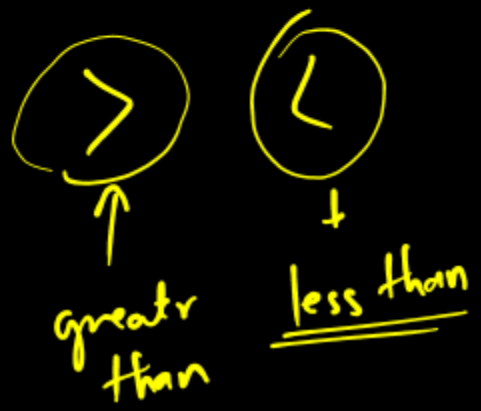
Q. Which is greater $\frac{5}{8}$ or $\frac{5}{11}$

$$\frac{5}{8} > \frac{5}{11}$$

Q. Arrange the following fractions in ascending order:

$\frac{4}{11}$, $\frac{4}{7}$, $\frac{4}{9}$, $\frac{4}{5}$ and $\frac{4}{13}$

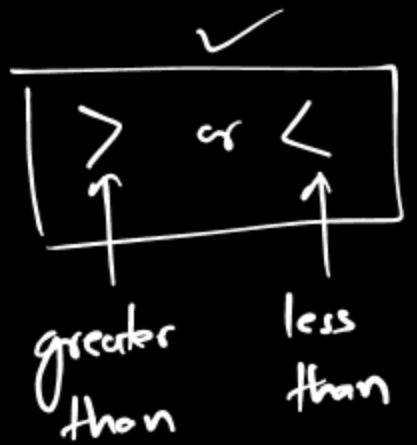
$$\frac{4}{13} < \frac{4}{11} < \frac{4}{9} < \frac{4}{7} < \frac{4}{5}$$



Q. Arrange the following fractions in descending order:

$$\frac{3}{5}, \frac{3}{8}, \frac{3}{10}, \frac{3}{4} \text{ and } \frac{3}{7}$$

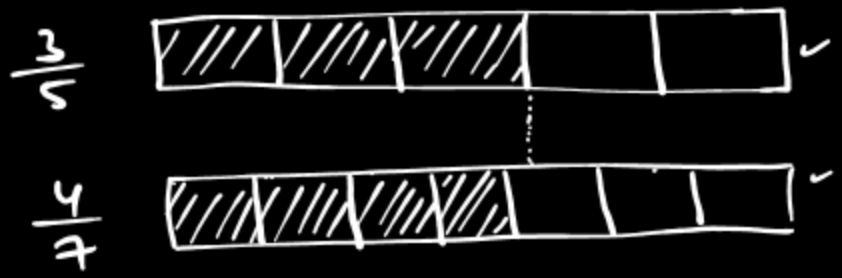
$$\frac{3}{4} > \frac{3}{5} > \frac{3}{7} > \frac{3}{8} > \frac{3}{10}$$



Comparison of fraction having different numerators and denominators.

IMO

eg:



$3 \times 7 = 21$

$4 \times 5 = 20$

→ Cross-multiply denominators with the numerators.

→ ↳ Bigger product represents greater fraction.

∴ $\frac{3}{5} > \frac{4}{7}$

5×2

$\boxed{10}$

$\boxed{3} \times 7$

$\boxed{21}$

$>$ or $<$

which one is bigger $\frac{9}{2}$ $\frac{14}{3}$

$\frac{9 \times 3}{27}$

$\frac{14 \times 2}{28}$

> or <

11×4 3×13

44 39

> or <

9×3 2×10

27 > 20

$\frac{6}{13}$ ☐ $\frac{7}{12}$ $\geq$ or $<$

6 x 12

72

7 x 13

91

$\frac{5}{7}$ ☐ $\frac{4}{3}$ $>$ or $<$

5 x 3

15

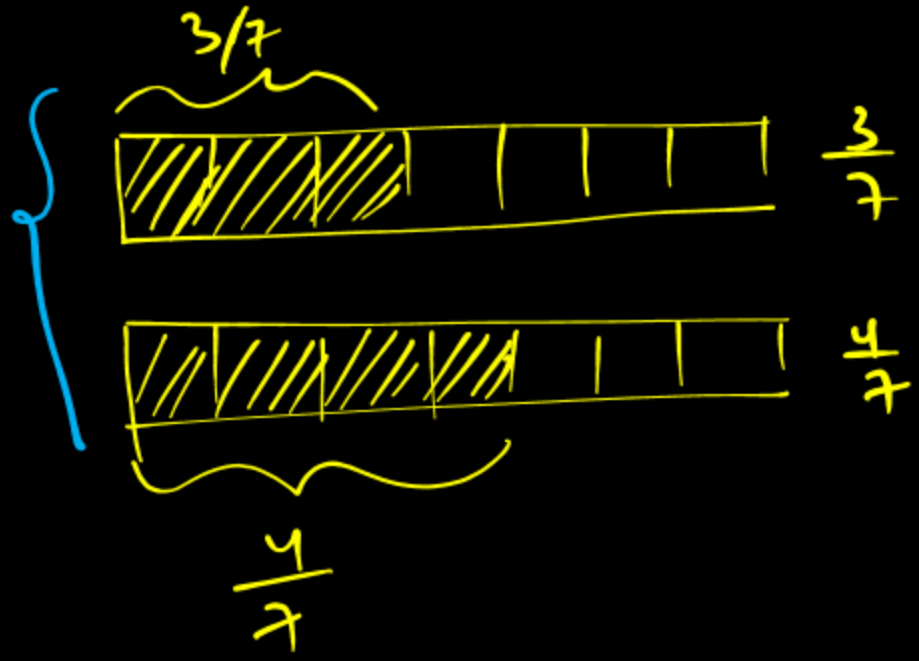
4 x 7

28


×4
3
5
<
×5
7
4

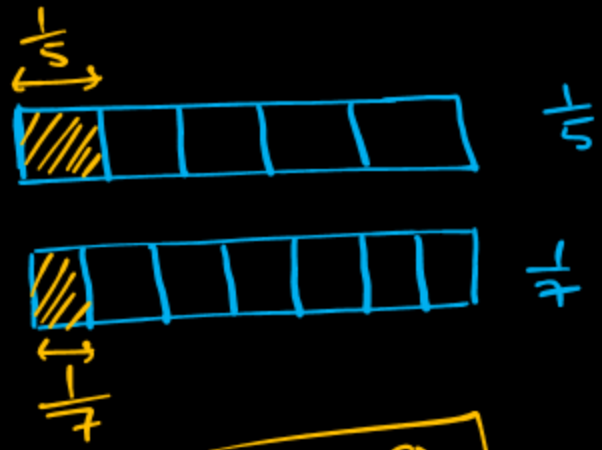
$\frac{7}{35} \boxed{>} \frac{7}{63}$ ✓

$\frac{3}{7} \boxed{<} \frac{4}{7}$



$\Rightarrow$ [when denominators are same, then fraction with greater numerator will be the bigger fraction]

$\frac{1}{5} \square \frac{1}{7}$



$\frac{1}{5} > \frac{1}{7}$

Q $\frac{3}{5} \square \frac{2}{7}$

3×7

21

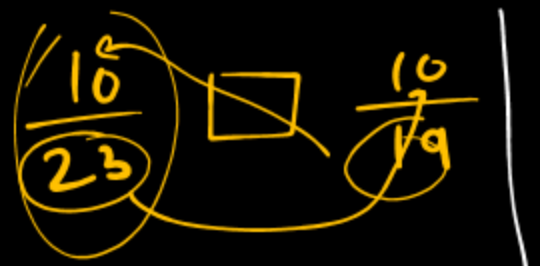
2×5

10

Q2

$\frac{5}{7} \square \frac{2}{3}$

$\frac{14}{15} \square \frac{8}{11}$



$$\frac{9}{13} \square \frac{7}{3}$$

$$\frac{5}{9} \square \frac{13}{23}$$

Like and Unlike Fractions

Like Fractions : Fractions with same denominator are called like fractions.

Examples: $\frac{4}{9}, \frac{5}{9}, \frac{13}{9}, \frac{2}{9}$, etc. are like fraction.

(11) :

Unlike fractions: Fractions with different denominators are called unlike fractions.

Examples: $\frac{6}{8}, \frac{7}{2}, \frac{9}{19}, \frac{4}{7}, \frac{9}{9}$, etc.

Unit fraction

* Fractions with numerator 1 are called unit fractions.

eg. $\frac{1}{2}$, $\frac{1}{7}$, $\frac{1}{4}$, $\frac{1}{9}$, etc. are unit fractions.

Proper and Improper fractions

$\frac{1}{3}$, $\frac{1}{9}$, $\frac{2}{7}$

Proper fraction: Fraction whose numerator is smaller than the denominator.

eg: $\frac{3}{5}$, $\frac{1}{2}$, $\frac{3}{7}$, $\frac{9}{15}$, $\frac{30}{41}$, etc. are proper fractions

Improper fraction: Fraction whose numerator is greater than the denominator.

eg: $\frac{9}{5}$, $\frac{11}{7}$, $\frac{5}{3}$, etc. are improperper fractions.

Addition of Like fractions

Sol: Add $\frac{3}{5}$ and $\frac{4}{5}$

Step1: $\frac{3}{5} + \frac{4}{5}$

Step2: Add the numerators and keep the denominator as it is.

$$\frac{3}{5} + \frac{4}{5} = \frac{3+4}{5} = \frac{7}{5}$$

Ans: $\frac{7}{5}$

Eg 2: Add $\frac{2}{7}$ and $\frac{3}{7}$

$$\frac{2}{7} + \frac{3}{7} = \frac{2+3}{7} = \frac{5}{7}$$

$\frac{2}{7}$ + $\frac{3}{7}$ = $\frac{5}{7}$

Q. Add $\frac{1}{9}$ and $\frac{5}{9}$

$$\frac{1}{9} + \frac{5}{9} = \frac{6}{9} = \frac{2}{3}$$

Q1. $\frac{1}{9} + \frac{5}{9} =$ ____ $\frac{12}{18}$

$\frac{6^2}{9_3} = \frac{2}{3}$

(1) $\frac{7}{9}$

(2) $\frac{4}{3}$

~~(3)~~ $\frac{9}{6}$

~~(4)~~ $\frac{2}{3}$

Add. $\frac{3}{7} + \frac{2}{7} + \frac{1}{7}$

$$= \frac{3+2+1}{7}$$

$$= \frac{6}{7}$$

Find the sum of $\frac{5}{13} + \frac{2}{13} + \frac{4}{13}$

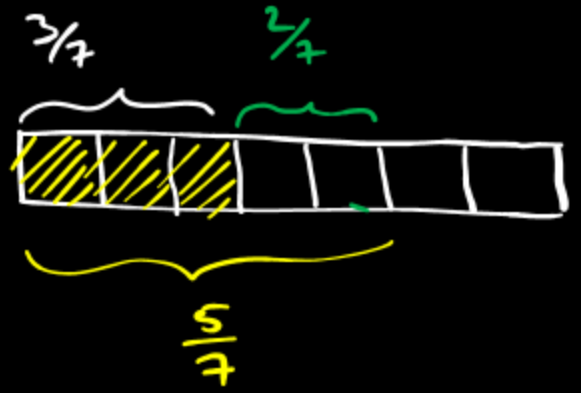
$$= \frac{5+2+4}{13} = \frac{11}{13}$$

Subtraction of Like fraction.

eg1: Subtract $\frac{2}{7}$ from $\frac{5}{7}$.

$$\Rightarrow \quad \frac{5}{7} - \frac{2}{7} = \frac{5-2}{7}$$

$$= \frac{3}{7}$$



Q. Find the difference between $\frac{3}{8}$ and $\frac{5}{8}$

Subtract, smaller no. from bigger no.

Sol:

Since $\frac{5}{8} > \frac{3}{8}$

Therefore, $\frac{5}{8} - \frac{3}{8}$

$\Rightarrow \frac{5-3}{8}$

$\Rightarrow \frac{2}{8}$ Ans

$\frac{2}{8} = \frac{1}{4}$

Not in school syllabus

Addition of unlike fractions

eg 1 : $\frac{6}{8} + \frac{7}{2}$

Step 1 :- Make the denominators same

(A) → LCM of denominators.

(B) → Make all the denominators equivalent to the LCM.

That is, write equivalent fractions of the given fraction such that their denominators are same as LCM value.

$\frac{6}{8} + \frac{7}{2}$

LCM of (8, 2) = 8 (A)

Multiples of 2 : 2, 4, 6, 8, 10, 12, ...

Multiples of 8 : 8, 16, 24, ...

(B) - - - - - - - -

$\frac{6}{8}$ ✓

$\frac{7}{2} = \frac{28}{8}$ ✓

×4

$$\frac{6}{8} + \frac{7}{2}$$

$$\Rightarrow \frac{6}{8} + \frac{28}{8}$$

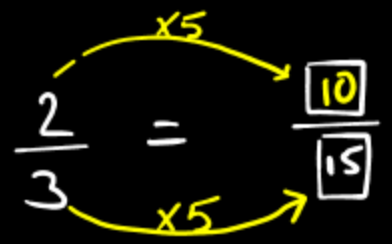
$$\Rightarrow \frac{6+28}{8}$$

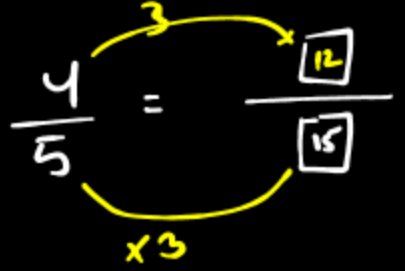
$$= \frac{34}{8}$$

eg 2

$$\frac{2}{3} + \frac{4}{5}$$

LCM of 3 and 5 = 15





$$\Rightarrow \frac{2}{3} + \frac{4}{5} = \frac{10}{15} + \frac{12}{15} = \frac{22}{15}$$

eg 3 $\frac{1}{3} + \frac{1}{7}$

LCM of 3 and 7 = 21

$\frac{1}{3} = \frac{7}{21}$

$\frac{1}{7} = \frac{3}{21}$

$\frac{1}{3} + \frac{1}{7} = \frac{7}{21} + \frac{3}{21} = \frac{10}{21}$

eg.4 $\frac{2}{1} + \frac{1}{2}$

$\frac{2 \times 2}{1 \times 2} + \frac{1 \times 1}{2 \times 1}$

$\frac{2}{1} \times_{x_2}^{x_2} = \frac{4}{2}$

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

$\frac{2}{1} + \frac{1}{2} = \frac{4}{2} + \frac{1}{2} = \frac{5}{2}$.

Q.1 $\frac{5}{6} + \frac{13}{24}$

LCM of 6 and 24 = 24

$\frac{5}{6} = \frac{20}{24}$ (×4)

$\frac{5}{6} + \frac{13}{24} = \frac{20}{24} + \frac{13}{24}$

$= \frac{33}{24}$

Q2. $\frac{7}{12} + \frac{5}{36}$

LCM (12, 36) = 36

$\frac{7}{12} = \frac{21}{36}$ (×3)

$\frac{7}{12} + \frac{5}{36} =$

$\Rightarrow \frac{7 \times 3}{12 \times 3} + \frac{5}{36}$

$\Rightarrow \frac{21}{31} + \frac{5}{36}$

$= \frac{26}{36}$

$$\frac{2}{3} + \frac{3}{5} + \frac{7}{15}$$

$$LCM(3,5,15) = \underline{\underline{15}}$$

$$\frac{2}{3} = \frac{\boxed{10}}{15}$$

$$\frac{3}{5} = \frac{\boxed{9}}{15}$$

$$\frac{7}{15} = \frac{7}{15}$$

$$\frac{2}{3} + \frac{3}{5} + \frac{7}{15} \Rightarrow \frac{10}{15} + \frac{9}{15} + \frac{7}{15} = \frac{26}{15}$$

Q4. $\frac{11}{15} + \frac{9}{5}$

$LCM(15, 5) = 15$

$\frac{11}{15} = \frac{11}{15}$

$\frac{9}{5} = \frac{27}{15}$

$\frac{11}{15} + \frac{9}{5} = \frac{11}{15} + \frac{27}{15} = \boxed{\frac{38}{15}}$

Subtraction of unlike fractions

eg 1 $\quad \frac{13}{15} - \frac{2}{3}$

LCM (15, 3) = 15

$\frac{13}{15} = \frac{13}{15}$

$\frac{2}{3} = \frac{10}{15}$

$$\frac{13}{15} - \frac{10}{15} = \frac{13-10}{15} = \frac{3}{15}$$

eg 2 Find the difference of $\frac{3}{7}$ and $\frac{5}{7}$.

$$\frac{5}{7} - \frac{3}{7} = \frac{2}{7}$$

eg 3 Find the difference of $\frac{3}{7}$ and $\frac{4}{21}$

LCM (7 and 21) = 21

$$\frac{3}{7} = \frac{9}{21}$$

$$\frac{4}{21} : \quad \frac{3}{7} - \frac{4}{21} = \frac{9}{21} - \frac{4}{21} = \frac{5}{21}$$

Q1. Find the difference of $\frac{2}{9}$ and $\frac{7}{2}$

LCM = 18

$$\frac{2}{9} = \frac{4}{18}$$

$$\frac{7}{2} = \frac{63}{18}$$

$$\frac{7}{2} - \frac{2}{9} = \frac{63}{18} - \frac{4}{18} = \frac{59}{18}$$

Improper fraction

$\frac{3}{2}$, $\frac{5}{2}$, $\frac{9}{4}$ etc are improper fractions.

⇒ Improper fraction are made up of a whole number and a proper fraction.

eg. $\frac{1}{1} + \frac{1}{2}$

Every whole can be written in the form of fraction using 1 as denominator.

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

$5 = \frac{5}{1}$

$10 = \frac{10}{1}$

10 ← whole no.

$\frac{10}{1}$ ← fraction

Proper $\frac{7}{11}$ $\frac{19}{21}$

$\frac{51}{19}$ Improper

$\frac{7}{11}$ and $\frac{19}{21}$

$\frac{7}{11} < \frac{19}{21}$

$11 \overline{)70}$

31×7

$(30+1) \times 7$

$210 + 7 = 217$

$(20+1) \times 7$

$140 + 7 = 147$

21×7

22×7

$(20+2)\,7$

$140 + 14 = 154$

⇒ | Trick to multiply any number by 11 |

19 × 11

0 | 19 | 0

2 0 9

7321 × 11

0 | 7321 | 0

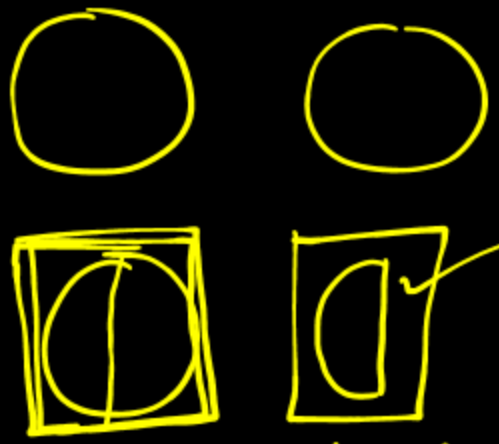
8 0 5 3 1

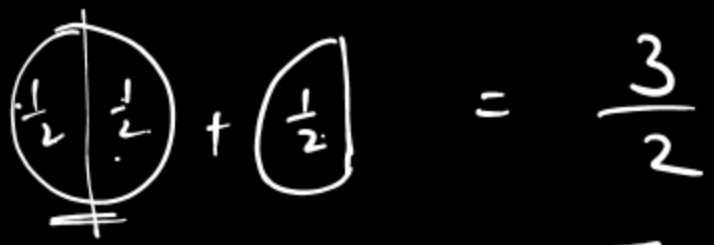
324 × 11

0 3 2 4 0

3 5 6 4

2 Apples





$= \frac{3}{2}$

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

How many apples left behind = $\frac{1}{1} + \frac{1}{2}$

$= \left(\frac{1}{2} + \frac{1}{2}\right) + \frac{1}{2}$

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

$= \frac{3}{2}$

$\frac{3}{2}$ is improper fraction

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

$\frac{3}{2}$ — Improper fraction

1 — whole no.

$\frac{1}{2}$ — proper fraction

$\frac{3}{2} = 1 + \frac{1}{2} = 1\frac{1}{2}$ → Mixed numeral

$\frac{3}{2}$ — Improper fraction

$1 + \frac{1}{2}$ can also be written as $1\frac{1}{2}$

Add:

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

* Every improper fraction can be written in the form Mixed numeral and Vice versa.

Eg: $\frac{3}{2} = 1\frac{1}{2}$

$1\frac{1}{2}$ apples means 1 apple + $\frac{1}{2}$ apple.

$2\frac{1}{2}$ chocolates means 2 chocolates + $\frac{1}{2}$ chocolate.

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

$3\frac{1}{4} = 3 + \frac{1}{4} = ?$

$4\frac{6}{7} = 4 + \frac{6}{7} = ? \frac{34}{7}$

$9\frac{3}{4} = 9 + \frac{3}{4} = ? \frac{39}{4}$

$2\frac{3}{4} = 2 + \frac{3}{4} = \frac{11}{4}$

Add $\frac{2}{1} + \frac{3}{4} = \frac{11}{4}$

LCM of denominators

LCM of 1 and 4 = 4

$\frac{2}{1} = \frac{8}{4} = \frac{8}{4}$ (×4)

$\frac{3}{4} = \frac{3}{4}$

$\frac{2}{1} + \frac{3}{4} = \frac{8}{4} + \frac{3}{4}$

$= \frac{11}{4}$

$\frac{3}{2} + \frac{5}{2} = \frac{8}{2}$

$\frac{9}{1} + \frac{3}{4}$

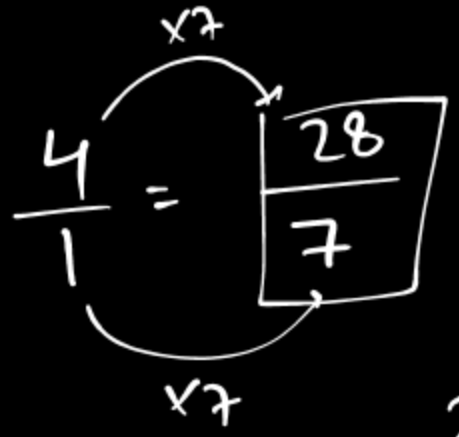
$$\frac{9}{1} + \frac{3}{4} =$$

$$LCM(1,4) = 4$$

$$\frac{9}{1} = \frac{36}{4}$$

$$\frac{3}{4} = \qquad \frac{36}{4} + \frac{3}{4} = \frac{39}{4}$$

$$4\frac{6}{7} = \frac{4}{1} + \frac{6}{7}$$



$$\frac{28}{7} + \frac{6}{7} = \frac{34}{7}$$

$$3\frac{1}{4} = \frac{3}{1} + \frac{1}{4} = \frac{13}{4}$$

$$3\frac{1}{4} = \frac{(3\times4)+1}{4} = \frac{12+1}{4} = \frac{13}{4}$$

$$4\frac{6}{7} = \frac{4\times7+6}{7} = \frac{34}{7}$$

$6\frac{2}{5} = \frac{32}{5}$

$7\frac{4}{11} = \frac{81}{11}$

Mixed Numeral to improper fraction

Improper fraction to mixed numeral

eg) $\frac{81}{11} = 7\frac{4}{11}$

$$\begin{array}{r} 7 \\ 11\,)\,81 \\ -77 \\ \hline 4 \end{array}$$

$\frac{32}{5} = 6\frac{2}{5}$

$$4\frac{6}{7} = \frac{34}{7}$$

$$\frac{103}{9} = 11\frac{4}{9}$$

$$\begin{array}{r} 11 \\ 9\overline{)103} \\ -9\downarrow \\ \hline 13 \\ -9 \\ \hline 4 \end{array}$$

$3\frac{5}{8} = \frac{8\times3+5}{8} = \frac{29}{8}$

$5\frac{2}{9} = \frac{47}{9}$

$\frac{48}{8} = 6\frac{0}{8} = 6$

$\frac{84}{8} = 10\frac{4}{8}$ ✓

$\frac{14}{5} = 2\frac{4}{5}$

$\frac{106}{11} = 9\frac{7}{11}$

$\frac{18}{7} = 2\frac{4}{7}$

$\frac{35}{8} = 4\frac{3}{8}$

$\frac{87}{10} = 8\frac{7}{10}$

$\frac{27}{6} = 4\frac{3}{6}$

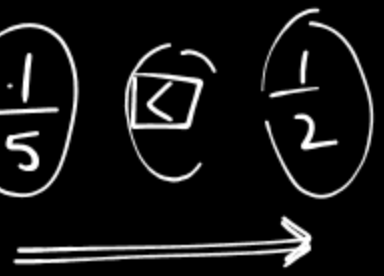
$\frac{100}{9} = 11\frac{1}{9}$

$$\frac{123}{12} = 10\frac{3}{12}$$

$12 \times 10 =$

$$\boxed{\frac{51}{4} = 12\frac{3}{4}}$$

$\frac{1}{5}$ $<$ $\frac{1}{2}$



$>$ greater than

$<$ less than

$\frac{2}{3}$ $\square$ $\frac{4}{3}$

$\frac{5}{7}$ $\square$ $\frac{3}{2}$

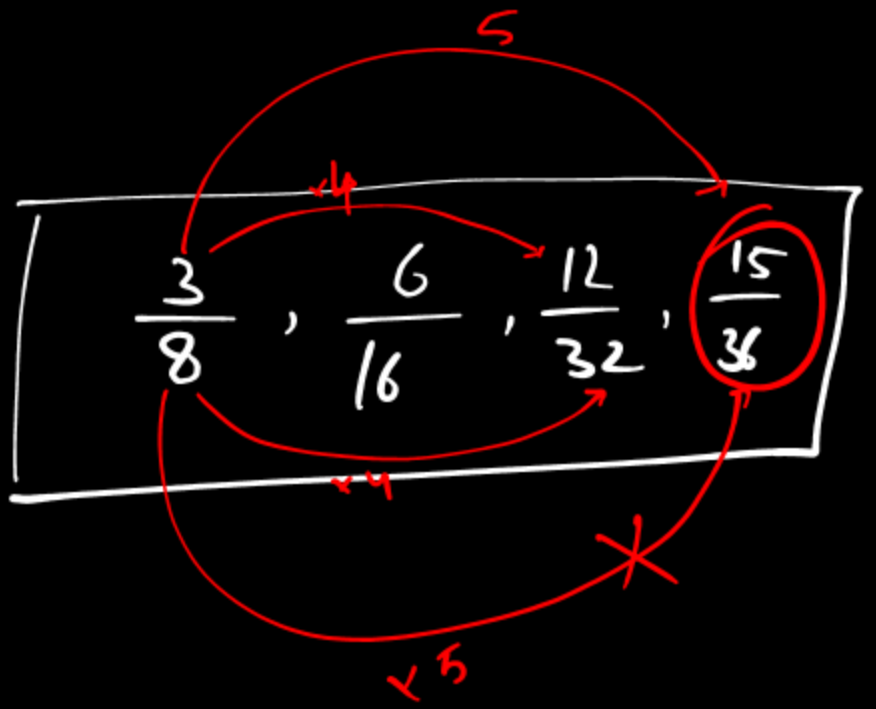
$\frac{5}{7} : \frac{10}{14}$ ✓

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

$\frac{11}{9}$ $\square$ $\frac{12}{13}$

$$\frac{15}{19} - \frac{4}{19} = \frac{11}{19}$$

$$\frac{2}{3}, \left(\frac{4}{9}\right), \frac{16}{15}, \frac{16}{24}$$



$$\frac{2}{3} \times \frac{2}{2} = \frac{4}{6}$$

$$\frac{2}{3} \times \frac{3}{3} = \frac{6}{9}$$

$$\frac{2}{3} \times \frac{8}{8} = \frac{16}{24}$$

$$\frac{2}{3} \times \frac{5}{5} = \left(\frac{10}{15}\right)$$

(10) $\frac{3}{5} + \frac{2}{15}$

$\frac{9}{15} + \frac{2}{15} = \frac{11}{15}$

(11) $\frac{11}{7} + \frac{12}{14}$

LCM = 14

$\frac{11 \times 2}{7 \times 2} = \boxed{\frac{22}{14}}$

$\frac{11}{7} + \frac{12}{14}$

$\Rightarrow \frac{22}{14} + \frac{12}{14}$

$\Rightarrow \frac{34}{14}$

$$
\begin{array}{r}
9\ 9\ 9\ {}^{2}9\ 9 \\
\ \ 9\ 9\ \ 9\ 9 \\
\ \ \ \ \ 9\ 9\ 0 \\
+\qquad\quad\ \ 9\ 9 \\
\hline
1\ 1\ 1\ 0\ 8\ 7 \\
\ \ \ 2\ 3\ \ 3
\end{array}
$$

$40928 \div 29$

0 2
2

$$
\begin{array}{r|l}
29 & 40928 \\
-0 & \\
\hline
40 & \\
29 & \\
\hline
119 & \\
-116 & \\
\hline
32 & \\
-29 & \\
\hline
38 & \\
-29 & \\
\hline
9 &
\end{array}
\qquad 0\ 1\ 4\ 1\ 1
$$

$29 \times 4 = 116$

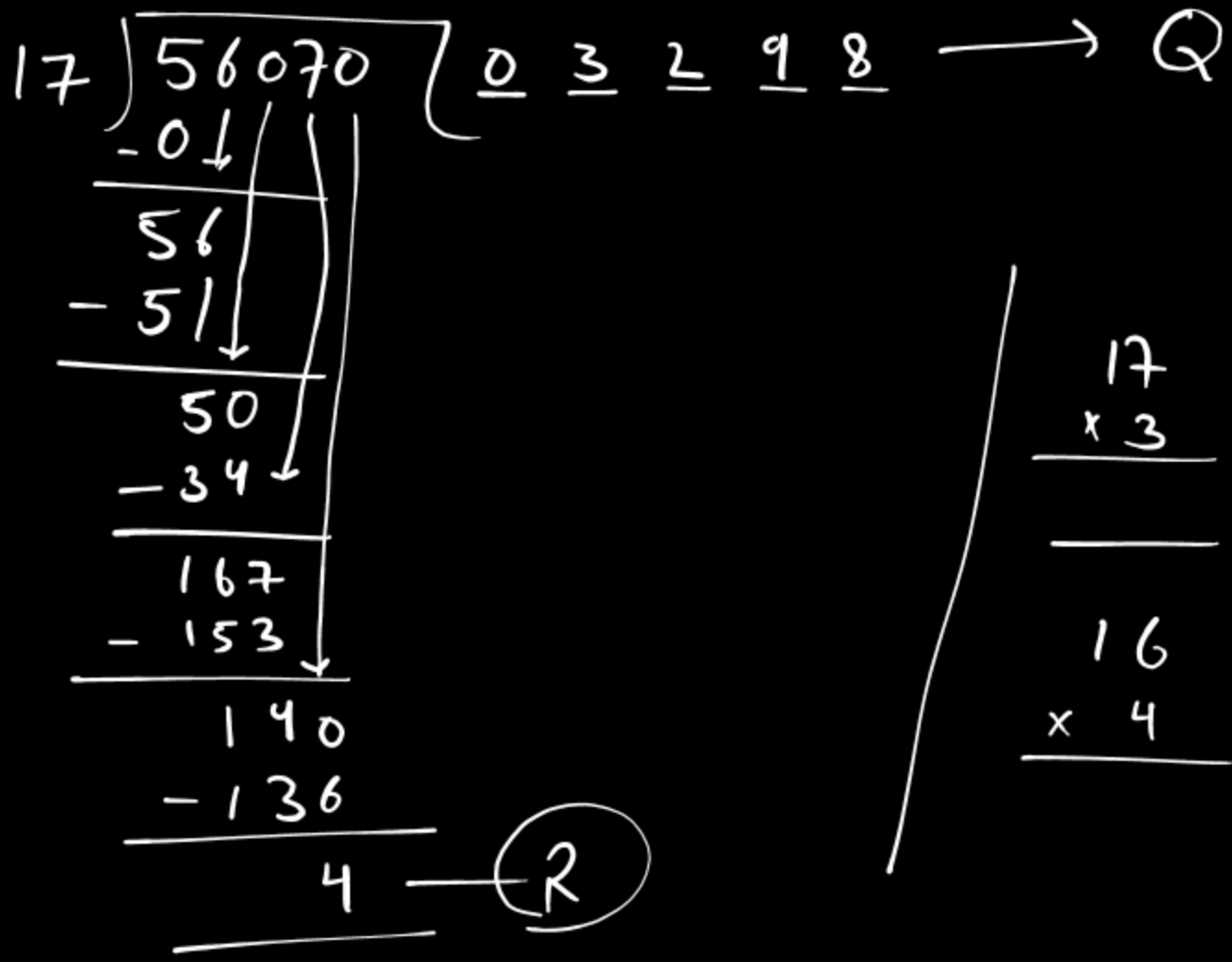
29×5

$40928 = (29 \times 1411) + 9$

$= 40919 + 9$

$= 40928$

$56070 \div 17$

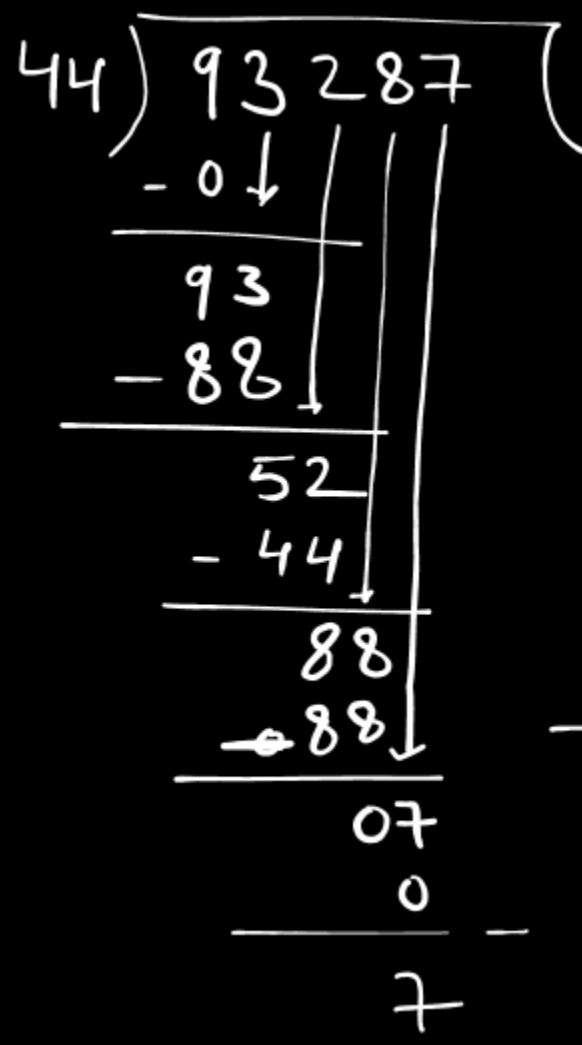


Dividend = Divisor x Quotient + Remainder

$= 17 \times 3298 + 4$

$= 56066 + 4$

$= \underline{56070}$



Dividend = Divisor × Quotient + Remainder

= 2120 × 44 + 7

= 93280 + 7

= 93287

2120
× 44

23 x 12

23 x (10 + 2)

230 + 46

276

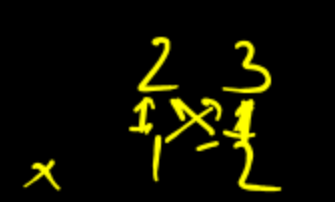
12 x 101

12 x (100 + 1)

1200 + 12

1212

2



276

1300 + 26

1003

↑23

13 x 102

1326

14 x 102

1428

23 x 103

2369

2300 + 69

23 x 1003

23000 + 69

230692

30) 91500 (

3050

3) 9150 (

3050 x 3

70) 141250 (

7) 14125 (

2017 Q.

14125 6 → Remaind

7

$$\frac{245900}{20}$$

$$12285$$

$$\frac{24590}{2}$$

$$1163$$

$$\frac{3490\,(1)}{3} \rightarrow R.$$

$Q = 1163$

$R \Rightarrow 1$

$$\frac{5}{9} - \frac{1}{6} = \frac{7}{18}$$

LCM of 9 and 6 = 18

$$\frac{5}{9} = \frac{10}{18}$$

$$\frac{1}{6} = \frac{3}{18}$$

$$\frac{10}{18} - \frac{3}{18} = \frac{7}{18}$$

Q. $\frac{15}{5}$, express it in simplest form.

$$\frac{15}{5} \begin{matrix} \div 5 \\ \div 5 \end{matrix} = \frac{3}{1} = 3$$ ✓ Simplest form.

This process is called Simplification.

Q. Simplify $\frac{15}{45} \begin{matrix} \div 5 \\ \div 5 \end{matrix} = \frac{3}{9} \begin{matrix} \div 3 \\ \div 3 \end{matrix} = \frac{1}{3}$

Simplest form

↓

Nu & de don't have any common factor.

Simplify $\frac{10}{60} = \frac{1}{6}$

Simplify $\frac{10 \div 2}{16 \div 2} = \frac{5}{8}$

Simplify $\frac{128 \div 2}{64 \div 2} = \frac{64 \div 2}{32 \div 2} = \frac{32 \div 2}{16 \div 2} = \frac{16 \div 2}{8 \div 2} = \frac{8}{4} = \frac{4}{2} = \frac{2}{1} = 2$

$15 + 15$
$+1 \quad +1$
$16 \quad +16$

$\begin{array}{r} 1 \\ 16 \\ +16 \\ \hline 32 \end{array}$

$\frac{5}{2} = 2\frac{1}{2} = 2.5$

$\begin{array}{r} 2.5 \\ +\ 2.5 \\ \hline \end{array}$

Find the value of $3\frac{4}{5} + 4\frac{3}{5} - 1\frac{1}{5}$

$$\Rightarrow \frac{19}{5} + \frac{23}{5} - \frac{6}{5}$$

$$\Rightarrow \frac{42}{5} - \frac{6}{5}$$

$$\Rightarrow \frac{36}{5}$$

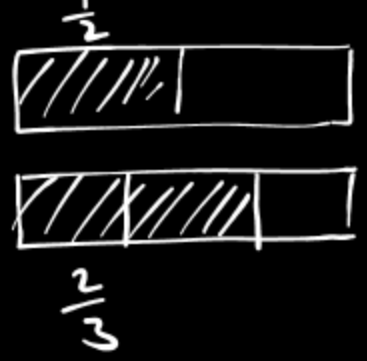
Arrange in descending order:

$\frac{9}{27}, \frac{1}{2}, \frac{5}{25}, \frac{4}{24}, \frac{10}{15}$

$\frac{1}{3}, \frac{1}{2}, \frac{1}{5}, \frac{1}{6}, \frac{2}{3}$

$\frac{2}{3} \quad \frac{1}{2} \quad \frac{1}{3} \quad \frac{1}{5} \quad \frac{1}{6}$

$\frac{10}{15} > \frac{1}{2} > \frac{9}{27} > \frac{2}{25} > \frac{4}{24}$



Fraction of a number

Q. find $\frac{3}{5}$ of 25

$$25 \times \frac{3}{5}$$

$$\Rightarrow \frac{25}{1} \times \frac{3}{5}$$

$$\Rightarrow \frac{25 \times 3}{1 \times 5}$$

$$= \frac{25 \times 3}{5}$$

of $\Rightarrow$ $\times$ multiply.

$25 = \frac{25}{1}$

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

$10 = \frac{10}{1}$

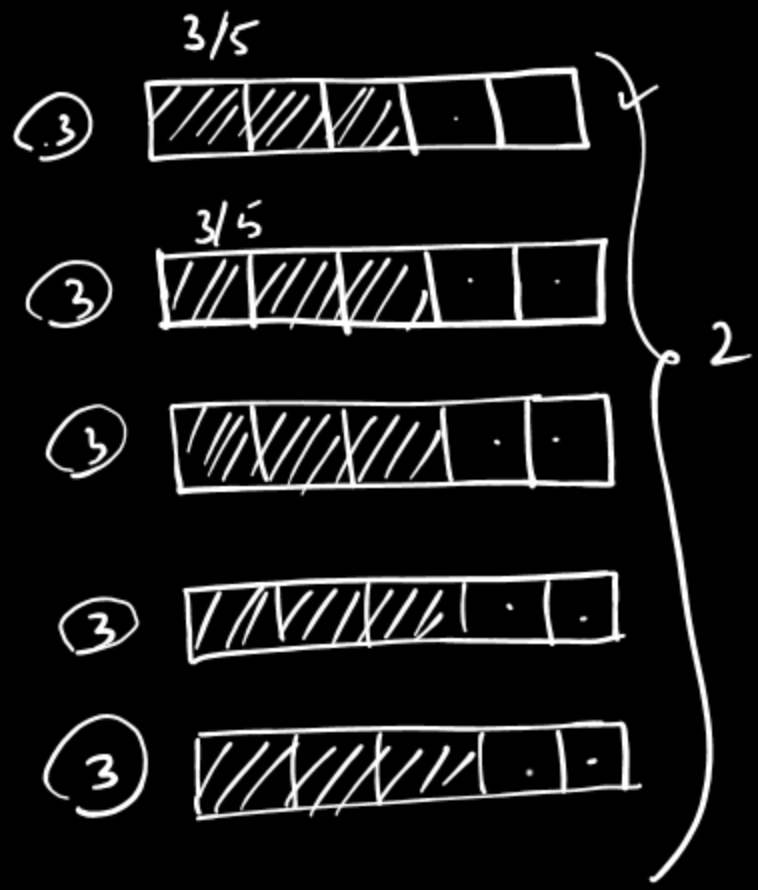
$\frac{3}{5}$ of 25

$\frac{3}{5}$ 3 parts out of 5 equal parts

$\frac{3}{5}$ of 25 = 15, 10 } 25

$\frac{3}{5} \times \frac{25}{1}^{5}$

$\frac{3 \times 5}{1} = 15$



Q. Find $\frac{7}{3}$ of 33

of = x

$\frac{7}{\cancel{3}_{1}} \times \cancel{33}^{11}$

$= \frac{7}{1} \times 11$

$= \underline{77}$

Find the value of $\frac{4}{27} + \frac{10}{9} + \frac{32}{27}$.

$\frac{4}{27} + \frac{30}{27} + \frac{32}{27} = \boxed{\frac{66}{27}}$

$\frac{10}{9} = \frac{30}{27}$ (×3)

mixed numeral

$\frac{66 \div 3}{27 \div 3} = \frac{22}{9}$ Simplest form

Improper

$99 \div 3$

mixed numeral

$2\frac{4}{9}$

Q. A florist has 12 roses, 2 out of them are white, 3 of them are yellow and rest are red. what fraction of the roses are red.

No. of Red roses = 12 − (2 + 3)

= 7

fraction of Red roses = $\frac{7}{12}$ ✓

Sohan filled one-seventh of a beaker with milk, and two-seventh with water. What part of the beaker is empty?

$\frac{1}{5}$

1 $\quad \frac{1}{7} + \frac{2}{7}$

1 

$\frac{1}{7} + \frac{2}{7} = \frac{3}{7}$

$1 - \frac{3}{7} \quad = \quad \frac{7}{7} - \frac{3}{7} = \frac{4}{7}$

Q. How many one-sixth makes 1 whole?

A) 4

B) 6

C) 10

D) 12

1/6

$6 \times \frac{1}{6}$

6 of $\frac{1}{6}$

$= \cancel{6} \times \frac{1}{\cancel{6}_1} = \frac{1}{1} = 1$

Match the column

Column A	Column B
(i) $\frac{4}{3} + \frac{3}{9}$	(a) $1\frac{2}{5}$
(ii) $\frac{8 \times 3}{5 \times 3} - \frac{3}{15}$	(b) $1\frac{7}{13}$
(iii) $\frac{7}{9} - \frac{1}{5}$	(c) $1\frac{2}{3}$
(iv) $\frac{12}{13} + \frac{8}{13}$	(d) $\frac{26}{45}$

$\frac{20}{13}$

$\frac{21 \div 3}{15 \div 3}$ $\frac{7}{5}$

$\frac{4 \times 3}{3 \times 3} + \frac{3}{9}$

$\frac{12}{9} + \frac{3}{9} = \frac{15 \div 3}{9 \div 3}$

$= \frac{5}{3}$

$\frac{4}{3} = \frac{12}{9}$ (×3)

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

If $a - \frac{11}{18} = \frac{5}{18}$ then $a = \_\_?\_\_$

(A) $\frac{13}{18}$

(B) $\frac{4}{5}$

(C) $\frac{8}{9}$

(D) $\frac{7}{18}$

$\frac{16}{18}$

$\frac{16}{18} \div 2 \div 2$

$\frac{8}{9}$

Q. If $\frac{\Delta}{5} - 1\frac{3}{10} = \frac{1}{10}$, find the the value of Δ.

(A) 3 (C) 2

(B) 6 ~~(D) 7~~

$$\frac{\square}{5} - 1\frac{3}{10} = \frac{1}{10}$$

$$\frac{\square}{5} - \frac{13}{10} = \frac{1}{10}$$

$$\frac{\square \times 2}{10} - \frac{13}{10} = \frac{1}{10}$$

$$\frac{\square}{5} = \frac{\square \times 2}{10}$$

$\times 2$

$$\frac{5}{12} + \frac{3}{6} = \boxed{\frac{11}{12}}$$

$\frac{1}{4} + \frac{5}{6} + \frac{3}{12}$ $\square$ $\frac{7}{12} + \frac{3}{6} + \frac{1}{3}$

$\frac{16}{12}$

(A) $<$

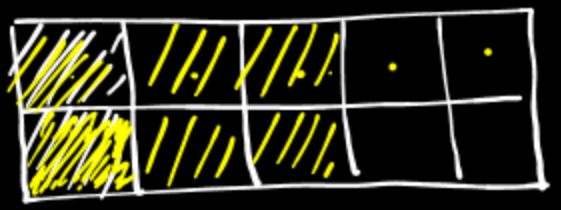
(B) $=$

(C) $>$

(D) Cannot say

Q. 2 out of 10 parts in a rectangle are shaded. Divya wants to shade $\frac{3}{5}$ of the rectangle. How many more parts she need to shade?

$\frac{3}{5} = \frac{6}{10}$



$\frac{6}{10} \Rightarrow \frac{3}{5}$

$\frac{1}{10}, \frac{2}{10}, \frac{3}{10}, \frac{4}{10}, \frac{5}{10}, \frac{6}{10}, \frac{7}{10}, \frac{8}{10}, \frac{9}{10}, \frac{10}{10}$

(A) 6 ✗

(B) 5

(C) 4

(D) 2

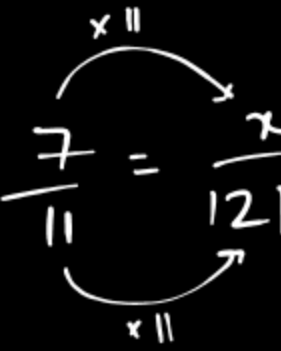
Q. The difference between $5\frac{1}{3}$ and $4\frac{1}{9}$.

$\boxed{\frac{11}{9}} \Rightarrow 1\frac{2}{9}$

$$x + \frac{11}{20} = \frac{19}{20}$$

$x = ?$ $\frac{8}{20}$

If $\frac{7}{11} = \frac{x}{121}$, find x and $\frac{x}{9}$



77

$\frac{77}{9}$ 'improper'

$8\frac{5}{9}$

$$\begin{array}{r} 11 \\ \times 11 \\ \hline 11 \\ 110 \\ \hline 121 \end{array}$$

$$9\overline{)77} \quad 8$$
$$-72$$
$$\overline{5}$$

Q. Shruti and payal shared a cake at a party. Shruti ate $\frac{1}{3}$ of the cake while payal ate $\frac{1}{9}$ of the cake. What fraction of the cake did they eat together?

A) $\frac{1}{3}$

B) $\frac{4}{9}$

C) $\frac{5}{9}$

D) $\frac{2}{3}$

$\frac{1}{3} + \frac{1}{9}$

$\frac{3}{9} + \frac{1}{9} = \frac{4}{9}$

Q. Sakshi bought a large pizza having 16 equal slices. Sakshi and her two friends ate 3 slices each. If she gave 4 slices to her brother, then what fraction of pizza is left with her.

(A) $\frac{7}{16}$

(B) $\frac{3}{13}$

(C) $\frac{3}{16}$

(D) $\frac{7}{13}$

$16 - (3+3+3) - 4$

3

Q. Find the difference between $\frac{1}{4}$ of 328 and $\frac{1}{7}$ of 147.

A) $\frac{4}{9}$

B) $\frac{3}{5}$

C) $\frac{4}{7}$

D) $\frac{5}{9}$

$2 \overline{)1708}$

$\frac{1708 \div 2}{28 \div 2}$

$\frac{854}{14}$

328×7

4×7

$\frac{1708}{28}$

$\frac{328 \times 7}{4 \times 7}$

$\frac{2296}{20}$

147×4

7×4

$\frac{1}{4} \times \frac{328}{1} = \frac{328}{4}$

$\frac{147 \times 4}{7 \times 4}$

$\frac{588}{28}$

$\frac{2296 - 588}{28} =$

End of the chapter