Decimals

$0.01 = 1/100$

$\frac{3}{13} \Rightarrow$

$$
\begin{array}{r|l}
13 & 30 \\
 & 26 \\
\hline
 & 40 \\
 & 39 \\
\hline
 & 100
\end{array}
\qquad 0.230
$$

$1/3 = 0.3333\ldots\infty$

$$
\begin{array}{r|l}
3 & 10 \\
 & 9 \\
\hline
 & 10 \\
 & 9 \\
\hline
 & 10 \\
 & 9 \\
\hline
 & 1
\end{array}
\qquad 0.3333
$$

$$
\begin{array}{r|l}
13 & 30 \\
 & 26 \\
\hline
 & 40 \\
 & 39 \\
\hline
 & 100 \\
 & 91 \\
\hline
 & 90 \\
 & 78 \\
\hline
 & 120 \\
 & 117 \\
\hline
 & 30
\end{array}
\qquad 0.230769230769\ldots
$$

$\frac{1}{3} \times 3$

$0.\overline{33} \times 3 = 1$

$0.33 = \frac{33}{100}$

$(0.333\ldots) \times 3$

$= 0.99\ldots9\ldots$

~ 1

Multiply fractions if the decimal number goes on till eternity

$\frac{1}{3} \times 0.33 = \frac{0.33}{3} = 0.11$

$= 3\overline{)0.33}$

Converting Decimals to fractions

$0.12 = 12/100 = 3/25$

$1.12 = \frac{112}{100} = 1\frac{12}{100} = 1\frac{3}{25}$

IMPROPER

$1 + \frac{12}{100} = 1 + \frac{3}{25}$

$= \frac{25}{25} + \frac{3}{25}$

7.24

MIXED NUMBER

SIMPLIFIED

$\frac{724}{100} = \frac{362}{50} = \frac{181}{25}$

5x5

$7\frac{6}{25}$

$25\overline{)181}\ 7$

175

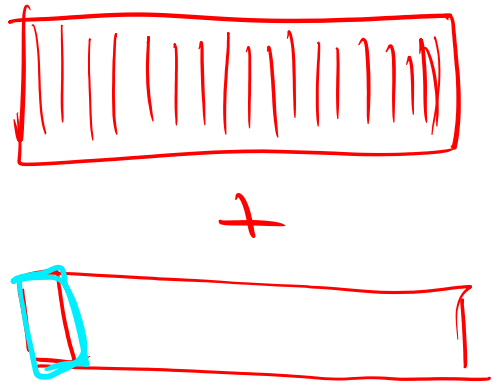
6

$700 > 350$

$\frac{700}{2}$

$\frac{700}{2}$

$360/2$



3-4 mins

$$7.24 = 7 + 0.24$$

$$= 7\left[\frac{24}{100}\right] = 7\frac{6}{25}$$ ✓

$$\frac{24/5}{100/5} = \frac{4.8}{25}$$

$5 \times 5 = 25$
$5 \times 4 = 20$

$4/5 = 0.8$

$= 5\overline{)40}$

$$24/5 = 4\frac{4}{5} \iff 4 + 0.8$$

4.8

$$5\overline{)24}$$
-20
40
40
0

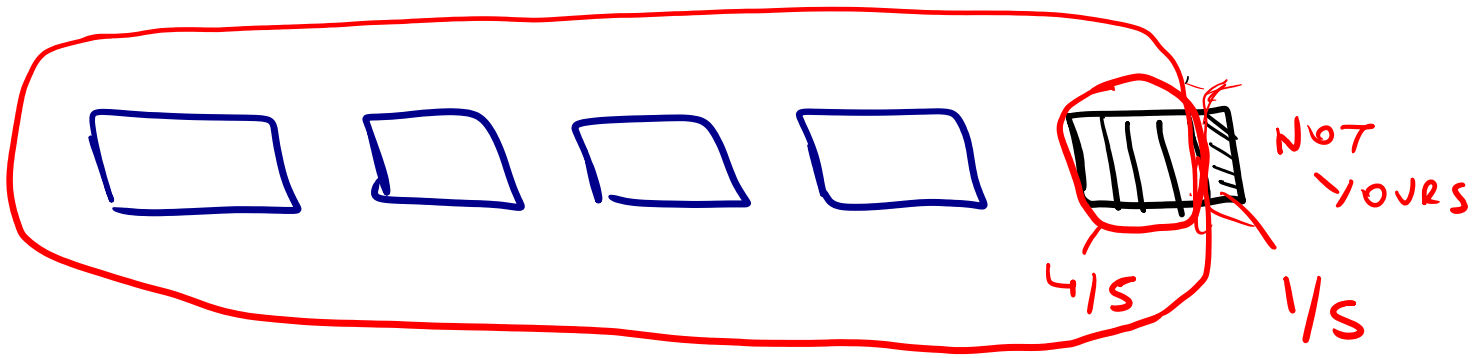
$$5\overline{)24}$$
20
4

4/5

$\frac{24}{5}$ = 4 whole parts

$\frac{24}{5} - 4 = \frac{4}{5}$

$\frac{24}{5}$ loaves of bread



$$\begin{array}{r} 0.8 \\ 5\overline{)\,40} \\ 40 \\ \hline x \end{array}$$

$4 + (4/5) = 4 + 0.8$

$= 4.8$

Different ways to write a Improper fraction

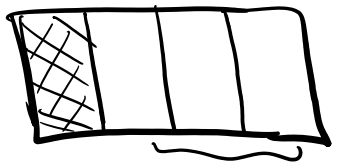
i) $2\frac{2}{5} = \frac{12}{5}$

ii) $2 + \frac{2}{5}$

iii) $2 + 0.4$

iv) 2.4

$$\begin{array}{r} 0.4 \\ 5\overline{)\,2\,0} \\ \underline{2\,0} \\ \times \end{array}$$



3/4

$\frac{1}{4} = 0.25$

$\frac{2}{5} - \frac{1}{4} = \frac{3}{20}$

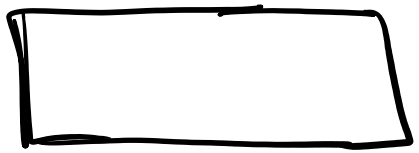
$0.4 - 0.25 = 0.15$

$$\begin{array}{r} 2.0 \\ +\ 0.4 \\ \hline +\ 2.4 \end{array}$$

$$\begin{array}{r|l} 0 & 40 \\ 0 & 25 \\ \hline 0 & 15 \end{array}$$

$$\frac{1}{4} \times \frac{25}{25} = \frac{25}{100} = 0.25$$

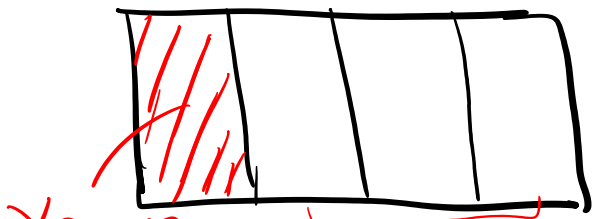
H.W



1 loaf

(2/5) th of the loaf.

The shop keeper cuts the bread into 4 parts. He gives 1 part to you.

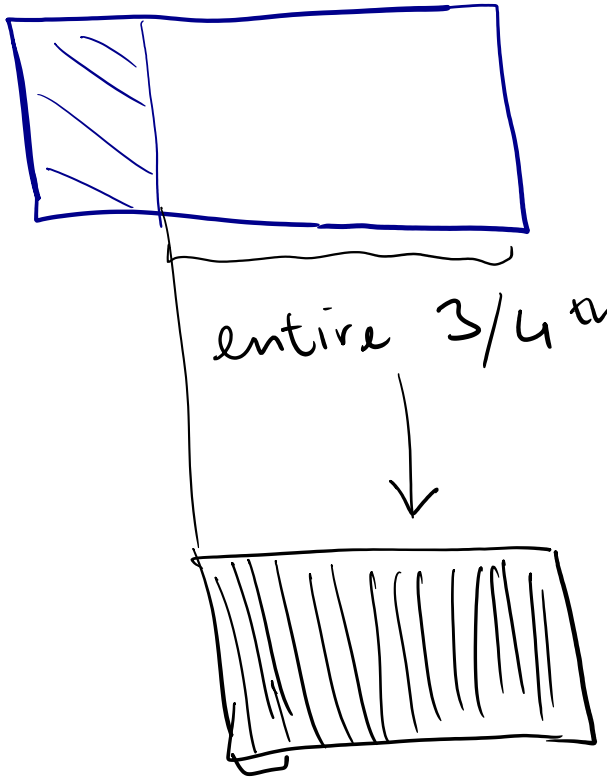


Yours

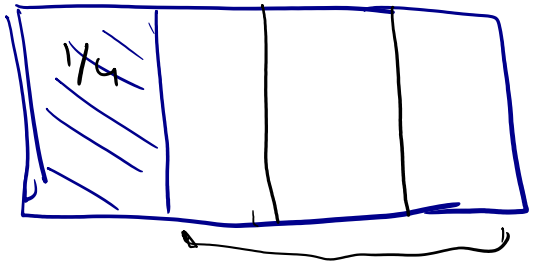
What do we do now so that you get your remaining required loaf of bread?

What are the possible number of cuts that need to be made?

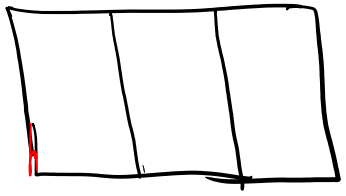
1)



2)



3 1/4 ths
Quarters



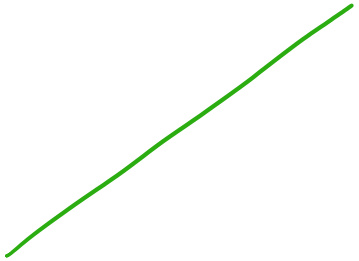
Adding 17 cuts ↑ (19)

17 + 2 = 19 cuts

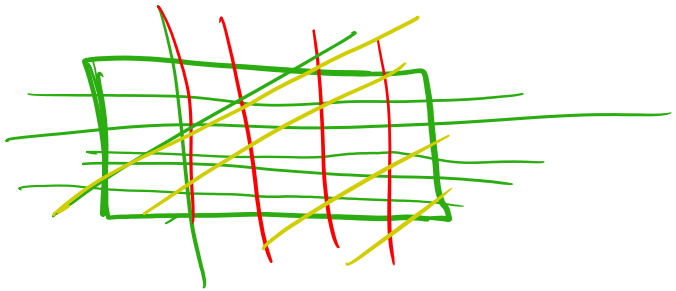
Q- Lets assume we are making only vertical cuts

Vertical

Horizontal



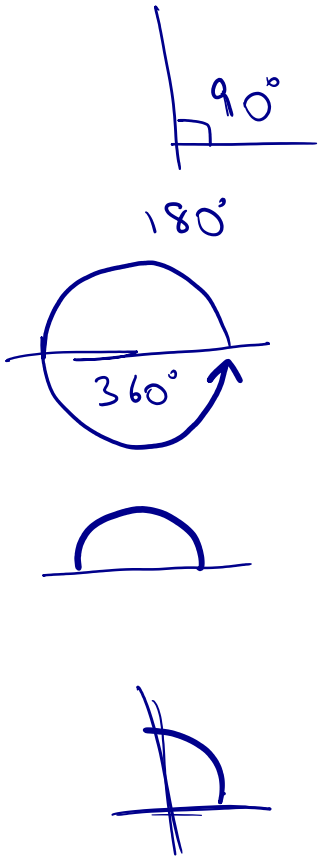
Slanting cut

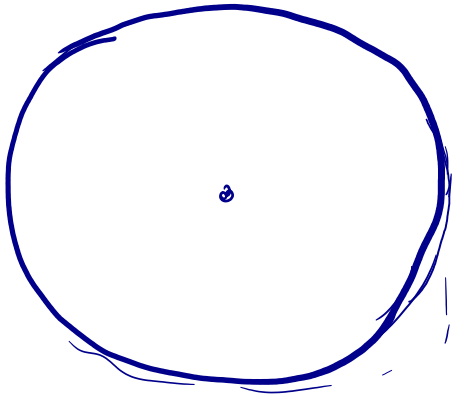


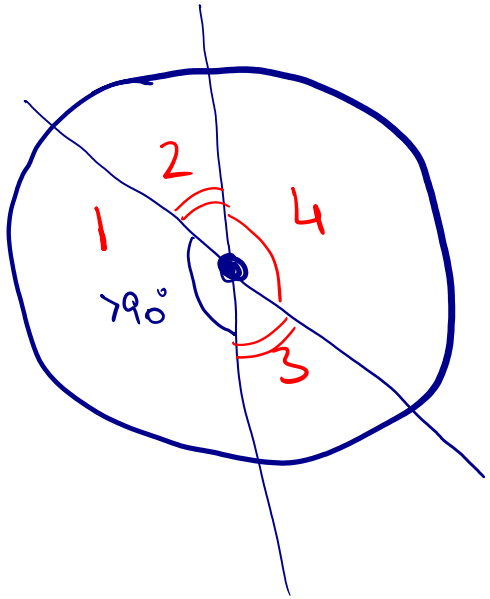
A cake

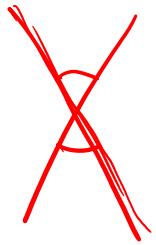
Need to cut it into 8 equal pieces.

I can only use 3 cuts.

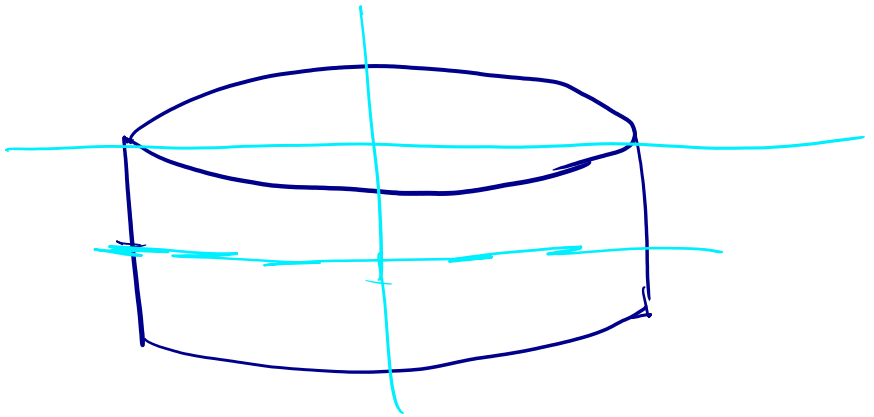


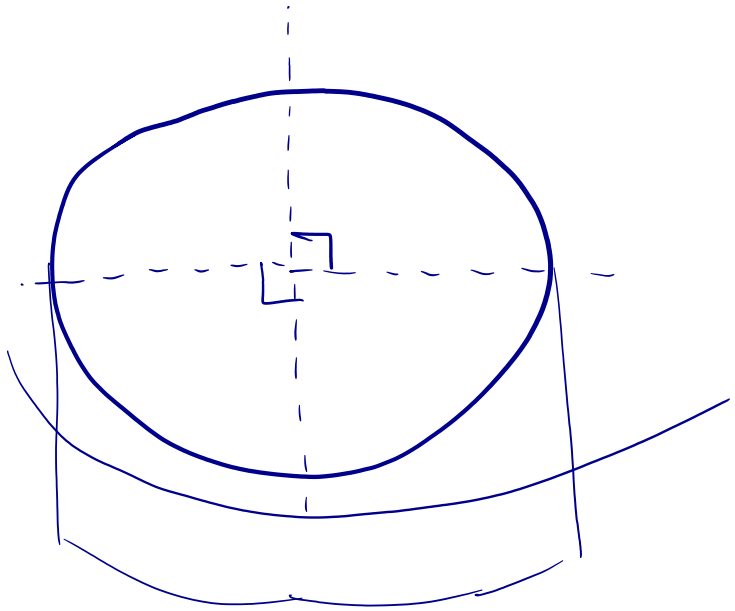


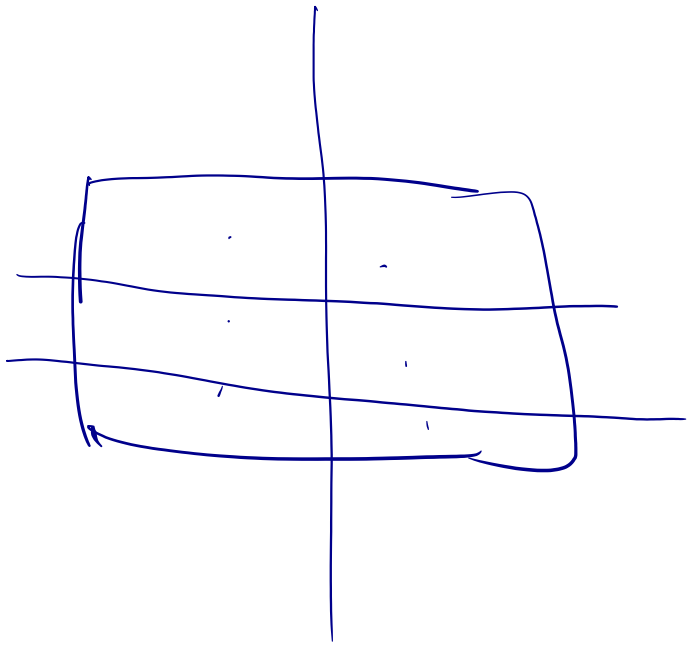


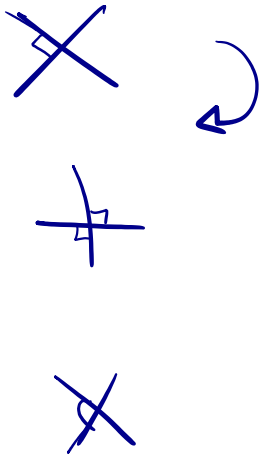


Vertically opposite angles.







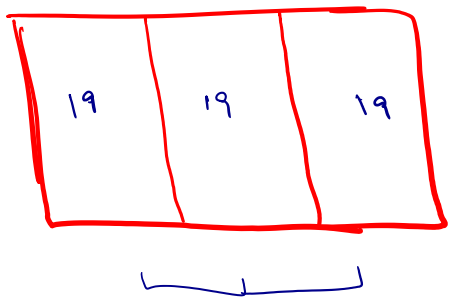


Dividing it into 40 pieces

39 cuts

$-2 = 37$ ✗

3/20 of the loaf



60 pieces

9/60

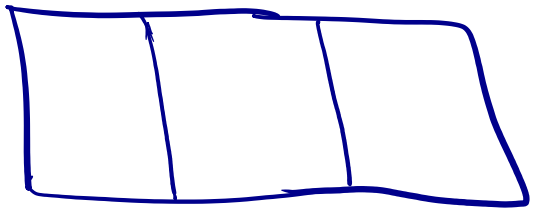
✓ Divide it into 60 pieces

59 cuts

$-2 = 57$

$57/3 = 19$

9 small pieces



LCM

3, 20

60

20 ✗

40 ✗

60 ✓

80 ✗

100 ✗

120 ✓

18/120

I need 20 equal parts.

But I've already made 3 equal parts

20 — 3
40 — 6
60 — 9

LCM

54 7

108
162
216
270

3/20 ← 1.5 → 0

1/6.666

20 is the min. number of cuts, out of which I need 3.

i) Add/ Decimals?
Subtract

ii) Multiply.

$+7.14$
-6.57
$+0.451$

$$\begin{array}{r} {}^{8}\,{}^{24} \\ 714 \\ \times\ 61 \\ \hline 43554 \end{array}$$

Simplification

HW

7.14×0.61

i) 7.14×0.99

ii) 7.14×1.01

iii) 7.14×1.23

iv) 7.14×1.99

Addition

Distributive law

v) 7.14×1.02

$7.14 \times (1 + 0.02)$

BODMAS

Q - Is the product more or less than 7.14

And by how much is it more or less than 7.14?

$$5 \times 4 = 20$$

$$5 \times (1 + 3) = 5 \times 1 + 5 \times 3$$

$$= 5 + 15$$

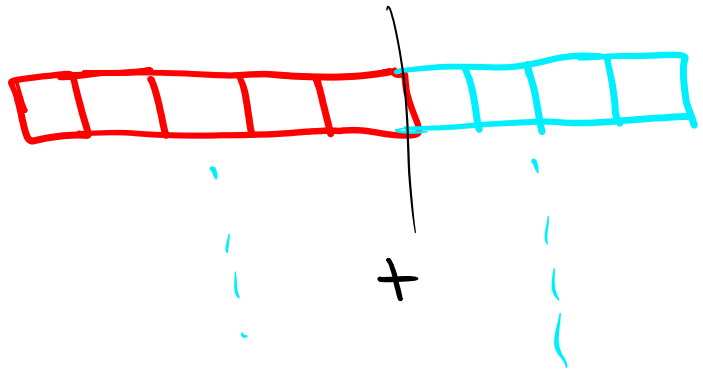
$$= 20$$

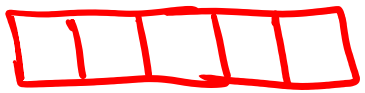
Distributive laws

$a \times (b + c) = a \times b + a \times c$

$10 \times (5 + 4) = 10 \times 5 + 10 + 4$

$a = 10$
$b = 5$
$c = 4$





7.14×1.01

Q - 7.14×101 Change the way of representing this product?

1st step) $7.14 \times (100 + 1) \Rightarrow 7.14 \times$

$7.14 \times 100 + 7.14 \times 1$

2nd step) $\Rightarrow$ $714.00 + 7.14$

$714 + 7.14$

$$7\,14 + 7.14$$

$714.00 + 7.14$

$$\begin{array}{r} 714.00 \\ 7.14 \\ \hline 721.14 \end{array}$$

3rd step) $714 + 7 + 0.14$

4th step) $721 + 0.14$

721.14

$7.14\,(10\,1)$

721.14

$25 \times 101 = 2525$ ✓

✓ Real 1, 2, 3 ..... ∞

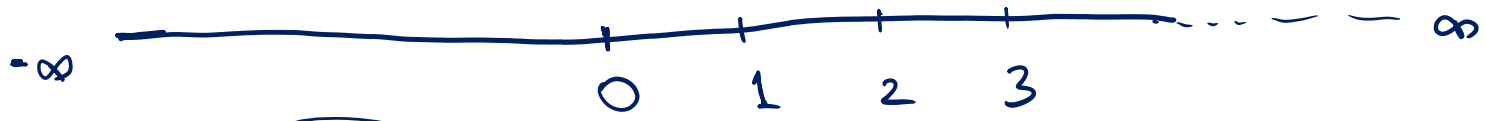
✓ Whole 0, 1, 2, ... ∞

Integers -3, -2, -1, 0, 1, 2 ..... ∞

$5 - 7 = -2$

LHS RHS

Same sign different terms $\begin{cases} -2 + 7 = 5 \\ 7 - 2 = 5 \end{cases}$



LHS = RHS

$5 + (5 + 2)$

$\Rightarrow 5 + 5 + 2$

$5 + (7 = 2)$

$5 + (5) = 10$

$5 - (5 + 2) = 5 - 5 - 2$

$= -2$

$5 + 7 - 2 = 10$

$5 - (5 + 2)$

One unit

X No sign

$$12 - [20 \div \{8 - 2 \times 2\}]$$

$$12 - [20 \div \{4\}]$$

$$12 - [20 \div 4]$$

$$12 - [5]$$

$$12 - 5 = 7 \sim 7$$

BODMAS

- Brackets
- Division
- Multiplication
- Addition
- Subtraction

$$\{8 - 2 \times 2\}$$

$$\{8 - 4\} = 4$$

Addition of a +ve and a -ve number is SUBTRACTION

1st Method

$$5 - (7 - 2)$$

$$5 - (5)$$

$$5 - 5 = 0$$ ✓

$$5 - (7 - 2) = 0$$

$$5 - 7 + 2 = 0$$

$$5 - 5 = 0$$

Attach (-) to everything every number inside

$5 - 7 = -2$

$(7 - 2)$ ← Same

$(7 + (-2))$

The difference bwn 7 & 2 is the same as the sum of 7 and (-2) ✓

$7 - 5 = 2$

$7 + (-5)$

+ve -ve

$7 - 5 = 2$

$5 - (7 - 2)$

$5 - 7$

30.0

HW $7 \times 101.00 = 707.00$

$7 \times 1.01 = 7.07$

HW

1) $6 \times 5 = 30$ ← Given

$6 \times 0.5 = 3.0 = 3$

2) $7 \times 21.0 = 147.0$

$7 \times 0.21 = 1.47$

3) $9 \times 12 = 108$

$9 \times .12 = 1.08$

4) $11.0 \times 15.0 = 165.0$

$.11 \times 0.15 = 0.0165$

$2 + 2 = 4$

1st statement is already given. Find the answer of the 2nd equation

5) $7.14 \times 101 = 721.14$

$7.14 \times 1.01 = 7.2114$

6) $131 \times 78 \times 4 = 42122.0$

$1.31 \times 0.78 \times 0.04$

$2 + 2 + 2 = 6$

$= 0.042122$

→ Whenever we multiply numbers having zero's at their end, we need to find the product without the extra 0's at their end & finally ADD all the zero's up together.

$400 \times 30 = 12000$

$400 \times 10 \times 3$

$4000 \times 3 = \boxed{12000}$

[If I multiply with 0's, we move the decimal point to the right.

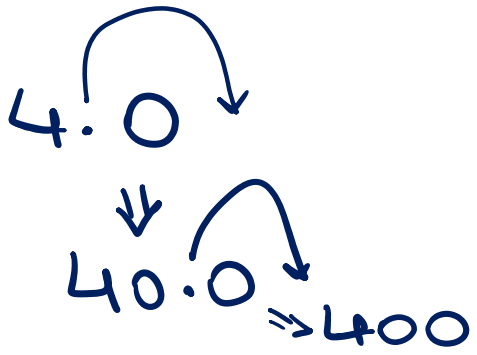
$4 \times 3 = 12$

$4.0 \times 3.0 = 12.0$

$400.0 \times 30.0 = 12.000$

$2 + 1 = 3$

$= 12000.0$



12.0 → 120

6.0 → 6000

3+1 = 4

4 places to the right

$12.0 \times 6.0 = 72.0$

$12 \times 6 = 72$

$120 \times 6000 = 7,20,000$

720 thousand

or

7 lacs 20 thousand

$5 \times 121 = 605$

$500 \times 1210 = 605000$ ✓

$5 \times 13 \times 9 = 585.0$

$.5 \times 0.13 \times 900 = 58.5$

5 0.5

1 Left

13 0.13

2 ~~Left~~

9 900

2 ~~right~~

5.0 50.0 72000.0

= = =

5 50 72000

1 place to the left

$17 \times 8 \times 5 = 680$

$17 \times 0.008 \times 5000 = 680$

$17 \times 8 \times 5 = 17 \times 40$

$= 68$

17×4

$17 \times 2 \times 2$

$(15+2) \times 2$

$15 \times 2 + 2 \times 2 = 34$

HW
5 min

i) $7 \times 4 \times 8 = 224$

$0.7 \times 40 \times 800 = 22400$

ii) $6 \times 31 \times 108 = 20088$

$0.6 \times 3.1 \times 10.8 = 20.088$

iii) $21 \times 8 \times 3 = 504$

$2.1 \times 0.008 \times 0.3 \times 1000 = 5.04$

iv) $10 \times 1000 = 10000$

$10 \times 0.1 = 1$

$\rightarrow 21 \times 8 \times 3 \times 1 = 504$

$2.1 \times 0.8 \times 0.003 \times 1000 = 5.04$

0.00504000

$$\frac{504}{\frac{21 \times 8 \times 3 \times 100}{100}}$$

5.04×100

5.04×100

$= 504$

$$\frac{100}{504 \times 100}$$

$504.00 \times 100 = 50400.00$

10,000

-5000

1 month

5000

-4500

500

-1000

Distributive law

$5 \times (4+3) = 5\times4 + 5\times3$

$7 \times (-4)$

1) → $7 \times (6-4) =$

2) → $7 \times (6 + (-4)) = 7\times6 + 7\times(-4)$

$42 - 28 = 14$

$7.14 \times (0 + 0.99)$

$6\,(3+4)$

$6\times(7) = 42$

$\begin{cases} -2+2=0 \\ 2-2=0 \\ 2+(-2) = 2-2=0 \end{cases}$

Adding

(-2) 6 times

$(-2) + (-2) + (-2) + (-2)$

$(-2) + (-2) = -12$

Balance = -12

Debt = 12 Rs

$6 \times (-2)$

$-2 + (-2) + (-2)$

H.W ✓

Multiplication rules

$5 \times 4 = 20$ (positive)

$(+) \times (+) = (+)$

$6 \times (-2) = -12$ (negative)

$(+) \times (-) = (-)$

$(-6) \times 2 = -12$ (negative)

$(-) \times (+) = (-)$

$(-6) \times (-2) = +12$ (positive)

$(-) \times (-) = (+)$

⊕ +

7.14×0.99

$7.14 \times$

Process

7.14×1.01

$7.14 \times (1 + 0.01)$

$7.14 \times 1 + 7.14 \times 0.01$

$7.14 + 0.0714$

H.W.

i) $6.28 \times 0.0001 =$

ii) $10.14 \times 100 \times 0.1 =$

iii) $142.8 \times 0.1 =$

Magic Numbers

1, 0

1
10
100
1000
⋮

0.1
0.01
0.001
0.0001
0.00001
⋮

728432 × 0.00001 = 728432.0

= 7.28432 ✓

1) 7.14×0.99

$7.14 \times (1 - 0.01)$

$7.14 \times 1 + 7.14 \times (-0.01)$

$7.14[1 + (-0.01)] = 7.14[1 - 0.01]$

$7.14 \times 1 + 7.14 \times (-0.01)$

$7.14 + (-0.0714)$

$7.14 - 0.0714$

$7.14 \times (1.01)$

$7.14 \times (1 \pm 0.01)$

$7.14 \times 1 \pm 7.14 \times 0.01$

7.14 is being multiplied

+1

+0.01

$5 + (-2) = 5 - 2$

Acc. +5 $5 + (-7)$

$-2 / +3$ (-2)

Think about BODMAS

Logic

i) $5 \times 4 - 3 + 6 \div 2$

$\rightarrow 20 - 3 + 6 \div 2$

$17 + 6 \div 2$

$23 \div 2 = 11.5$

$5 \times 4 \quad -3+3$

$20 - 3 + 3$

20

ii) $(5 \times 4 - 3 + 6) \div 2$

$7.14 \times 0.99 = 7.14 \times (1 - 0.01)$ 1)

ENTIRE PROCESS (FUNDAMENTALLY)

2) $\Rightarrow 7.14 \times (1 + \{-0.01\})$

Distributive Law

$a \times (b + c) = a \times b + a \times c$

$\Rightarrow$ 3) $\Rightarrow 7.14 \times 1 + 7.14 \times \{-0.01\}$

4) $\Rightarrow 7.14 \times 1 - 7.14 \times 0.01$

5) $\Rightarrow 7.14 - 0.0714$

6) $\Rightarrow 7.$

$$\begin{array}{r} 7.14^{13}0^{10} \\ 0.0714 \\ \hline 7.0696 \end{array}$$

Greater than

6.15

6.1400000

7.14

0.23

7.

7.14000000

0.07140 0

≈ 7.07

Approximately

Most significant

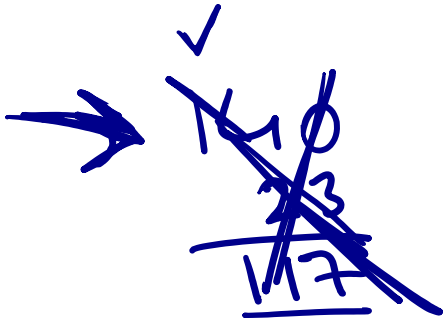
4.9312

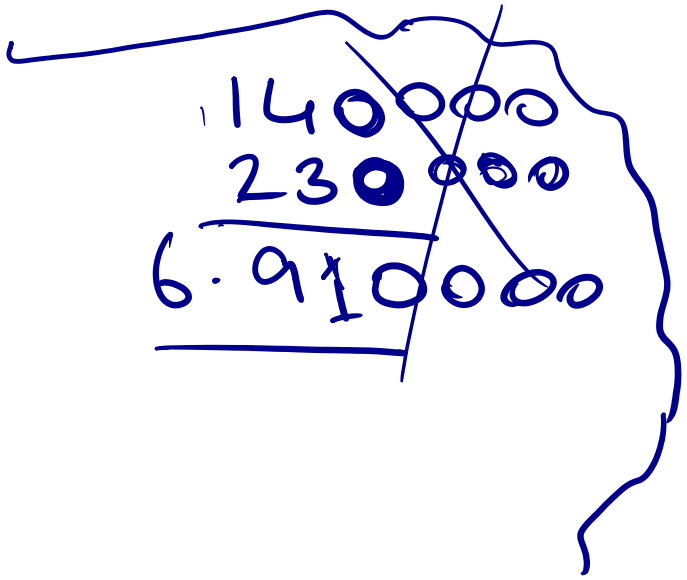
4.931

least significant

1400

-0714





700 , 14

1400 - 714

=> 1400 - (700 + 14)

outside

=> 1400 - 700 - 14 = 686

$7.14 \times 0.99 = 7.0686$ ✓

$\Rightarrow 7.14 \times 1.99 = 7.14 \times (1 + 1 - 0.01)$

$7.14 \times 2 - 0.01 = 7.14 \times (2 - 0.01)$

inside

11

1.99

$5.021 \times 2.01 = 10.042 + 0.05021$

$= 10.09221$

$5.021 \times (2 + 0.01)$

5021
201

5021
×
10042××

10.09221

5021 ⇒ 5000 + 0.021
5021 ⇒ 5.000 + 0.021
10 ⇒ 0.042

5....

$\sim 5 \times 2 = 10$

$$6.01 \times 4 = 4 \times (6 \pm 0.01)$$

$$= 24. + 0.04$$

$$= \boxed{24.04}$$

$7.01 \times 3 \approx$

7

- a) 20
- b) 19
- c) 21
- d) 22

i) First find the approx. answer

ii) Then calculate the real answer (bracket technique) & confirm the hypothesis.

$6.99 \times 4 \approx$

a) 27
b) 28 ✓
c) 29
d) 26

(7) 0.1

0.01

0.0004

27.96 ✓

The answer is correct

$6.49 \times 2 = (6.5 - 0.01) \times 2$

$= 6.5 \times 2 - 0.01 \times 2$

$= 13 - 0.02$

$= 12.98$

$6 + 0.49$

$12 + 0.98$

12.98

0.01

$6.50 \sim 6.49$

$12 + 1 = 13$

$6.49 \times 7 =$

$6 \times 7 = 42$

$7 \times 7 = 49$

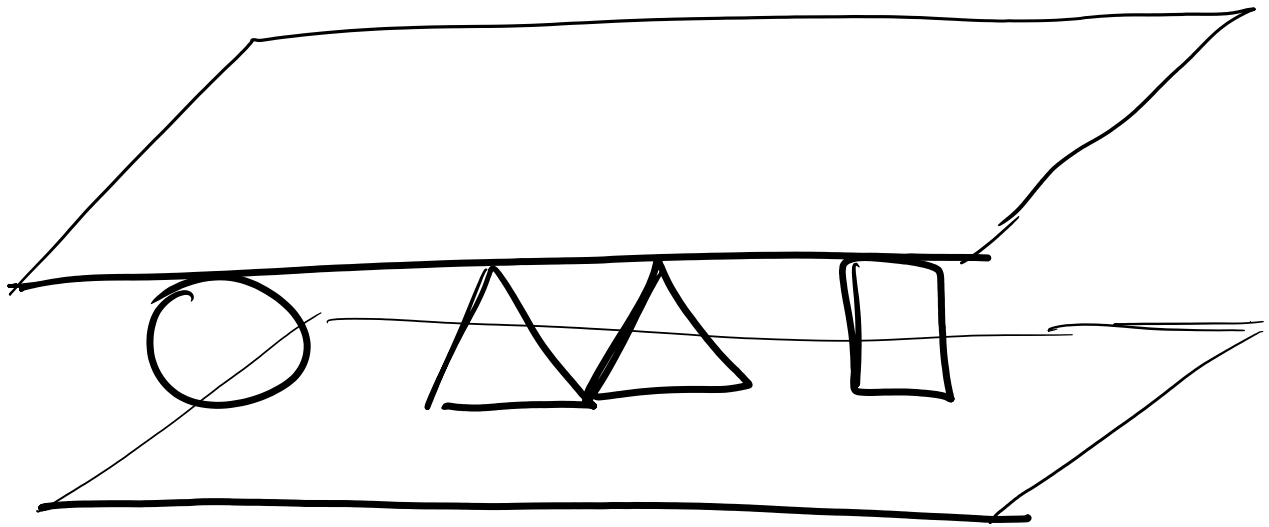
$6.5 \times 7 = 45.5 \sim 45.43$

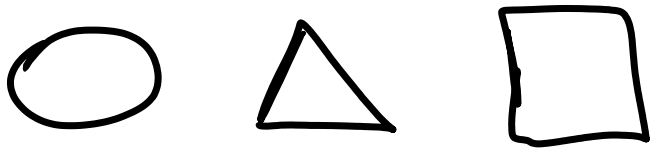
$\begin{array}{r} {}^{3}\,{}^{6}\,{}^{6}\\ 6.49 \\ \times \quad 7 \\ \hline 45.43 \end{array}$

$$1.5 \times 73 = \sim$$

$73 \times 1 = 73$

$73 \times 2 = 146$ ⇒





$198 - 126 + 6 = 198 + 6 - 126$

$= 198 - 6 + 126$

Always follow DMAS

$(+198) + (-126) + (+6)$

$198 - 126$

$+ (-ve)$

$-ve$

REDO

✓i) $(+198) - (-126) + (+6)$

✓ii) $(+198) - (+126) + (+6)$

✓iii) $(+198) + (-126) + (+6)$ — (iii)

new HW

iv) $(-198) - (-126)$

v) $(-198) - (+126)$

vi) $(-198) + (-126)$

iii) 198 - 126 (Subtracting 126 from 198)

1) $198 - (+126)$

$198 - 1 \times (+126)$

$1 \times (\quad) = (\quad)$

$-1 \times (\quad) = -(\quad)$

a) $198 - 126$

b) $+198 + (-1 \times (+126))$

Addition of 2 numbers

1) $(+198) - (-126)$

$(-) \times (-) = +ve$

i) $(+198) + -1 \times (-126)$

(-ve) (-ve)

$-1 \times ( ) = -( )$

$-1 \times (-126) = -ve(-126)$

$= +126$

$(+198) + (+126)$

$+1 \times (-126)$

$= -126$

$+198 + 126$

324

ii) $+198 - (-126)$

$(+198) - (-126)$

iii) $+198 - \{+1 \times (-126)\}$

$198 - (-126)$

$198 + 126$

9) 198 −

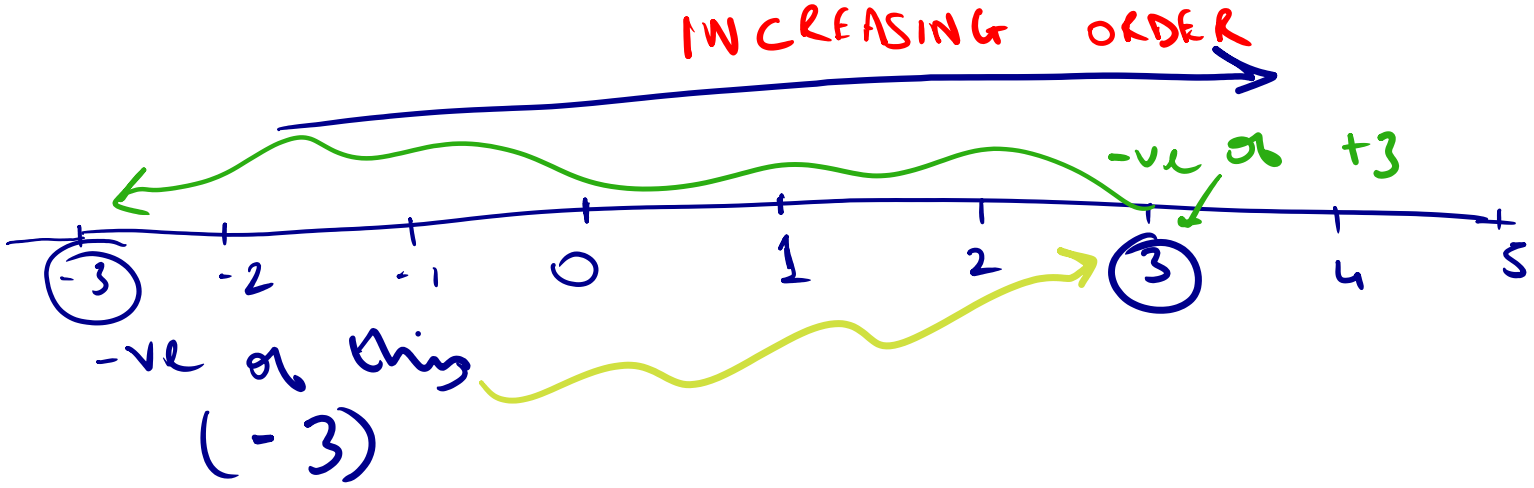
$+198 - (-126)$

$-20000 > -50000$

A B

Bank Balance

(A) has more money than
(B) in his bank account



$50000 > 20000$

-ve it just reverses

$0.2 \times 0.2 = 0.04$

2 decimal

$\frac{2^{1}}{10_{5}} \times \frac{2^{1}}{10_{5}} = \frac{1}{25}$

$\frac{2}{10} \times \frac{2}{10} = \frac{4}{100}$

$25 \overline{)10}$ → 0.04

100

$\frac{100}{\times}$

4 = 4.0

.04

0.04

Divide by $10, \frac{}{}, \ldots$

Multiply by $100, \times$

$$(-198) - (-126)$$

Subtracting a (-ve) number from another negative(-ve) number.

i) Represent as an addition of 2 numbers

2 numbers could be (+ve, +ve), (+ve, -ve), (-ve, +ve), (-ve, -ve)

( ) + (-)

ii) Simply solve

$198 - 126 + 6$

$(+198) + (-126) + 6$

overrule the DMAS

$198 - 126 + 6$

$198 - (126 + 6)$

Cut to this

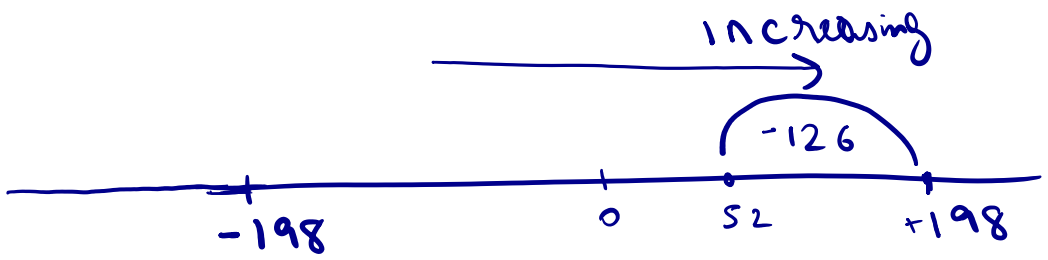
$198 - 126 + 6$

$198 - (+126$

v) $(-198) - (+126)$

Subtracting a (+ve) number from a (-ve) number.

$-198 - 126$



-ve +ve

UNDERSTAND