Numbers

Chapter 1

Class 1

- <u>Sets</u> →

- <u>Ratios</u> & <u>Proportion</u>

- <u>Profits</u> & <u>Loss.</u>

$$21 \div 7 + 6 - 5 \times 3 = -6$$

$$\underline{9 - 15} = -6$$

Round bracket →
small bracket ( )

[   ] → Square bracket
→ Big bracket.

{ } → Curly bracket

→ Braces

$$12 - [6 \div 3 + \{8 \div 2(8-6)\}]$$

$$\Rightarrow \quad 12 - [2 + \{8 \div 2 \times 2\}]$$

$$\Rightarrow \quad 12 - [2 + 8]$$

$$\Rightarrow \quad 12 - 10$$

$$\Rightarrow \quad 2 =$$

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Prime nos. less than 20.   48,

2, 3, 5, 7, 11, 13, 17, 19

LCM (12, 16)

LCM (48, 72) = 2×2 × 2×2 × 3×3 = 144

$$\begin{array}{r} 16 \\ \times 9 \\ \hline 144 \end{array}$$

LCM(96, 108, 180)

$$2 \mid 96, 108, 180 \quad \checkmark$$

$$2^5 \times 3^3 \times 5^1$$

$$\Rightarrow 32 \times 27 \times 5$$

$$\Rightarrow 4320$$

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HCF (60, 72)

2	60, 72
2	30, 36
3	15, 18
	5 6

$HCF = 2 \times 2 \times 3$
$= 12$

$$HCF(56, 84, 154) = 2 \times 7 = 14$$

$$
\begin{array}{r|l}
2 & 56, \ 84, \ 154 \\
\hline
7 & 28, \ 42, \ 77 \\
\hline
 & 4, \ 6, \ 11 \\
\hline
\end{array}
$$

Fractions:

$$\frac{7}{5} \div \frac{28}{40}$$

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

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

$$\frac{7}{5} \begin{array}{c} \times 3 \\ \times 3 \end{array} = \frac{21}{15}$$

$$= \frac{7+2}{5} = \frac{9}{5}$$

$$\frac{21}{15} + \frac{2}{15}$$

$$\boxed{\frac{23}{15}}$$

$$\frac{\boxed{7}}{5} \times \frac{\boxed{15}}{14} = \frac{\overset{1}{7} \times \boxed{15}^{3}}{\boxed{5} \times 14}_{2} = \frac{1 \times 3}{1 \times 2} = \frac{3}{2}$$

$$\frac{7}{5} \div \frac{28}{40} = \frac{\overset{\boxed{1}}{7}}{5}_{1} \times \frac{\overset{8^{2}}{40}}{28}_{1} = \frac{1 \times 2}{1 \times 1}$$
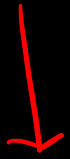
$$= 2$$

$$\frac{\text{HCF}(135, 180)}{\text{HCF}(217, 385, 735)}$$

Class 2

201859

Place value and face value of 8 in the above no. ?

$8 \times 100 = 800$

8

1 Mega $\rightarrow$ 10^6 $\rightarrow$ 1000000

1 Googol. $\rightarrow$ 10^{100}

1 Googolplex $\rightarrow$ 10^{googol} $(10)^{10^{100}}$ $\rightarrow$ $10^{(1000\ldots\ldots\ 100\ zeros\ )}$

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$\uparrow$

Misspelling of the word Googol

Integers

Natural Number :

        ↳ Counting number

        eg. $1, 2, 3, \ldots, \infty$

Whole Number :

Zero and natural numbers together are called whole number

        eg. $0, 1, 2, 3, 4, \ldots, \infty$

Integers

$\rightarrow$ whole nos. + all negative number

eg $-\infty...., -3, -2, -1, 0, 1, 2, 3, ... + \infty$

Integers are directed numbers
↓
Directional.

①

$\boxed{+45m}$
↓
45m above sea level

$\boxed{-45m}$
↓ 45m below sea level
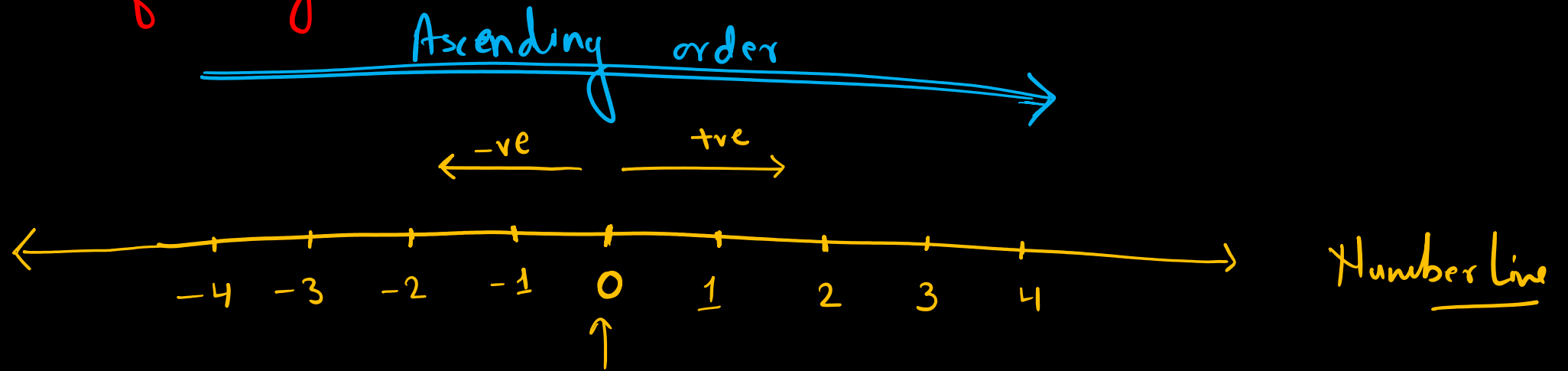
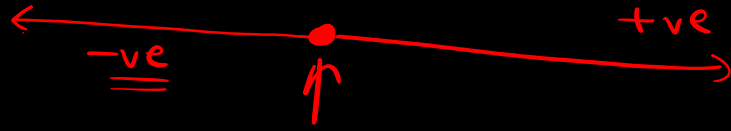↑ above sea level +ve number
~~~ → sea level
↓ below sea level is represented using -ve numbers

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(11) If the temperature above freezing point (0°C) is represented by **+ve number**, then the temp. below freezing point is represented by negative number (negative integer)
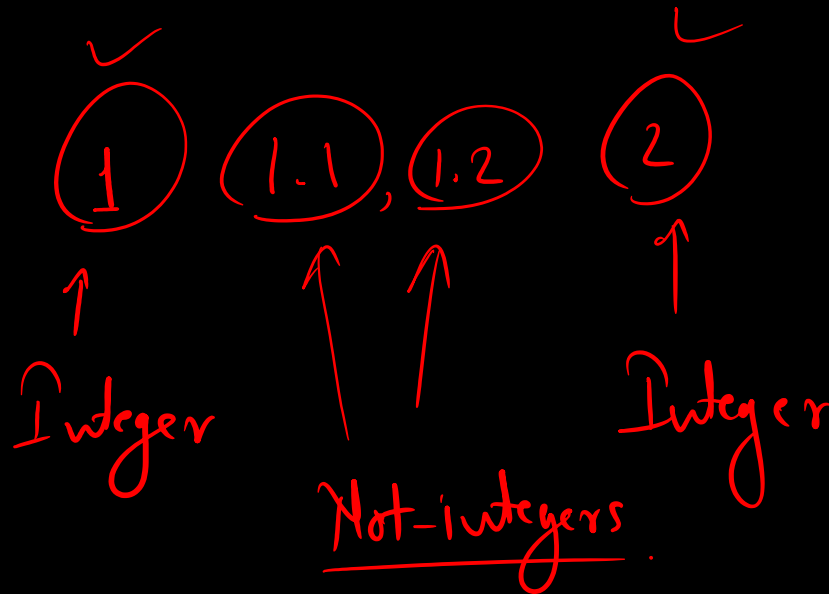
for eq.

13°C above freezing point ⟹ +13°C

13°C below freezing point ⟹ −13°C

Class 3

−ve   +ve

Reference Point

-3

1 $1.1 , 1.2$ 2

Integer   Integer

Not-integers

Representation of Integers on number-line

Ascending order

-ve   +ve

-4 -3 -2 -1 0 1 2 3 4   Number Line

Reference point / Starting point

(Origin)

All non-negative integers : [0, 1, 2, 3, ... ∞]

All positive integers : [1, 2, 3, 4, ... ∞]

All non-positive integers : [0, -1, -2, -3, ... ∞]

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Addition and Subtraction of Integers
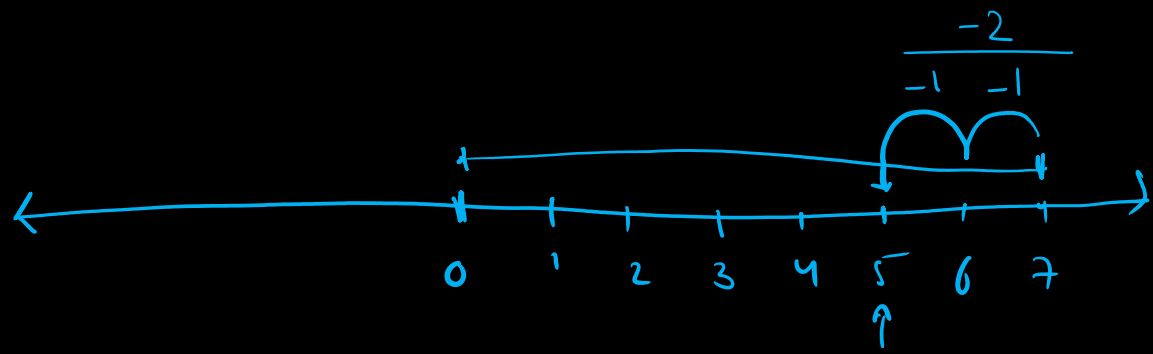
$$+7 = 7$$
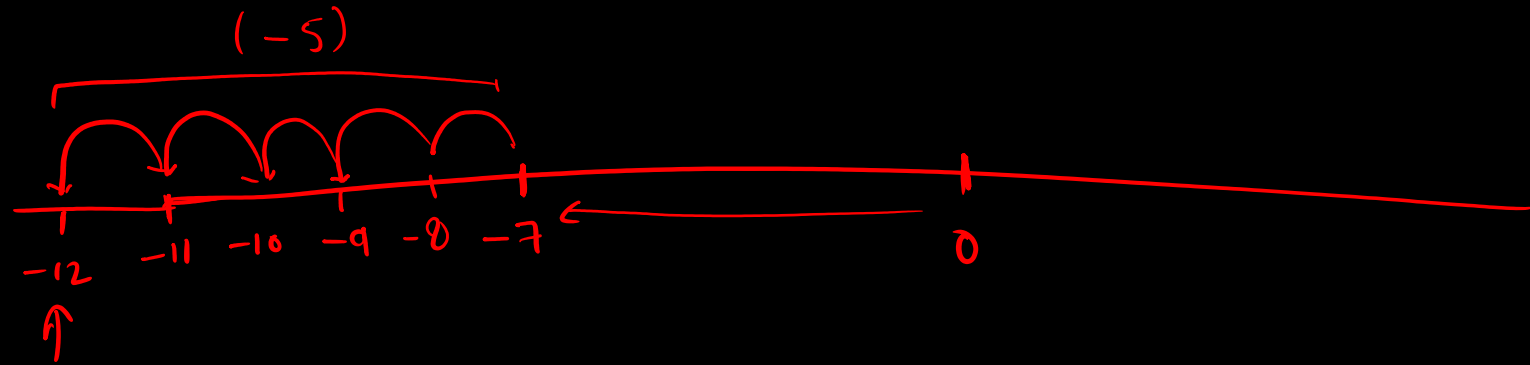
① Add two positive integer.

$$(+2) + (+5) = 2 + 5 = 7$$

② Add a negative integer to a positive integer.

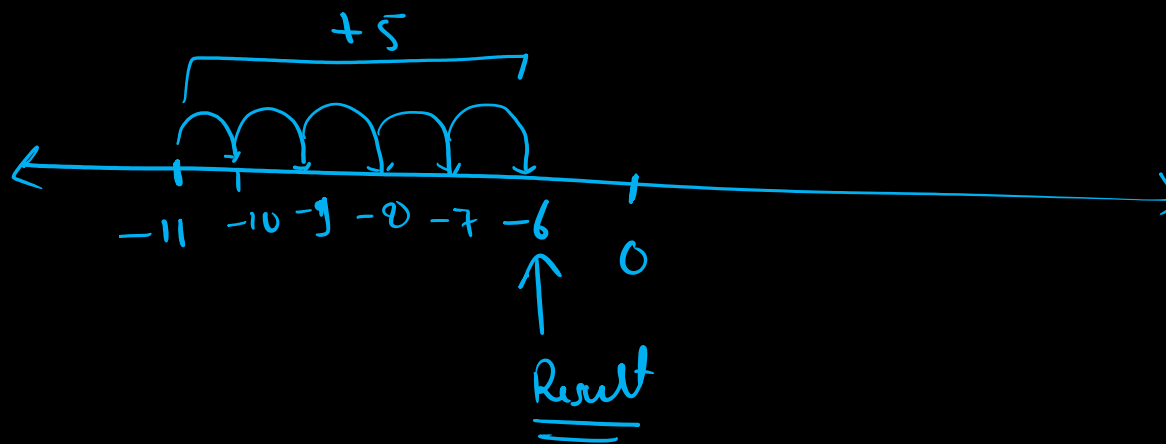$$(+7) + (-2) = 7 - 2 = 5$$

(ii) $7 + (-9) = 7 \ominus 9$

$= -2$

(iii) $(-7) + (-5) = -7 - 5 = \underline{\underline{-12}}$

(iv) $(-15) + (-19) = -15 - 19$

$= -34$

Add the nos. and put
$-ve$ sign.

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(v) $\underline{-11} + 5 \qquad = \ominus 6$

$\begin{array}{r} 11 \\ -5 \\ \hline 6 \end{array}$

$\Rightarrow \qquad -13 + 2 \quad = \quad -11$

$\Rightarrow \qquad \dfrac{-17}{\uparrow} + \dfrac{+25}{\uparrow} \quad = \quad +8$

$\qquad\qquad\qquad = \quad 8$

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(vi) $-6 - (-11) = -6 + 11 = 5$

$7 - (-10) = 7 + 10 = 17$

$-12 - (19) = -31$

$-12 - (-19) = -12 + 19 = 7$

Class 4

1. $12 + (-19) - (-7)$

$\Rightarrow 12 - 19 + 7$

$\Rightarrow -7 + 7$

$\Rightarrow 0$

$-30 \quad -18$

$-48 \quad -11$

$\Rightarrow -59$

2. $-30 + 19 + 23 - 18 + 7 - 11 + 3$

$\Rightarrow \underbrace{19 + 23 + 7 + 3} \quad \underbrace{-30 - 18 - 11}$

$\Rightarrow 52 - 59$

$\Rightarrow -7$

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3. $86 - 72 + 33 - 48 + (-14) - (-26)$

$\Rightarrow 86 + 33 + 26 \quad \underline{-72 - 48 - 14}$

$\Rightarrow \underline{145 - 134}$

$\Rightarrow \underline{\underline{11}}$

$\underline{-72 - 48 - 14}$

Multiplication of integers

Ex. $2 \times 6 = 12$
         ↓   ↓   ↓
        +ve   +ve   +ve

=) $2 \times (-6) = -12$
       ↓   ↓   ↓
      +ve   -ve   -ve

Important Box

$$\oplus \times \oplus = \oplus$$
$$\oplus \times \ominus = \ominus$$
$$\ominus \times \oplus = \ominus$$
$$\ominus \times \ominus = \oplus$$

positive (+ve)
negative (-ve)

① $(-3) \times 7 = -21$

   ↓   ↓

  −ve   +ve

② $(-7) \times (-9) = 63$

③ $(-2) \times (-8) \times (-3)$

$\Rightarrow 16 \times (-3)$

$\Rightarrow -48$

$(-3) \times 7 = -(3 \times 7)$

$= -21$

$\Rightarrow (-7) \times (-9) = +(7 \times 9)$

$= +63$

$\Rightarrow$

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(iv) $(-1) \times (-2) \times (-3) \times (-6)$

$= 2 \times 18$

$= \underline{\underline{36}}$

$\Rightarrow \quad 2 \times (-3) \times (-6)$

$\Rightarrow \quad (-6) \times (-6)$

$\Rightarrow \quad \underline{\underline{36}}$

(v) $(-3) \times (-5) \times (-2) = \boxed{-30}$

Class 5

Division of Integers

(i) $+ve \div +ve = +ve$

for eg $15 \div 3 = 5$

$\downarrow$ $+ve$ $\downarrow$ $+ve$ $\downarrow$ $+ve$

(ii) $-ve \div +ve = -ve$

for eg :→ $(-15) \div 3 \Rightarrow -(15 \div 3) = -5$

$\downarrow$ $-ve$ $\downarrow$ $+ve$ $\downarrow$ $-ve$

(iii) $+ve \div -ve = -ve$

for eg : $15 \div (-3) = -(15 \div 3) = -5$

(iv) $-ve \div -ve = +ve$

for eg : $(-15) \div (-3) = +(15 \div 3) = 5$

$\downarrow$ $-ve$ $\downarrow$ $-ve$ $\downarrow$ $-ve$

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eg.
$$(-30) \div 6 = \frac{-30}{6} = -\left(\frac{30}{6}\right) = -5$$

eg:
$$140 \div (-7) = \frac{140}{-7} = -\left(\frac{140}{7}\right) = -20$$

Q. __Evaluate__ $-3564 \div 22 = -(3564 \div 22) = -\underline{\underline{162}}$

Absolute Value of an Integer

→ Actual numerical value of integer regardless of its sign (+ or -)

→ It is denoted by mod sign | |

⇒ Absolute value of an integer x, is denoted by |x|

mod is abb. for modulus.

eg. |6| = 6
       |-7| = 7
              ↑
       read as mod (-7) or mod of (-7)

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$|-13| = \underline{\underline{13}}$

↑

mod of -13

$|0| = \underline{\underline{0}}$

$|122| = \underline{\underline{122}}$

Q. Find the product of $\qquad$ $1296 \times (-74) = -(1296 \times 74)$

$$= -95904$$

Q: Simplify: $\qquad$ $4 \times 3 - 2 + 16 \div 8$

$$= 12 - 2 + 2$$

$$= 12$$

BODMAS
↑
of
↓
multiplication

eg. $\left(\dfrac{1}{2}\right)$ of $\textcircled{4} = \left(\dfrac{1}{2}\right) \times \left(\dfrac{4}{1}\right)$

$$= \dfrac{4}{2} = 2$$

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Q. Simplify: $\quad 92 - [18 + 16 \div 4 \{26 - (14 - \overline{7-3})\}]$

$$= 92 - [18 + 16 \div 4 \{26 - (14 - 4)\}]$$
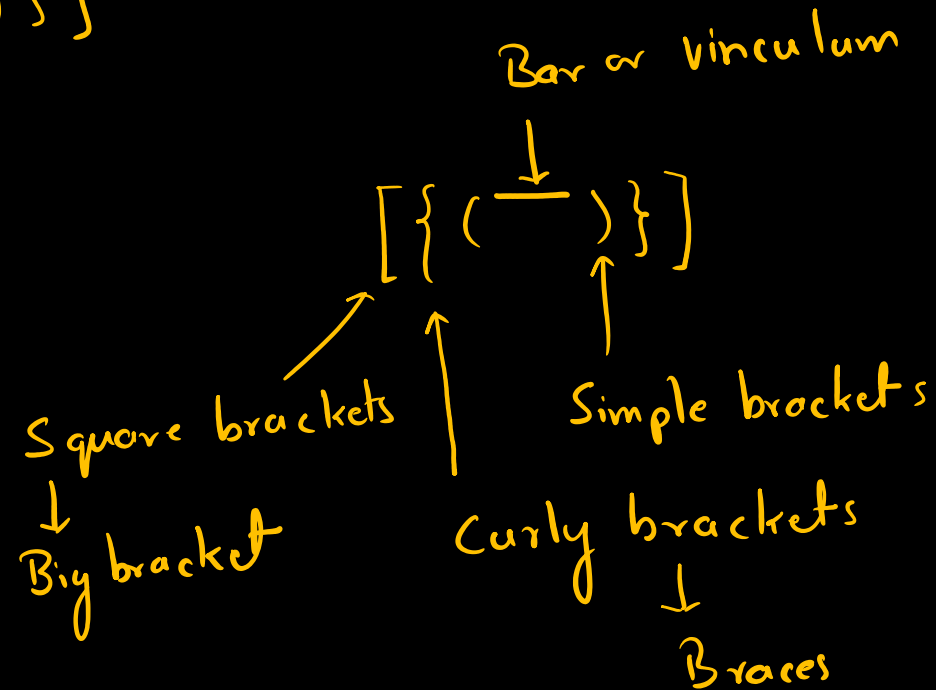
$$= 92 - [18 + 16 \div 4 \{26 - 10\}]$$

$$= 92 - [18 + 16 \div 4 \times 16]$$

$$= 92 - [18 + 4 \times 16]$$
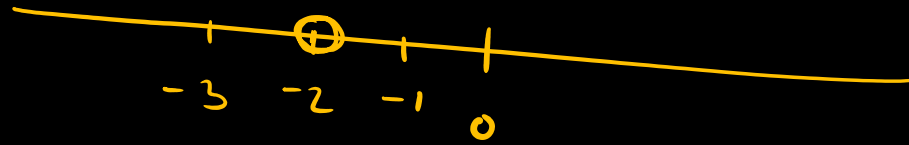
$$= 92 - [18 + 64]$$

$$= 92 - 82$$

$$= \underline{\underline{10}}$$

Bar or vinculum

$$[\{(\overline{\quad})\}]$$

Square brackets
↓
Big bracket

Simple brackets

Curly brackets
↓
Braces

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Class 6

Gain $\Rightarrow$ +ve value

Loss $\Rightarrow$ −ve value

$$-3 \quad -2 \quad -1 \quad 0$$

5000

$$\begin{array}{r} 5 \\ 105.06 \\ 144 \overline{\smash{)}15129.0} \\ -144 \\ \hline 729 \\ -720 \\ \hline 900 \\ 864 \\ \hline \end{array}$$

$- \left(15129 \div 144 \right)$

$- \left(105.06 \right)$

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Q. If P means multiplication Q means division, R means addition and S means subtraction, then find the value of:

$$36 \, P \, 48 \, Q \, 16 \, R \, 15 \, S \, 23$$

$$\Rightarrow \quad 36 \times 48 \div 16 + 15 - 23$$

$$\Rightarrow \quad \underline{100}$$

Q. Find the value of : $|-15| + |12|$

$$\Rightarrow \quad 15 + 12$$

$$\Rightarrow \quad \underline{27}$$

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Q. Arrange A, B & C in ascending order.

A: $-12 + (-15)$

B: $-16 - (12)$

C: $-14 - (-12)$

$$B < A < C$$

$A = -12 + (-15) = -12 - 15 = -27$

$B = -16 - 12 = -28$

$C = -14 - (-12) = -14 + 12 = -2$

Q. $|-5| - |-3|$

$\Rightarrow 5 - 3$

$\Rightarrow 2 .$

Q. P is neither positive nor negative, $Q = -|-9|$ and
R is the absolute value of -13. Find the value of $P + Q + R$.

Sol. $P = 0$

$Q = -|-9| = -9$

$R = 13$

$P + Q + R = 0 + (-9) + 13$

$= -9 + 13$

$= \underline{4}$

Q. The cost of a pen is the largest two digit number (in $).
The cost of a text book and a geometry box respectively
are the successor and predecessor of the cost of pen.
Find the sum of the costs of the text book & geometry box (in $)

=)   Text book = $100

geometry box = $98

total cost = $(100 + 98)

= $198

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Q. Simplify : $36 - 369 \div [-72 \div 24 \times 5 + 2(17 - \overline{7 - 18})]$

$\Rightarrow 36 - 369 \div [-72 \div 24 \times 5 + 2(17 - (-11))]$

$\Rightarrow 36 - 369 \div [-72 \div 24 \times 5 + 2(28)]$

$\Rightarrow 36 - 369 \div [-3 \times 5 + 56]$

$\Rightarrow 36 - 369 \div [-15 + 56]$

$\Rightarrow 36 - 369 \div [41]$

$\Rightarrow 36 - 9$

$\Rightarrow \underline{\underline{27}}$

Q. If A,B,C and D represents X, ÷, + and − respectively.
then find the value of $9\,0\,B\,3\,A\,5\,D\,3\,C\,9$

Ans ⟹ 156

Class 7

Doubt Clearing Class

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$\triangle \longrightarrow$ _delta_

$+ \Rightarrow$

$- \Rightarrow$

$\times \Rightarrow$

$\div \Rightarrow$

$\triangle \Rightarrow$

(i) $\underset{\underset{a}{\uparrow}}{2} \triangle \underset{\underset{b}{\uparrow}}{3} = \underline{2 - 3 - (-2)} \quad \checkmark$

$\underset{a}{\downarrow} \triangle \underset{b}{\downarrow} = \underline{\underline{a - b - (-2)}}$

$= -1 + 2$

$= 1$

(ii) $\underset{\underset{a}{\Downarrow}}{(-3)} \triangle \underset{\underset{b}{\Downarrow}}{(-4)} = (-3) - (-4) - (-2)$

$= -3 + 4 + 2$

$= -3 + 6$

$= \underline{\underline{3}}$

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$a = \boxed{24} \rightarrow \textcircled{18}$

$b = \underline{(a - 2)}$

$\boxed{a + b} = 24 + 22$

$= 46$

$(a + b) = 18 + 16$

$=$ _____

$a = 18$

$O \rightarrow \underline{a + b}$

$\underline{\triangle} \rightarrow \underline{(a - b)}$

$a = 20$
$b = 18$

$O = 20 + 18 = 38$

$\triangle = 2$

$\checkmark \underline{O + \triangle} = 38 + 2 = \underline{\underline{40}}$

$$a \; \triangle \; b \; = \; a - b - (-2)$$

$$2 \; \triangle \; 3 \; =$$

$\uparrow$ $\uparrow$

a b

$$1, \; 2, \; 3, \; \ldots$$

$$\underbrace{1-2}\underbrace{+3-4}\underbrace{+5-6}\underbrace{+7-8}\underbrace{+9-10}\underbrace{+11-12}\underbrace{+13-14}\underbrace{+15-16}$$

$$\boxed{-1} \quad \boxed{-1} \quad \boxed{-1} \quad \boxed{-1} \quad \boxed{-1} \quad \boxed{-1} \quad \boxed{-1} \quad \boxed{-1}$$

$$\boxed{-8} \checkmark$$

Method I

Method II :

$$1-2+3-4+5-6+7-8+9-10+11-12+13-14+15-16$$

$$\left(1+3+5+7+9+11+13+15\right) + \left(-2-4-6-8-10-12-14-16\right)$$

$$64 + (-72) = \boxed{-8} \checkmark$$

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Calcute

$(-5020 + 2320)$

$-709 - (-2700)$

$\begin{array}{c} \downarrow \quad \downarrow \\ -2 \; +5 \\ \Rightarrow 3 \end{array}$

$\Rightarrow \quad \underline{-709} + \underline{2700}$

$\Rightarrow 1991$

$\begin{array}{r} 2700 \\ -709 \\ \hline \end{array}$

Calculate the sum

$2 + (-2) + 2 + (-2) + 2 + (-2) + \dots$

(i) if the no. of terms is $\underline{140}$.   (ii) if the no. terms is 125.

$\underset{0}{\Downarrow}$

$\underset{0}{\underbrace{2 + (-2)}} + \underset{0}{\underbrace{2 + (-2)}} + \underset{0}{\underbrace{2 + (-2)}} + \dots \qquad \underset{0}{\underbrace{\underset{\Downarrow}{+2 + (-2)}}} + \underset{\uparrow}{\underline{2}}$

$\boxed{+2}$

$\Rightarrow \underline{\underline{0}}$