Holiday Home-work

Class - VI. (Autumn Break)

(1) Which is greater ——

(a) 0.099 or 0.19 (b) 1.431 or 1.490

(c) 5.64 or 5.603 (d) 1.23 or 1.2

(2) Express as rupees using decimals ——

(a) 75 Paise (b) 20 Paise (c) 725 Paise

(3) Find the sum ——

(a) 15 + 0.632 + 13.8 (b) 0.75 + 10.425 + 2

(c) 280.69 + 25.2 + 38 (d) 0.007 + 8.5 + 30.08

(4) Find the value of ——

(a) 9.756 − 6.28 (b) 21.05 − 15.27

(5) Rani had Rs 18.50. She bought one ice-cream for Rs 11.75. How much money does she did he get back from the shopkeeper?

(6) Catherine threw a dice 40 times and noted the number appearing each time as shown below —

1	3	5	6	6	3	5	4	1	6
2	5	3	4	6	1	5	5	6	1
1	2	2	3	5	2	4	5	5	6
5	1	6	2	3	5	2	4	1	5

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Holiday Home-work

Class - VII (Autumn - break)

(1.) List five rational numbers between —
(i) -2 and -1 (ii) $\frac{1}{2}$ and $\frac{2}{3}$.

(2.) Write five rational numbers equivalent to (i) $-\frac{2}{5}$ (ii) $\frac{-7}{9}$

(3.) Write $\frac{2}{3}, \frac{4}{7}, \frac{5}{9}$ in ascending order.

(4.) Find —
(a) $-2\frac{1}{3} + 4\frac{3}{5}$
(b) $\frac{5}{63} - \left(\frac{-6}{21}\right)$
(c) $\frac{3}{7} \times \left(\frac{-2}{5}\right)$
(d) $\frac{3}{13} \div \left(\frac{-4}{65}\right)$

(5) The area of a trapezium is $34\ cm^2$ and the length of one of the parallel sides is 10cm and its height is 4cm. Find the length of the other parallel side.

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Home-work. Class-VIII
(Autumn Break)

(1.) Add.
$a-b+ab$, $b-c+bc$, $c-a+ac$

(2) Subtract: $4a-7ab+3b+12$ from $12a-9ab+5b-3$.

(3.) Find the volume of each rectangular box with given length, breadth and height-

	length	breadth	height
(i)	$2ax$	$3by$	$5cz$
(ii)	m^2n	n^2b	b^2m
(iii)	$2q$	$4q^2$	$8q^3$.
(iv)	$5xy$	$2y$	$3z$

(4) Simplify $3x(4x-5)+3$ and find its values for (i) $x=3$, (ii) $x=\frac{1}{2}$

(5) Add: $2x(z-x-y)$ and $2y(z-y-x)$.

(6) Subtract $3a(a+b+c)-2b(a-b+c)$ from $4c(-a+b+c)$

(7) Simplify: $(x+y)(2x+y)+(x+2y)(x-y)$.

Home-work (Autumn break).

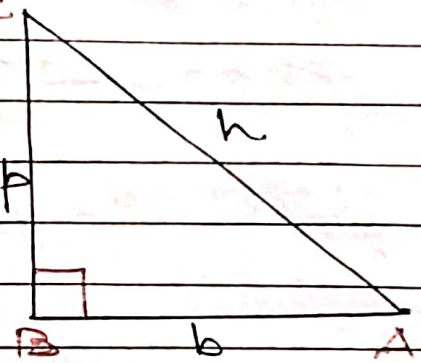
Class-IX

1. Show how $\sqrt{5}$ can be represented on the number line.
2. Find three different irrational numbers between the rational numbers $\frac{5}{7}$ and $\frac{9}{11}$
3. Simplify: $(5+\sqrt{7})(2+\sqrt{5})$
4. Factorise: $x^3 - 3x^2 - 9x - 5$
5. Find the value of k if $x-1$ is a factor of $p(x) = kx^2 - 3x + k$
6. Factorise: $8a^3 - b^3 - 12a^2b + 6ab^2$
7. Plot the points A(0,5), B(3,4), C(4,0), D(2,-3), E(-2,-4), F(-3,0) on a graph paper.
8. Draw the graph of $x = 3y$.
9. State and prove Mid-Point Theorem.

Trigonometry

Introduction to Trigonometry

Trigonometric Ratios of the angle A in a triangle ABC right-angled at B are defined as—



AC = Hypotenuse = h

AB = Side adjacent to $\angle A$ = b

BC = Side opposite to $\angle A$ = p

$$\sin A = \frac{\text{Side opposite to } \angle A}{\text{Hypotenuse}} = \frac{p}{h}$$

$$\cos A = \frac{\text{Side adjacent to } \angle A}{\text{Hypotenuse}} = \frac{b}{h}$$

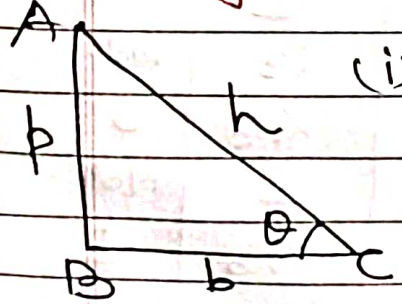
$$\tan A = \frac{\text{Side opposite to } \angle A}{\text{Side adjacent to } \angle A} = \frac{p}{b}$$

$$\cot A = \frac{\text{Side adjacent to } \angle A}{\text{Side opposite to } \angle A} = \frac{b}{p}$$

$$\sec A = \frac{\text{Hypotenuse}}{\text{Side adjacent to } \angle A} = \frac{h}{b}$$

$$\operatorname{cosec} A = \frac{\text{Hypotenuse}}{\text{Side opposite to } \angle A} = \frac{h}{p}$$

Trigonometric Identities:—



(i) $\sin\theta = \frac{1}{\operatorname{cosec}\theta}$

$\operatorname{cosec}\theta = \frac{1}{\sin\theta}$.

$\sin\theta \cdot \operatorname{cosec}\theta = 1$

$\sin\theta \cdot \operatorname{cosec}\theta = \frac{p}{h} \times \frac{h}{p}$

$= 1$.

(vi) $\cos\theta \cdot \sec\theta = 1$.
$\cos\theta = \frac{1}{\sec\theta}$.
$\sec\theta = \frac{1}{\cos\theta}$.

$\cos\theta \cdot \sec\theta = \frac{b}{h} \times \frac{h}{b} = 1$.

(viii) $\tan\theta \cdot \cot\theta = 1$
$\tan\theta = \frac{1}{\cot\theta}$.
$\cot\theta = \frac{1}{\tan\theta}$.

$\tan\theta \cot\theta = \frac{p}{b} \times \frac{b}{p} = 1$.

(iv) $\sin^2\theta + \cos^2\theta = 1$
$\sin^2\theta = 1 - \cos^2\theta$
$\cos^2\theta = 1 - \sin^2\theta$.

$\sin^2\theta + \cos^2\theta = \left(\frac{p}{h}\right)^2 + \left(\frac{b}{h}\right)^2$
$= \frac{p^2 + b^2}{h^2} = \frac{h^2}{h^2} = 1$

(v) $\sec^2\theta - \tan^2\theta = 1$
$\sec^2\theta = 1 + \tan^2\theta$
$\tan^2\theta = \sec^2\theta - 1$

$\sec^2\theta - \tan^2\theta = \left(\frac{h}{b}\right)^2 - \left(\frac{p}{b}\right)^2$
$= \frac{h^2 - p^2}{b^2} = \frac{b^2}{b^2} = 1$

(vi) $\operatorname{cosec}^2\theta - \cot^2\theta = 1$
$\operatorname{cosec}^2\theta = 1 + \cot^2\theta$.
$\cot^2\theta = \operatorname{cosec}^2\theta - 1$.

$\operatorname{cosec}^2\theta - \cot^2\theta = \left(\frac{h}{p}\right)^2 - \left(\frac{b}{p}\right)^2$
$= \frac{h^2 - b^2}{p^2} = \frac{p^2}{p^2} = 1$

(vii) $\tan\theta = \frac{\sin\theta}{\cos\theta} = \frac{\frac{p}{h}}{\frac{b}{h}} = \frac{p}{b} = \tan\theta$.

$\cot\theta = \frac{\cos\theta}{\sin\theta} = \frac{\frac{b}{h}}{\frac{p}{h}} = \frac{b}{p} = \cot\theta$.

Trigonometric Ratios of some Specific Angles:

Angles / A	0°	30°	45°	60°	90°
Sin A	0	1/2	1/√2	√3/2	1
Cos A	1	√3/2	1/√2	1/2	0
Tan A	0	1/√3	1	√3	Nd.
Cot A	Nd	√3	1	1/√3	0
Sec A	1	2/√3	√2	2	Nd.
Cosec A	Nd	2	√2	2/√3	1

Questions:-

Prove the following identities:-

1. $(\operatorname{Cosec}\theta - \cot\theta)^2 = \frac{1-\cos\theta}{1+\cos\theta}$

2. $\frac{\cos\theta}{1+\sin\theta} + \frac{1+\sin\theta}{\cos\theta} = 2\sec\theta.$

3. $\frac{\sin\theta}{1+\cos\theta} + \frac{1+\cos\theta}{\sin\theta} = 2\operatorname{Cosec}\theta.$

4. $\frac{1+\sec\theta}{\sec\theta} = \frac{\sin^2\theta}{1-\cos\theta}$

5. $\sqrt{\frac{1+\sin\theta}{1-\sin\theta}} = \sec\theta + \tan\theta.$

6. $\frac{\tan\theta}{1+\sec\theta} - \frac{\tan\theta}{1-\sec\theta} = 2\operatorname{Cosec}\theta.$

7. $\frac{\sin\theta - 2\sin^3\theta}{2\cos^3\theta - \cos\theta} = \tan\theta$

8. $(\sin\theta + \operatorname{Cosec}\theta)^2 + (\cos\theta + \sec\theta)^2 = 7 + \tan^2\theta + \cot^2\theta.$

9. $\frac{\tan\theta + \sec\theta - 1}{\tan\theta - \sec\theta + 1} = \frac{1+\sin\theta}{\cos\theta}.$

10. $\tan^2\theta + \cot^2\theta + 2 = \sec^2\theta \cdot \operatorname{Cosec}^2\theta.$

11. $\frac{\tan\theta - \cot\theta}{2\sin\theta \cdot \cos\theta} = \tan^2\theta - \cot^2\theta.$

Questions for Practice

1. If $\sin\theta = \frac{3}{4}$, Calculate $\cos\theta$ and $\tan\theta$.
2. If $\sec\theta = \frac{13}{12}$, Calculate all other trigonometric ratios.
3. If $3\tan\theta = 4$, find the value of
$$\frac{4\sin\theta - 3\cos\theta}{3\sin\theta + 2\cos\theta}.$$
4. If $\sin\theta + \cos\theta = p$ and $\sec\theta + \operatorname{cosec}\theta = q$ then prove that-
$$q(p^2 - 1) = 2p$$
5. If $\tan A = \frac{1}{3}$, Prove that-
$$\sin 2A + \cos 2A = 1.$$
6. If $\tan\theta = \frac{7}{24}$, find the value of $\sin\theta + \cos\theta$.
7. If $\sin\theta = \frac{\sqrt{3}}{2}$, find the value of other trigonometric ratios
8. If $\cot\theta = 2$ find the value of $\frac{4\cos\theta + 2\sin\theta}{5\cos\theta - 2\sin\theta}$.
9. If $\tan\theta = \frac{m}{n}$, show that-
$$\frac{m\sin\theta - n\cos\theta}{m\sin\theta + n\cos\theta} = \frac{m^2 - n^2}{m^2 + n^2}$$

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Question:-

(1) Evaluate

(i) $\cos 30^\circ \cdot \cos 45^\circ - \sin 30^\circ \cdot \sin 45^\circ$

(ii) $\tan 30^\circ \cdot \operatorname{cosec} 60^\circ + \tan 60^\circ \cdot \sec 30^\circ$

(iii) $\tan 30^\circ \cdot \operatorname{cosec}^2 45^\circ + \sec^2 60^\circ \cdot \tan 45^\circ$

(iv) $$\frac{\sin 30^\circ + \tan 45^\circ - \operatorname{cosec} 60^\circ}{\sec 30^\circ + \cos 60^\circ + \cot 45^\circ}$$

(v) $$\frac{5\cos^2 60^\circ + 4\sec^2 30^\circ - \tan^2 45^\circ}{\sin^2 30^\circ + \cos^2 30^\circ}$$

(2) Show that-

(i) $\operatorname{cosec}^2 60^\circ \cdot \sec^2 30^\circ \cdot \cos 0^\circ \cdot \sin 45^\circ \cdot \cot^2 60^\circ \cdot \tan^2 60^\circ = \frac{8\sqrt{2}}{9}$

(ii) $$\frac{\tan 60^\circ - \tan 30^\circ}{1 + \tan 60^\circ \cdot \tan 30^\circ} = \tan 30^\circ$$

(iii) $$\frac{\cos 30^\circ + \sin 60^\circ}{1 + \cos 60^\circ + \sin 30^\circ} = \frac{\sqrt{3}}{2}$$

(iv) $2(\cos^2 45^\circ + \tan^2 60^\circ) - 6(\sin^2 45^\circ - \tan^2 30^\circ) = 6$