	Market Description of the state
	Page Page
	Signature
104 2019	Rational Numbers and Their Operations Rational Numbers
	Any varional number is of the form of a where are bare integers and b \$0.
(5.0)	Basic Rule
)	When a positive integer is divided by positive integer, the quotient is positive and hence it is a positive various number.
	eg. +7 se a +ve trational no.
2)	uner a negative integer is divided by a negative integer, the quotient is a positive integer.
	= = = = = = = = = = = = = = = = = = =

3)	When the dividend and divisor are of the is negative. $\frac{9}{-9} = \frac{8}{-9}$	
0	NOTE: - Zeno is a national no.	DE POST DE LA TRANSPORTE DE LA TRANSPORT
Q. 1)	9) a) 4 - yes a) 0 yes. b) 10 - yes e) 1-2- yes	roten comb brance
Te y acto	c) -8 Ye	
(1)	a) +7 - yes c) -7 No +10 - No	
(J* 1)	b) +q d) -11 - yes -14 -14	
111)	a) $\frac{-4}{-8}$ No c) $\frac{-4}{+9}$ Yes b) $\frac{+12}{+17}$ No d) $\frac{+6}{-13}$ Yes	cont of gargania
Q.2)	4 = 4 ord to the department for the second	
	-8 = -2 10 to observe care per relevantation visit	Chickers of a foledown

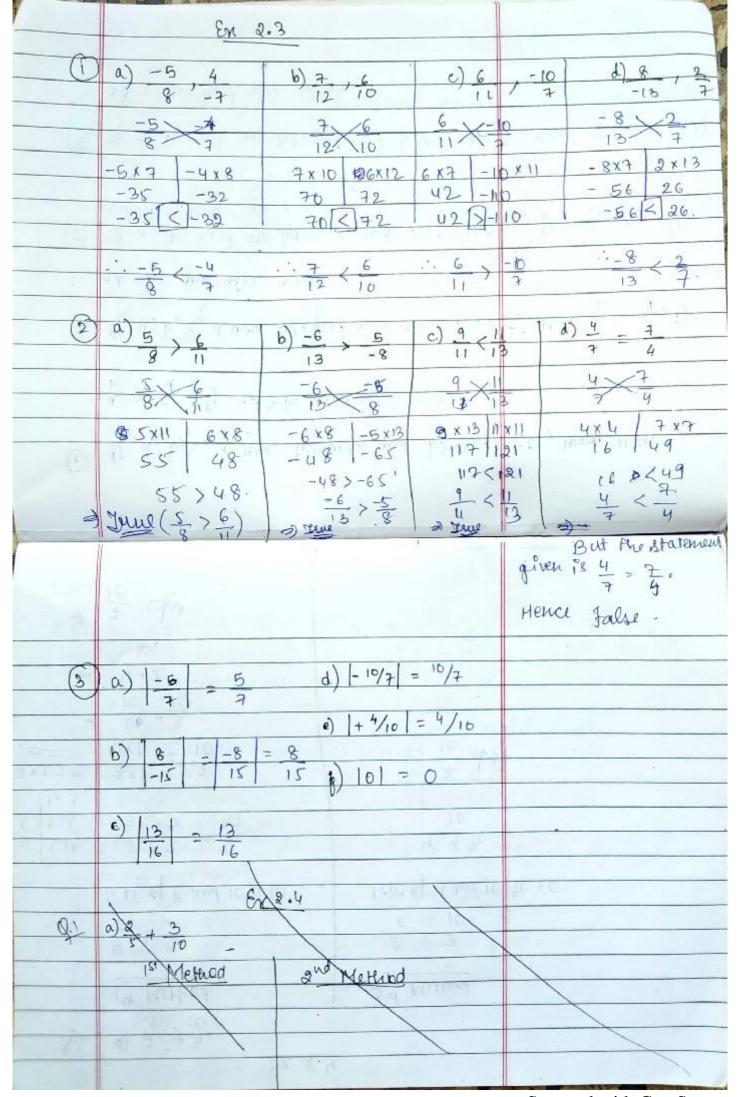
	E.	
	yer, integers can be represented as a qu	uptient of a integers.
Q. 5) a)	-7 and 7 are the same negative ration	nal numbers.
(d	-3; -3 and 3 are 3 defferent form	el of the same
111	national no.s.	
Q. 4)	yes, integers are national no.s.	
Q.5)	a) 15 _ 15	
b)	-3 x 3 -57 5 x 3 -14 1-3 -3	
ري	45 _ 15	3x=6 18 5x=6 - 19
9.6)	a) $5 = \frac{5}{1}$ b) $-13 = -13$ c)	12=19
	Standard FORM OF RATIONAL NO.3	q frais qui s

	A rational no. is toulten in the stan	tand form has:-
9	positive denominator.	
(1)	rumoration and denomination age copula	nes.
	E. N. 2.2	
Q.1)	2 -3	10
a)	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	c) = 12 2x-6 = -12 -3x-6 = 18
	$\frac{2 \times 7}{-3 \times 7} = \frac{14}{-21}$	
(9.2)	<u>-3</u>	
	-4 -30 30 0 79857 32 6	7 37 (- 8/)
a) 4		3×26 4×2 -8
()	$16 \Rightarrow -3 \times -4 = 12$ d) $-12 \Rightarrow -3 = -4$	$\frac{x3}{x3} = \frac{-9}{-12}$
(Pod)	a) $\frac{-5}{-6} = \frac{5}{6}$ b) $\frac{7}{9} = \frac{-7}{9}$ c) $\frac{-9}{-13} = \frac{9}{13}$	d) 15 = -15 -17 17
<u>Q.4</u>	-13 13 7 _{0.18} -8-1	5 d) -11 - 11 -13 -15 15

02)		30.1) DAD	c) -+ -9	= 1 + pxn
9)	8 = r	(s nice)	-15 17	nun b	31 35	рил
9)	15 , 0	un h)	-13	5 -> pun 13	-12 (-d 2)	4 11 1 4 - 10 - 10 - 10 - 10 - 10 - 10 -
9.6)		→ 4. (I	6 ÷ 4		98 -4	(21:7) = -3 (-28:7) = 4
()	-25 → -30 →	36,5	30÷2) d) 28 32		32 ÷ \$4
<u> </u>	a) 3 and	-15				
	3x - 20	OL U	1 and	method	1 2011	nethod
	J/ &0	11 0		+15	290	ni ruog
=)	-60	-60	3 4	120	3	nd -15
		10		=15+5	4	-20
	-60 = -	60		20+5	Bred 3	and the contain
					3 av	d 15
	a	The same of the same of	3	= 3	4	au.
	- 8 5		4	4	L. c. M.	of u and 20 = 20
		l				
5	1	19.43		3	3 X 5	- 19 7
				5 3	4 1 3	20
	-1	16			15 × t	- 15
		1816		1846	20X1	- 20
				3 1535	14-200	C .
	Hence.	3 and	-15 -	are ear	ial.	
	,	4	-20	are eq		
					100	

P 8	0.14 -16	1 @ 12 a	nd 15		
-9	and -16	€ 12 a 18 ⇒ 12 ÷ 6		S	9
⇒ <u>•</u> 8 q	<u>-16</u> 18	18:6	-		
= -8	-16÷2	= 2	= 3	#1E	
9	18÷&	- 2	4 3	N II POL	200
3 - 8	2 -8 q	3	/ 4		
Hence	-9 18		and 3	are not	equal.
5) 60	-(0 1	十国 2	377		
38 - 3	.30	ng military			
(A3) 3) 3	mul +15		- 14		
					-
d -10	and 11	@ -6 and	<u>9</u> -27	18,	md - 15 -25
L KCA	ALL OF L	STNEODE	M.G		
=) <u>10 ÷ 5</u> 15 ÷ 5	14	The same of the sa	27	21:3	15÷5 25÷5
15 ÷ 5	reprise ecopia	1050			
=) = = = = = = = = = = = = = = = = = =	14	= -1	27-49	3) <u>6</u> ,	7 3
40 5					
117	3		1-1		
No, the	y are not equal	3.0	3	6	A 3 TOPECUOT
		t o tricin	3	No shu	xe not
No, the	y are not equal	3 = =	3	No shu equal.	1 are not
81- 1-2. 1 3 3	2 3	Henre, Hrey	3 or equal		
8t- [-2,] 3 3		3 = =	3 or equal		of 3 remet
1) yw 0	hactors mans	Henre, Hrey	3 or equal		

	Absolute Value of Rational No.8.
<u>8</u>	The absolute value of a negative national no. is a positive rational no. $ -2 -\frac{9}{3} -\frac{3}{3} $
(D)	The absolute value of a positive rational no. is a positive eational
eg.	$\begin{vmatrix} 2 & 2 \\ 3 & 3 \end{vmatrix} = \frac{2}{3}$
3	The absolute nature of 0 25 0.
3	Rules Of Comparing
-0	= 10 and 11 (8) -6 and a 11 18 and -12
0	If a, b, c, d are Portegers and b>0, d>0, here then
	a > c gif ad > bc and vice - versa;
3	y a, b, c, dare l'otegers and b≠0, d≠0, then a = a, ly
	ad = bc and wice - wereal
3	of a, b, c, d one integers, and b>0, d>0; for a, c, if add bc then at a
3	9 a, b, c, d are integers and b \(\pm 0, d \(\pm 0, \) then \(\frac{ab}{b} = \frac{c}{a}, if
0	ad = bc and wice versa.



	En 2.	U	
9:1	Q2+3		
	9 2 + 3 5 10 1st Method		
	1st Method	2 nd Method	
	S 0	2 6 3	
1 (1)	8 t 3 5 t 10	5 10	
	LCM of 5 and 10 is 10	1cm of sand 10	S rO
8 5,10	2 × 2 , 4	4 + 3	
5 55	5 ×2 10	10	
11,1			
2x5=10	3×1 = 3	10 dus	
	10 10 lo	10	
-)	10 10	All I	
A			
	10		
9	7 dus		THUKS TO
	7 Jus.		
	7		THE THE WATER
	<u> </u>		
		200	
2. 18	4 + 7	$\frac{3}{4} + \left(-\frac{2}{5}\right)$	
	6 8		
	com of 6 and 8 is 2 v.	3-2	
	8 6,8	LCM of 4 an	d 5 = 20
		2 4,5	_
	2 3, 2 3 1 1, 1	2 2,5	x2 - 60
	11,1	31,3	
	2 x2x2x3=24.	2 x 2 x 5 = 5	00
	= 17, 21		7,16,5
	= 16+21 24	15 + (-8	
	> 37	20	ANIX ON
	> <u>37</u> 24.	The state of the	
	> <u>37</u> 24.	7	
	> <u>37</u> 24.		
	> <u>37</u> 24.	7	

(a)	$\frac{8}{14} + \left(\frac{-10}{21}\right)$ $\boxed{8} + \frac{-7}{15}$	
	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	0 15 30
3 10	= 4 (0) 42 (a)) = -53 (m) 60 (m)	
	$\frac{9}{16} + \left(\frac{13}{24}\right)$ $\frac{9}{5} - \frac{4}{3} + \frac{3}{4}$ $\frac{9}{16} - \frac{13}{24}$ $= -\frac{4}{3} + \frac{3}{4}$ $= -\frac{4}{3$	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$

(P)	-7 +5 feu @ 3 feu	(1) + 5 27 9
0	8 16 24 B 3 +=4	
_	-7+5-4 = 3-4	1 cm of 27 and 9
	8 16 24. 1 5	3 827,9
		3 9,3
	0	3 3,1
	2 4, 8, 12 5 1, 1	1-1,1
	22,4,6 (01-5	3x3x3= 27 /
	2 1,2,3	
	3 1, 1, 3	= -11+15
		.87
	2x2x2x2x3=48 = 15-4	
-	-42+16-8 5	= 4 Sur
	24 = 11	15
-	-42+7	
-	24	
=	-36	
	24	
10-13	a = (13)	-3
1		
14		
	PROPERTIES OF ADDITION	
(1)	Closure Property => The sum of any 2 rate	nal numbers le also a
	Closure Property => The sum of any 2 rather say the closed under addition?	set of sational no.s ie
	"closed under addition?	0.00
	eg Consider & rectional nors 4 and	E XXI
	July 110 = -4 + 5	
	Theil sum = -4 + 5 5 6	
	Lcm of sand 6 = 30.	
40		
	= -4 x6 + 5x5	
	5×6 6×5	soloho ne
		8
	= -24 + 25	A Me say Mala
		STATISTICS SANS PAGE 451
	30 30,	
	1/30 is also a rational no.	AND THE PARTY OF T

(2)	Commutative Property	- The sum of 2	eational nous to the same
	Commutative Property	Teven of the order	of the no. s & changed.
		1 a, b, c, das	integers and 6>0, d>
	100 x E = 2	then a + c = c	a . We say additte
		is commultative to	
ey	Consider 2 lational no	7 11	
	6 + -8 -	8 + 6	
	= 6 × 11 + -8 × 7 ×	78/xe/1 -8 x7 +	6 X 1 7 X 1
	11.47	TEVI IIX F	1.7.7.53
	77 77	-56 +66 7-9 77	
	7-7	-56466	THE RESERVE TO SERVE THE S
	= <u>10</u> 77	77	
	Draw March		
		तेत ।	
		तित ।	
3	Associative Property		
3	Associative Property Consider 3 national no.s.	2 5 -3	
3	Associative Property		
3	Associative Puoperty Consider 3 national no.s > (2 + 5) + -3 4	$\frac{2}{3}$, $\frac{5}{6}$, $\frac{-3}{4}$, $\frac{2}{3}$, $\frac{5}{6}$, $\frac{5}{4}$	
3	Associative Property Consider 3 national nois > (2+5) + -3 4	$\frac{2}{3}, \frac{5}{4}, \frac{-3}{4}$ $\frac{2}{3} + \left(\frac{5}{6}, \frac{-3}{4}\right)$	
3	Associative Property Consider 3 national no.s > $ \begin{pmatrix} 2 + 5 \\ 3 & 6 \end{pmatrix} + \frac{3}{4} $ $ \frac{4}{3} + \frac{3}{4} + \frac{3}{4} = \frac{3}{4} $	$\frac{2}{3}, \frac{5}{6}, \frac{-3}{4}$ $\frac{2}{3} + \left(\frac{5}{6}, \frac{+-3}{4}\right)$ $\frac{2}{3} + \left(\frac{10}{12}, \frac{-9}{12}\right)$ $\frac{2}{3} + \left(\frac{10}{12}, \frac{-9}{12}\right)$	
3	Associative Property Consider 3 national no.s > $ \begin{pmatrix} 2 + \zeta \\ 3 & 6 \end{pmatrix} + \frac{-3}{4} $ $ \begin{pmatrix} 4 + \zeta \\ 6 & 6 \end{pmatrix} + \begin{pmatrix} -3 \\ 4 \end{pmatrix} $ $ \begin{pmatrix} 4 + \zeta \\ 6 \end{pmatrix} + \begin{pmatrix} -3 \\ 4 \end{pmatrix} $ $ \begin{pmatrix} 4 + \zeta \\ 6 \end{pmatrix} + \begin{pmatrix} -3 \\ 4 \end{pmatrix} $	$\frac{2}{3}, \frac{5}{4}, \frac{-3}{4}$ $\frac{2}{3} + \left(\frac{5}{4} + \frac{-3}{3}\right)$ $\frac{2}{3} + \left(\frac{10}{12} + \frac{-9}{12}\right)$ $\frac{9}{3} + \left(\frac{10 + (-9)}{12}\right)$ $\frac{9}{3} + \left(\frac{10 + (-9)}{12}\right)$	
3	Associative Purperty Consider 3 national nois > $ \begin{pmatrix} 2 + \zeta \\ 3 & 6 \end{pmatrix} + \frac{-3}{4} $ $ \begin{pmatrix} 4 + \zeta \\ 6 & 6 \end{pmatrix} + \begin{pmatrix} -3 \\ 4 \end{pmatrix} = \frac{1}{6} $	$\frac{2}{3}, \frac{5}{4}, \frac{-3}{4}$ $\frac{2}{3} + \left(\frac{5}{6}, \frac{+-3}{4}\right)$ $\frac{2}{3} + \left(\frac{10}{12}, \frac{-9}{12}\right)$ $\frac{2}{3} + \left(\frac{10}{12}, \frac{-9}{12}\right)$	
3	Associative Property Consider 3 national no.s >	$\frac{2}{3}, \frac{2}{4}, \frac{-3}{4}$ $\frac{2}{3} + \left(\frac{5}{4} + \frac{-3}{3}\right)$ $\frac{2}{3} + \left(\frac{10}{12} + \frac{-9}{12}\right)$	
3	Associative Property Consider 3 national no.s >	$\frac{2}{3}, \frac{5}{4}, \frac{-3}{4}$ $\frac{2}{3}, \frac{5}{6}, \frac{-3}{4}$ $\frac{2}{3}, \frac{5}{6}, \frac{-3}{4}$ $\frac{2}{3}, \frac{5}{6}, \frac{-3}{4}$ $\frac{2}{3}, \frac{10}{6}, \frac{-9}{12}$ $\frac{10}{12}, \frac{-9}{12}$ $\frac{1}{12}, \frac{10}{12}, \frac{-9}{12}$ $\frac{2}{3}, \frac{10}{12}, \frac{-9}{12}$ $\frac{2}{3}, \frac{10}{12}, \frac{-9}{12}$ $\frac{2}{3}, \frac{10}{12}, \frac{-9}{12}$ $\frac{1}{3}, \frac{10}{12}, \frac{-9}{12}$	

4	Additive Identity	
	when we add zexo to any springe no.	Hro sum is that
	If a and b are Entegess and b × 0, the	n + 0 = 0 + a = 2 $b + 0 = 0$
	O se called the Addition identity for sa the identity or element for addition of	eathoral numbers.
eg	Enamine the following addition.	+ -9 = 0 + (-9) = -9
	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	
	3.7 + 0 = 7 12 13 14 15 16	= -9 16.
3	A'ddethu Inverse	
3,31	-a go called the addition inverse as	D
	a is called the additine investe or	apposite of -a
લ્યું:	Enanine the followind addition of se	
	9 + -9 = 9 + (-9) = 0 = 0 $-7 + 7$ 11	12 12
	$\frac{9}{11} + \frac{9}{11} = 0$ 11 11 12 12 11	2 0 .
8 % 14 0 / C	de a, base intégers and b + 0,	then $\frac{a}{b} + \left(-\frac{a}{b}\right) = 0$.

	8x . 2 . S	
9.1 b	The state of the s	
9.2 be		
3 12, 2 2 6,1 3 3,1 1,1 2×3×2=1	3 H 2 (**Way (**Yay (**2 + 3) + 1	2 4,2 2 3,1 1,1 2 x 2 = 0
b)	<u>74 + 7 + -9</u> <u>5 10 15</u> <u>-4 + 7 -9</u> <u>5 10 15</u>	
672	1st way -4 + (7-9) (-4+7)-9 5 (10 15) (5 10) 15	2 5,10 5 5,5 1,1
2 10,15 3 5,15 5 5,5 1,1 263×5=36	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	245=10,
2 5,30		
2×3×5=30	=-7	Scanned with CamScanne

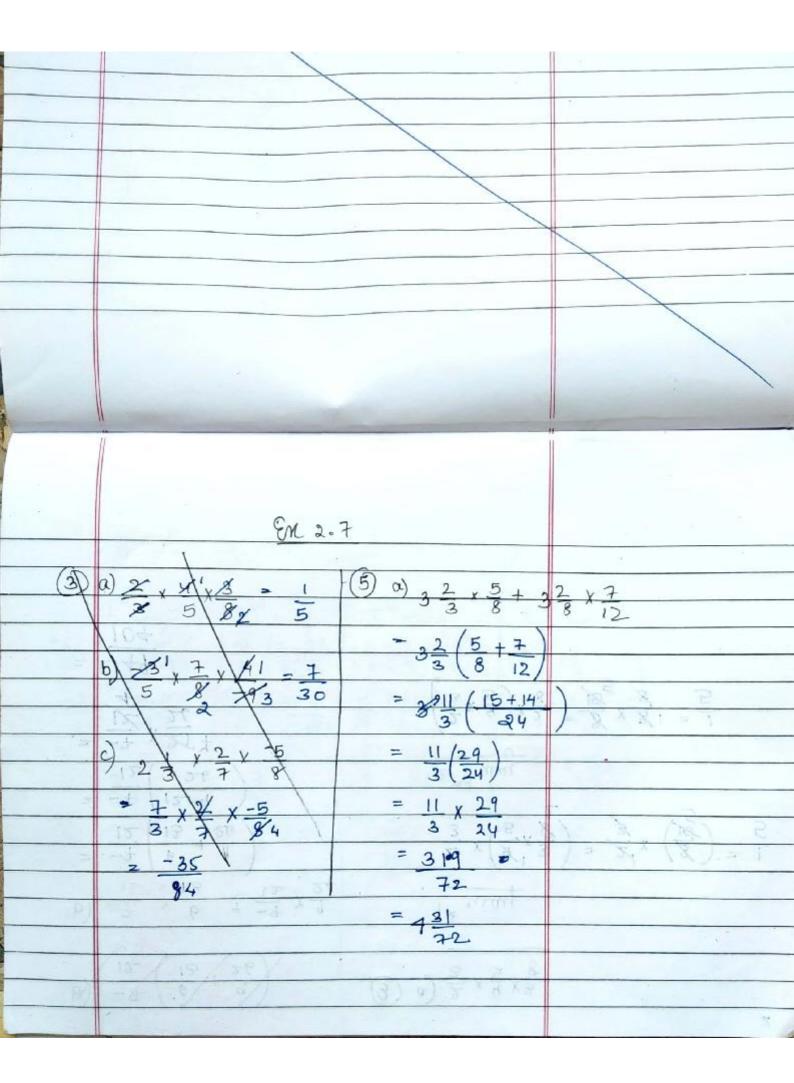
(5)	2.95 +3.08+4.67	
	1st way 2nd way	
S ASIS THE	2.75+3.08)+4.67 2.75+ (3.08+4.69)	
	=5.83+4.67 = 2.75+7.75	
	= 10.5	
9.4	book.	
d·z	a) $\frac{23}{25} + n = \frac{31}{35} + \frac{23}{45}$ b) $-\frac{7}{25} + \frac{5}{25} = n + \frac{-1}{25}$	
X)	a) $4\frac{3}{4} + 0 = 91$ $\chi = 4\frac{3}{4}$ $\chi = 4\frac{3}{4}$ $\chi = \frac{17}{20}$	
	$O\left(\frac{-4}{15} + \frac{6}{12}\right) + \frac{-8}{10} = \frac{-4}{15} + \left(n + \frac{-8}{10}\right)$ $n = \frac{6}{12}$	
	-35 435 12 -7 1	
0.6=	\$ 12 addition of range no. , done?	Q.7. a)yee
18	a) closed? you	b) yes.
		0
	9 12 12	10 0,
	b) assoctative? yes.	
(3)	8 Sura 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1	-5
	18 11 35 mgd N	Δ
100	c) commutarine? Yes	= 2
(a. *	15 7 3C 15 10 1	
	(4) 42 (-0 -	0
	Sm. N. C.	

	En 2.6	
	$\frac{4}{7} \times \frac{3}{5} = \frac{12}{35}$ $\frac{7}{7} \times \frac{12}{10} \times \frac{0}{10} = \frac{12}{7} \times \frac{0}{10} = \frac{0}{7} \times \frac{0}{10} = $	0
<u> </u>	-5 x 7 = -35 (8) 25 x 8 8 4 32 27q 8	= <u>5</u>
3	$\frac{8}{15} \times \frac{31}{7} = \frac{8}{35} = -\frac{8}{35} = \frac{9}{35} \times \frac{61}{35} = \frac{1}{35} \times \frac{61}{35} $	<u>-5</u> <u>6</u>
A	5 763 15 (D) 78 x 15 = 28 12 3	-3 [0
<u>(C)</u>	$\frac{\begin{pmatrix} -9 \\ \cancel{10} \end{pmatrix} \times \begin{pmatrix} -\cancel{8} \\ \cancel{16} \end{pmatrix}}{\cancel{10}} \times \frac{\cancel{11}}{\cancel{11}} = \frac{-3}{\cancel{11}} \times \frac{-9}{\cancel{11}} = \frac{-9}{\cancel{11}}$	55°
0	$\frac{9}{-32} = \frac{239}{932}$ $\frac{763}{711} \times \frac{8}{8} = \frac{2}{55}$ $\frac{-24}{55}$ $\frac{7}{11} \times \frac{8}{8} = \frac{2}{55}$	27
	PROPERTIES OF MULTIPLIC	ATION
	The product of two national nois is also	a rational number.
89.	2 Jake 2 national Nois 1, 1 2 3	
0	Commutative property	
	The product of 2 rational no.s is to order of the factors is changed.	
हुते ।	at a, b, c, d are integers and b = 0	

-		
Eq.	$\frac{4}{9} \times \frac{-3}{8} = \frac{4 \times (-3)}{9 \times 8} = \frac{-3}{8} \times \frac{4}{9} = \frac{-3 \times 9}{8 \times 9}$	-
	3 8 9 x 8 8 9 8 x 9	
	= -11 = -1	
	$\frac{1}{72} = \frac{-1}{6}$ $\frac{1}{72} = \frac{-1}{6}$	
	Die primitie of 2 Antistrai no 1 1	to the contract to the
(2)	A. (1, 0, 16, 0, 1	
2	Absociative Property	
	The product of 3 national no.s is the same	even if the geouping of
	the factors is changed.	0 0 77
. 5/19	0	. 140 640
	9) a, b, c, d, e, f are integers and b x 0 a	nd are, fr
	$\frac{\left(a \times \frac{c}{d}\right) \times \frac{e}{d}}{b} = \frac{a \times \left(c \times e\right)}{b}$	C MANAGER CONTRACTOR
	(b) a) b (a)	
(1)	Chetan Perputa.	
	Commence of the commence	THE PORT OF
	PROPERTIES OF MULTIPLIE	THUN
	(1/2 × 1/3) × 1/5 - 1/2 × (1/3 × 1/2)	
	$=\frac{1}{6}\times\frac{1}{5}$	
	= 1 = 30 + P = 2 15 F	
	P 30 4 F P 42 15 F	
	of a higher pass should and b +6, d x	B. LAD Mins
(A)	Multipucative Identity.	
	Marrie Line Line	, , , , , , ,
	If we multiply a sectional no. by I, the	product is that gational
68	1, a, b are Postagers and b ≠ 0 then a x1.	1 x a = a
	1) a, b we was a series and b	Ъ Б
eg	12 x 1 = 10 to to Arragaral.	
-	15' 15'	
0	A To collect acabearast at h	
	Multiplicative anverse.	
	It a, b are heggers and a × 0 b × 0, the	0 9
	The could have sort present the training	b a x b = 1
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	b is called the nuclprocal of or	
13	multiplication inverse of a.	
	a is called neclprocal of b.	
87	Remember O hes no reciprocal.	
		1 2 17 50 50
्रे	* * * = 1	Control of supplemental
E	Distal butine Property.	
	O CONTRACTOR OF THE CONTRACTOR	5 1 1 5 Harm
	If a, b, c, d, e, f are gitegers and b≠0, d≠	01 5 70 mil
	$\frac{a}{b} \times \left(\frac{c}{4} + \frac{e}{b}\right) = \frac{a}{b} \times \frac{c}{a} + \frac{a}{b} \times \frac{e}{b}$	
	3 (4 1) 5 7 5 7	
	$=\frac{1}{1}\times\frac{1}{1}$	
	(() () () () () () () () () (
	Y	
eg.	$\frac{3}{5} \times \left(\frac{-7}{8} + \frac{2}{3}\right) \left \frac{3}{5} \times \frac{-7}{8} + \frac{2}{5} \times \frac{2}{83}\right $	
4	5 / (8 3 / 5 % 5 93	
	$\frac{3}{5} \times \left(\frac{-21+16}{24} \right) = \frac{-21}{40} + \frac{2}{5} = \frac{-21+16}{40}$	
=		
	8 248 40 8.	
2	8.	
(9)	Multiplication of a national 170. by zero.	
-	The product of a rational no. and gele	W V
eq.		
-6	$\frac{-7 \times 0 = -7 \times 0}{19 \times 1} = \frac{0}{19 \times 1} = \frac{0}{19} = \frac{0}{19}$	
		g 1 11 G g



b) .		4 - 7 x 9 12 26	$ \begin{array}{c} 3 & 2 & 4 \\ 3 & 3 & 5 \end{array} $ $ \begin{array}{c} 2 & x & 4 \\ 3 & x & 5 \end{array} $ $ \begin{array}{c} 2 & x & 4 \\ 3 & x & 5 \end{array} $	X 2 8	$= \frac{2^{1}}{3^{1}} \times \left(\frac{8}{10^{2}}\right)^{2}$ $= \frac{8}{10^{2}} \times \frac{8^{1}}{10^{2}} = \frac{1}{10^{2}}$ $= \frac{8}{10^{2}} \times \frac{8^{1}}{10^{2}} = \frac{1}{10^{2}}$	15
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0.8	xxy = yxx	
a)	$n - \frac{5}{6}, y = \frac{-3}{4}$ b) $n = \frac{-3}{7}, y = \frac{11}{13}$	
	nxy yxn xxy yxx	
	5 x - × 1 - × 1 x 5 - 3 x 1 1 1 x - 3	-
1.	-5 -5 -33 -33 8 8 91 9)	
137	Henre verified. Henre verifted.	
-c)	$x = 0$, $y = \frac{9}{13}$ $x = \frac{-3}{-5}$, $y = \frac{5}{3}$	
	nxy yxx nxy yxx	
9)		
	Hence west fred >1	
Qa	1 * xx (yxx) = (nxy) x z.	
a)	a) $n = 3, y = -5, z = 1$ b) $n = -7, y = 0, z = 3$	
	2x/4x2) (xxy)x2 2x(4x2) (xxy)x2	
	4 6 3 4 26 3 9 4 9 9	1/ 243-1
	$\frac{3}{4}$, $\frac{-5}{186}$ $\frac{-5}{8}$ $\frac{-7}{3}$ $\frac{-7}{9}$ $\frac{5}{4}$ $\frac{3}{4}$ $\frac{3}$ $\frac{3}{4}$ $\frac{3}{4}$ $\frac{3}{4}$ $\frac{3}{4}$ $\frac{3}{4}$ $\frac{3}{4}$	17 12
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	- c)	21 = 6 , y =	$\frac{2}{3}$, $2 = \frac{1}{4}$	a) n = 7	y = 1 Z	= -13
		2x(yx2) 1			7	
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	2	-11 (3 24)	(-11 x) y	ox x (yxz)	(Mxy)x	
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		Henre v	en fied.	-15	17-1	
		Argue - For	* 1			
	- 9	N = 3 - 11 - 1				
	Gar	2 22 (377) =	18811 12			
	9.10	xx(y+z) =	(xxy) + (xx2)		
Control of the Contro	a)	$x = \frac{-5}{6}, y = \frac{3}{9}$, 2 = 1	b) n=7	, y = 4 -5	12 = 3
		nx (y+z)	(xxy)+ (xx2	2x (y+	2) (nx	y) + (yxz)
4		$6 \times \left(\frac{3}{4} + \frac{1}{2}\right)$	(-5 xx) + (-5 6	* 1 3 × 4 × 5	+3 (78.	$\left(\frac{41}{25}\right) + \left(\frac{7}{-8} \times \frac{3}{10}\right)$
		-5 x (3+2)	-5 + -5 8 12	$\frac{7}{-8}$ x $\left(\frac{-8}{1}\right)$	+3 = 7	21
		-5 x 5	-15+-10 24	7 × (=	s) = 5	6-21
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= 9.75 or 9.75 100		$= \frac{12 - 10}{15}$ $= \frac{2}{15}$ $6.54 - (-3.21)$	$=\frac{5}{6} + \frac{1}{8}$ $=\frac{5}{6} + \frac{1}{2}$ $=\frac{5+3}{6}$ $=\frac{8}{6}$	= -15-14 = -29 = 24	$\frac{-1}{3} + \frac{5}{14}$ $\frac{-14+15}{42}$	= 9.87 - 6.56 3.31
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	$\frac{7}{6} - \frac{-2}{3}$	739 450
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	11 = 15	
	PROPERTIES OF SUBTRACTION	
1.	The difference of a national rows to always	a halfonal no.
eg.	$\frac{5}{6} - \frac{-4}{8} = \frac{4}{3}$	
2)	Subtraction & not commutative for ration	al nos.
571	Control Contro	
y.	$\frac{-8}{21} \frac{5}{14} \frac{2}{21} \frac{-8}{14} + \left(\frac{-5}{14}\right) \frac{5}{14} \frac{-8}{21} \frac{-5}{14}$	21
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	(b -8 - 5 \neq 5 -5	2

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(3)	Robbins 9	2 2 22 4
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=	-8 + -45 = -53 = 40 + -3	= 37
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· eg.	[27] 10일 : 10일	1.
٠٠	-3 x (7-5) -3 4 7 -3 4 5 12	
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	PROPERTIES OF DIVISION	
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0	when we divide a rational no ber anothers no	n gue satienal no, we
	duays get a rational no. Rational por ex	cluding o are closed
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eg	9 5 27	× 3 3 0
0	9 5 27 .1) -5	(12 0) 42 +4 2 m
(2)	Division is not commutative ju sational,	os,
	0	
	9.7-27 7,-9-28	
	$\frac{-9.7}{16} \cdot \frac{7}{12} \cdot \frac{-27}{28} \cdot \frac{7}{12} \cdot \frac{-9}{16} = \frac{-28}{27}$	
	10 X - X +1 - X	
(3)	Obvicion is not associative for rations	l no.s.
	and the state of t	
	1256/243 103/01/01/01	
	P.F.O.	
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2	$\begin{pmatrix} 3 & 2 \\ \hline 4 & 5 \end{pmatrix} \div \frac{-3}{2}$ $\begin{pmatrix} 3 & 2 \\ \hline 4 & 5 \end{pmatrix} \div \frac{-3}{2}$ $\begin{pmatrix} 3 & 5 \\ \hline 4 & 2 \end{pmatrix} \div \frac{-3}{2}$ $\begin{pmatrix} 3 & 5 \\ \hline 4 & 2 \end{pmatrix} \div \frac{-3}{2}$ $\begin{pmatrix} 3 & 5 \\ \hline 4 & 2 \end{pmatrix} \div \frac{-3}{2}$	
2	15 -5 1 = 3 - 4 48 -8-1 4 -15	
7 (3)	En 2.9	
1.0	a) $\frac{-5}{8} + \frac{3}{2} = \frac{7}{8}$ (b) $\frac{-2}{5} + \frac{3}{4} = \frac{7}{20}$	$(2 \ a) \ \frac{-2}{3} = \frac{+4}{5} = \frac{-22}{5}$
b)	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	$\frac{-2}{3} = \frac{-22}{15} + \frac{4}{5}$
Gs.	5 - 7 + 2 4 12 3	
6)		
9	Em_2.10	
0	9 = 3 = 4 × 5 = 20	
2	$-9 \div 4 = -9 \times 81 = -1$ $10 5 182 4 8$	
(3)	$\frac{-19}{20} \cdot \frac{1}{15} = \frac{-12^{3}}{20^{3}} \times \frac{15^{3}}{7} = \frac{-9}{7}$	•
(4)	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	
(7)	$\frac{20}{32} = \frac{-8}{-15} = \frac{205}{328} = \frac{-75}{-8}$	
©	$\frac{-11}{15} = \frac{-5}{3} = \frac{-11}{15} \times \frac{25}{5} = \frac{11}{25}$	
	5	
	EN 3 14	

	9.	
	En 2.11	
(2)		
	$a) - 8 \cdot 9 = -8 b) 21 = 14 = 3$ $13 \cdot 13 \cdot 9 25 \cdot 10 \cdot 5$	
	$\frac{-8 = -8 \times 9}{13} = \frac{21 - 3 \times 14}{35}$	4
	13 3 15 25 13 10	
6	a) u 312 b) -8 52	
(§)	(a) $\frac{-4}{5} \times \frac{3}{7} = \frac{-12}{35}$ b) $\frac{-8}{15} \times \frac{5}{12} = \frac{-2}{9}$	
10.7	-4 = -12 = 3 $-8 = -2 = 5$ $-8 = 3 = 12$	
	5 35 7 15 9 12	
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Applications -> Scientific Notation
We apply the knowledge of Exponents in
wedling Scientific Notation.
What is Scientific Notation?
The numbers are written in the form of the product of a number
i) between 1 and 20 (K)
ii) And a power of 20 (10")
That is K × 10 n. (where K lies between 1 to 10)
Standard Representation of Numbers

Example: Is 149.6 × 10° in Standard form.

Because value of [NO]

1st part: 149.6 is not between 1 & 10.

So it has to be Changed. as below

149.6 = 1.496 × 100

Now 149.6 × 10° = 1.496 × 10° × 10°

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- 1.496 × 1

Example: Is 149.6×10^6 in Standard from.

Because value of NO 1^{st} part: 149.6 is not between 1 + 10.

So it has to be Changed as below $149.6 = 1.496 \times 100$ Now $149.6 \times 10^6 = 1.496 \times 10^2 \times 10^6$ $= 1.496 \times 10^8$ $= 1.496 \times$

Example 3: Example: 2 weight of a box is Diameter of Easth is 200 tonnes. 12756 km = 200 × 1000 Kg. = 1.2756 × 10000 = 1.2756 × 104 Km. = 2×100 × 1000 kg = 2×10 × 10 Kg = 1.2756 × 104 × 1000 m = 2 × 10 Kg. = 1.2756 × 104 × 103 m. = 2 × 10 × 1000 9 = 1.2756 × 104+3 m =2×105×1039 = 1.2756 x 10 m = 2 x 10 9. (K x 10 m) (K x 10m) 1-60 10.

Exercise 3.9 (Pg-47)

1. Refer table (Pg-47) and write in Scientific Notation.

d) The distance between venus & the Easth

Earth → 149.6 million Km Venus → 108.2 million Km Difference = 41.4 million Km

= 41.4 x 1000 000 Km

= 41.4 × 106 km.

= 4.14 × 10 × 106 km

= 4.14 × 107 km.

2. Write in Common Notation d) 1.785 x 10

= 1.785 x 100000

= 178500 .

c) 4.56 × 10³ = 4.56 × 1000

= 4560 .

3. Write in Scientific Notation

d) 1632.7×10^{2} $= 1.6327 \times 10^{3} \times 10^{2} = 1.6327 \times 10^{5}$ 4. Compare each pair using > cr <d) 7.2×10^{6} ; 17.3×10^{5} $\Rightarrow 7.2 \times 1000000$ $\Rightarrow 17.3 \times 100000$ $\Rightarrow 72,00,000$ $\Rightarrow 1730,000$ 72 Lakhs > 17 Lakh 30 Thousand.

5) Express the product in Scientific Notation.

e) 723×3000000 = $723 \times 3 \times 1000000$ = 2169×1000000 = 2169×10^{6} = $2 \cdot 169 \times 10^{3} \times 10^{6}$ = $2 \cdot 169 \times 10^{3} \times 10^{6}$

= 2.169 × 109

1 to 10.

(K X 102)

Infinitesimals in Scientific Notation (13)

The word 'infinitesimals' means 48)

Very Small numbers

Example: The mass of an Electrical (the smallest particle in an atom) is

9.108 × 10⁻²⁸ gm.

Example: Express 0.000 005 in Scientific notation.

- 5 - 5 - 5 × 10⁻⁶.

$$\frac{1}{50000} = \frac{527}{100000} \times 10^{-3}$$

$$=$$
 527×10^{-3}

$$= 527 \times 10^{-5} \times 10^{3}$$

$$= 527 \times 10^{-8}$$

$$= 5.27 \times 10^{+2} \times 10^{8}$$

$$=$$
 5.27 $\times 10^{+2} \times 10^{8}$

$$= 5.27 \times 10^{+2-8}$$

$$= 5.27 \times 10^{-6}$$

$$= (K \times 10^{n})$$

$$= 1610.$$

i)
$$0.32 \times 0.0005$$

$$= 32 \times 5$$

$$10000000$$

$$= 160 \times 10^{6}$$

$$= 1.6 \times 10^{7} \times 10^{6}$$

$$= 1.6 \times 10^{72} - 6$$

$$= 1.6 \times 10^{-4}$$

$$(K \times 10^{2})$$

$$+ 15.10$$

2. Compare each pair, using >
$$8 < \frac{1.5.67 \times 10^{-9}}{10^9}$$
, $\frac{1.3 \times 10^{-8}}{10^8}$
 $\Rightarrow \frac{5.67}{10^9}$ $\Rightarrow \frac{13}{10 \times 10^8}$
 $\Rightarrow \frac{567}{10^{11}}$ $\Rightarrow \frac{13}{10^9}$
 $\Rightarrow 567 \times 10^{11} < \Rightarrow 13 \times 10^{-9}$

3 Simplify and Write the answer in Scientific Notation
c) $(3.123 \div 90) \times 10^{5}$ $= 3.123 \times 10^{5}$ 90 $= 3.123 \times 100000$ 90 = 31230 = 3470 $9 = 3.47 \times 10^{3}$ $(K \times 10^{2})$ 1 to 10

3. (1.43 × 10⁻⁷) ÷ (1.3 × 10⁻⁹)
$$= \underbrace{\frac{1.43}{10^{7}}}_{10^{7}} ÷ \underbrace{\frac{1.3}{10^{9}}}_{10^{9}}$$

$$= \underbrace{\frac{1.43}{10^{7}}}_{10^{7}} × \underbrace{\frac{10^{9}}{1.3}}_{1.3} = \underbrace{\frac{1.43}{1.3}}_{1.3} × 10^{49} × 10^{7}$$

$$= \underbrace{\frac{1.43}{10^{3}}}_{1.3} × 10^{42}$$

$$= \underbrace{\frac{1.43}{10^{3}}}_{1.3} × 10^{24}$$

$$= \underbrace{\frac{1.43}{10^{3}}}_{1.3} × 10^{42}$$

Ch-11. Volume and Surface Asiea

Asea measures Segments,
Asea measures Surfaces,
Volume is the measure of Capacity.

It is the Amount of Space available inside any closed container.

Example: Amount of water a bottle can hold water stored in a tank etc.

Standard units for measuring capacity or finding volume is cubic units.

Volume of a cube of side 1 cm is 1 cm³.

Volume of a cube of side 1 m is 1 m³.

1 Little = 1000 cu.cm.

1 Kilolitre = 1000 l.

Cuboid: It has 6 faces.

It has length, Breadth & Height:

Volume of a Cuboid = L x B x H cu units. Height.

OR = Area x H (A = L x B).

Surface Area of a cuboid = 2 (LB + BH + HL) Sq. Unit

Cube: It has 6 faces.

All 6 faces are Squares.

Its L, B and H are equal in length.

Volume of a cube = l x l x l cubic wids

= l³ cubic wids (l = 1 Side)

Surface Area of a cube = 6l² Sq. vemits:

Exercise 11.1 Pg-139

Figures of cubes and cuboids asce given.

We have to find the volume country cubic—
blocks.

Exercise 11.2 Pg-142

1 Figures are given find volume

Volume = Lx BxH

= 9 cm x 3 cm x 4 cm

= 108 cu cm.

2. How many cubic centimetries in 1 metere cube?

We know 1 m = 100 cm.

(1 m)³ = (100 cm)³ (cube both sides)

1 m x 1 m x 1 m = 100 cm x 100 cm x 100 cm

1 m³ = 10,00,000 cm³.

```
3. Find the volume of a cuboid, whose length = 2m, Breadth = 75 cm & Height = 1½ m.

Sol: We know Volume = L x B x H.

= 2m x 75 cm x 1½ m

= 2m x 0.75 m x 1.5 m

= 1.5 x 1.5 m<sup>3</sup> = 2.25 m<sup>3</sup>.

4. The volume of cuboid is 70 c·c· and the asiea of the base is 10 sq·cm· Find the height.

Sol: Given V of cuboid = 70 c·cm·

Area of Base = 10 sq·cm

We know Height = Volume = 70·c·c = 7 cm·

Area 10·cm²
```

5. Find the Volume of the cube whose Edge is

a) 4.5 cm

We know Volume of Cube = l³

= 4.5 cm × 4.5 cm × 4.5 cm = 91.125 cm³.

6. A water tank is 6m long, 4m broad & 2m deep.

How much of water can it Stoke? Give answer in literes

Sol: Dimensions of water tank are

l = 6m, b = 4m l hie depth = 2m.

Volume of tank is the volume of water it can Stoke.

= l × b × d(h)

= 6m × 4m × 2m = 48 m³.

= 48 × 10,00,000 cm³ = 4,80,00,000 cm³

We know 1 l = 1000 cu.cm.

4,80,00,000 cm³ = 4,80,00,000 literes = 48,000 l.

The floor of a classicorne is some by 12 m.

Its height is 8 m. First the onea of the floor and its volume.

Sol: Given Floor of class = some by 12 m., h=8 m.

Asea of floor = lxb = som x12 m = 120 m².

Volume of swom = Asea x height = 120 m² x8 m = 960 m.

8. How many boxes of size 5 cm by socm by soom can be packed into a big wood box of size 1 m by 1 m by 2 m.

Sol: No of boxes that can be packed in the big box

Volume of big box

Volume of big box

1 m x 2 m x 3 m = som x 50 cm x 75 cm

5 cm x 10 cm x 10 cm 5 cm x 10 cm

= 750 boxes.

9. How many bricks of size 6 cm by 20 cm by 7 cm will ?

be suggested to build a wall 15 m by ½ m by 7 m?

No of boicks needed = $\frac{\text{Volume}}{\text{Volume}}$ of Wall

= $\frac{15 \text{ m} \times \frac{1}{2} \text{ m} \times 7 \text{ m}}{6 \text{ cm} \times 20 \text{ cm} \times 7 \text{ cm}} = \frac{1500 \text{ cm} \times 50 \text{ cm} \times 700 \text{ cm}}{6 \text{ cm} \times 20 \text{ cm} \times 7 \text{ cm}} = \frac{62,500 \text{ boicks}}{62,500 \text{ boicks}}$

10. Ramesh has 64 one-on cubes. Give the measures of 3 types of cuboids he can build, using them all for each.

1. 16 x2x2 2. 8 x4x2

3. 16 x 4 x 1

11. Find the area of 4 walls of a stoom measuring alom × 5m × 6m (height).

Ed: Area of 4 walls = Perimeter × H

= 2(10+5)m × 6m

= 2×15m × 6m = 180 m².

12. Find the volume and surface Area of a cube whose edge is 5 cm.

Sol: Edge is 5 cm.

Volume of cube = l³ = 5 × 5×5 cm³ = 125 cm³.

Surface Area of cube = 6l²

= 6 × (5 cm)²

= 6 × 25 cm².

= 150 m².

13. A Swimming pool is 200m long and 120m wide. ?

36,000 m³ of water is pumped into it. Find the give in the level of water.

Sol: Length of pool = 200 m

Width of pool = 120 m

Volume of water = 36,000 m³.

Rise in level of water is the height of water.

h = V = 36,000 m³

24,000 m²

= 36,000 m²

14. An oil tin is 20 cm × 20 cm × 50 cm.

Find the area of the tin sheet required to make 30 such tins.

Sol: Dimensions of oil tin = 20 cm × 20 cm × 50 cm.

Sweface Area of 1 oil tin = 2 (lb + bh + hl)

= 2(20 cm × 20 cm + 20 cm × 50 cm + 50 cm × 20 cm)

= 2(400 cm² + 1000 cm² + 1000 cm²)

= 2(2400 cm²)

= 4800 cm².

Sweface Area of 30 oil tins = 30 × 4800 cm²

= 1,44,000 cm².

Thank You, Stay Safe.