## Chapter 1

## Ratio, Proportion, Indices, Logarithm

Past Trends					
Attempt	Ratio & Proportion	Indices	Log	Total	
May 2018	2	1	2	5	
Nov 2018	2	1	1	4	
Jun 2019	1	2	2	5	
Nov 2019	2	2	1	5	
Nov 2020	3	1	2	6	
Jan 2021	3	1	1	5	
Jul 2021	3	1	1	5	
Dec 2021	3	4	2	9	
Jun 2022	2	1	3	6	
Dec 2022	2	1	2	5	
Jun 2023	0	2	2	4	

## **Ratio Basics**

Definition	• A ratio is a comparison of the sizes of <b>two or more</b> quantities
Dejimition	of the <b>same kind</b> by division.
	• The quantities <b>a</b> and <b>b</b> are called the <b>terms</b> of the ratio, <b>a</b> is
Terms	called the first term or <b>antecedent</b> and <b>b</b> is called the <b>second</b>
	term or consequent.
	• Both terms of a ratio can be multiplied or divided by the same
Ciumlast Forme of Datio	(non–zero) number.
Simplest Form of Ratio	• Usually, a ratio is expressed in lowest terms (or simplest
	form).
Order of Terms	• The order of the terms in a ratio is important.
Quantities of same	• <i>Ratio exists only between quantities of the same kind.</i>
kind	• Example: There is no ratio between the weight of one child and
~~~~~	age of another
	• Quantities to be compared (by division) must be in the same
Quantities of same	units.
unit	• Example: 150 gm and 2 kg cant be directly compared, convert
	2kg into 2000 gm
Equivalent like	• To compare two ratios, convert them into equivalent like
fractions	fractions i.e. ratios with same denominator

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Increase or Decrease of quantity by ratios	<ul> <li>If a quantity increases or decreases in the ratio a : b then new quantity is b/a times of original quantity</li> <li>The fraction by which the original quantity is multiplied (i.e. b/a) to get a new quantity is called the factor multiplying ratio.</li> </ul>
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<b>Properties of Ratio</b>				
Inverse Ratio	<ul> <li>One ratio is the inverse of another if their product is 1.</li> <li>Thus b : a is the inverse of a : b and vice-versa.</li> </ul>			
Compounding	<ul> <li>The ratio compounded of the two ratios a : b and c : d is ac : bd.</li> <li>Compounding two or more ratios means multiplying them</li> </ul>			
Duplicate Ratio, Triplicate Ratio	<ul> <li>A ratio compounded of itself is called its duplicate ratio.</li> <li>a<sup>2</sup>: b<sup>2</sup> is the duplicate ratio of a:b</li> <li>a<sup>3</sup>: b<sup>3</sup> is the triplicate ratio of a:b</li> </ul>			
Sub-Duplicate Ratio, Sub-Triplicate Ratio	<ul> <li>√a : √b is the sub-duplicate ratio of a:b</li> <li>∛a : ∛b is the sub-triplicate ratio of a:b</li> </ul>			
Commensurable	<ul> <li>If the ratio of two similar quantities can be expressed as a ratio of two integers, the quantities are said to be commensurable.</li> <li>Otherwise, they are said to be incommensurable</li> <li>Example of Incommensurable - √3 : √2</li> </ul>			
Continued Ratio	<ul> <li>Continued Ratio: is the relation or comparison between the magnitudes of three or more quantities of same kind.</li> <li>The continued ratio of three similar quantities a, b, c can be written as a:b:c</li> </ul>			

					Study Mat
(1)	The inv	erse ratio of 11 : 15			
	а.	15 : 11	<i>b</i> .	$\sqrt{11}$ : $\sqrt{11}$	15
	С.	121 : 225	<i>d</i> .	None of these	
					Study Mat
(2)	The rat	io of two quantities is .	3 : 4. If the antecedent	is 15, the consequent	is
	а.	16	<i>b</i> .	60	
	С.	22	<i>d</i> .	20	
					Study Mat
(3)	The rat	io of the quantities is 5	5 : 7. If the consequent	of its inverse ratio is 3	5, the
	anteced	ent is			
	a.	5	<i>b</i> .	$\sqrt{5}$	
	С.	7	<i>d</i> .	None of these	



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					Study Mat
(4)	The rational contract of the second sec	o compounded of 2 : 3, 9	: 4, 5 : 6, and 8 : 10	is	
	а.	1:1	<i>b</i> .	1:5	
	С.	3:8	<i>d</i> .	None of these	
					Study Mat
(5)	The dup	licate ratio of 3 : 4 is			
	а.	$\sqrt{3}: 2$	<i>b</i> .	4:3	
	С.	9:16	<i>d</i> .	None of these	
(6)		1 11 4 41 607 0	~ ·		Study Mat
(6)		-duplicate ratio of 25 : 36			
	а.	6:5	<i>b</i> .	36:25	
	С.	50:72	<i>d</i> .	5:6	
					Study Mat
(7)	•	licate ratio of 2 : 3 is	1	6.0	
	а.	8:27	<i>b</i> .	6:9	
	С.	3:2	<i>d</i> .	None of these	
(0)	T11.	uiuliada natio a ( 0 x 27	·_		Study Mat
(8)		<i>-triplicate ratio of 8 : 27</i>		24 - 01	
	а.	27:8	b.	24:81	
	С.	2:3	<i>d</i> .	None of these	Ct. I. Mat
(0)	The nati	a common and of 4 + 0 an	ed the developte matic	of 2. 1 is	Study Mat
(9)		o compounded of 4 : 9 an 1 : 4	b.	1:3	
	a.	1.4 3:1	<i>d</i> .		
	С.	5.1	и.	None of these	Study Mat
(10)	The rati	o compounded of 4 : 9, th	he duplicate ratio of	$3 \cdot A$ the triplicate $i$	· · · ·
(10)	and 9 : 7		<i>ie uupiicuie tuito 0j</i> 5	). ±, <i>ine iripiicale i</i>	uno 0j 2 . 3
	ана <i>5</i> . 7 а.	2:7	b.	7:2	
	и. С.	2:7	<i>d</i> .	None of these	
	ι.	2.21	и.	None of these	Study Mat
(11)	The rati	o compounded of duplica	ate ratio of 4 · 5 trip	icate ratio of 1 · 3	5
(11)		81 : 256 and sub-triplica	· ·	2	suo uupiicuic
	а.	4 : 512	b.	3:32	
	и. С.	1:12	d.	None of these	
	ι.	1.12	и.	None of these	Study Mat
(12)	If $a \cdot h =$	= 3 : 4, the value of (2a +	-3h); $(3a + 4h)$ is		<i>Contry</i> 11111
()	1) и. U a.	54 : 25	b.	8:25	
	с.	17:24	<i>d</i> .	18:25	
					Study Mat
(13)	Тwo nu	mbers are in the ratio 2 :	3. If 4 be subtracted	from each. they are	U
()		umbers are		,,,	
	a.	(16, 24)	<i>b</i> .	(4, 6)	
	с.	(2, 3)	d.	None of these	
		. , .		,	



		Study N	Mat
(14)	The angles of a triangle are in ratio 2 :	7 : 11. The angles are	
	a. $(20^{\circ}, 70^{\circ}, 90^{\circ})$	b. (30°, 70°, 80°)	
	c. $(18^o, 63^o, 99^o)$	d. None of these	
		Study N	Mat
(15)	Division of ₹ 324 between X and Y is	in the ratio 11: 7. X & Y would get Rupees	
	a. (204, 120)	b. (200, 124)	
	c. (180, 144)	d. None of these	
		Study N	Mat
(16)	Anand earns ₹ 80 in 7 hours and pron	node ₹ 90 in 12 hours. The ratio of their earni	
	is		U
	a. 32 : 21	<i>b.</i> 23 : 12	
	<i>c.</i> 8:9	d. None of these	
		Study N	Mat
(17)	The ratio of two numbers is 7 : 10 and	their difference is 105. The number are	
. ,	a. (200, 305)	<i>b.</i> (185, 290)	
	c. (245, 350)	<i>d.</i> None of these	
		Study N	Mat
(18)	P. O and R three cities. The ratio of an	erage temperature between P and Q is 11 : 12	
(10)	-	ratio between average temperature of $Q$ and $I$	
	$\frac{4}{5}x^2$	rune berween weerwee remperature of Q what	
		1 07 00	
	a. 22:27	b. 27:22	
	c. 32:33	d. None of these	
(10)		Study N	Mat
(19)	If $x : y = 3 : 4$ , the value of $x^2y + xy^2$ :	-	
	a. 13:12	b. 12 : 13	
	c. 21:31	d. None of these	
		Study N	Aat
(20)	If $p$ : $q$ is the sub-duplicate ratio of $p$ –		
	a. $\frac{p}{p+z}$	b. $\frac{q}{m+q}$	
	p+q pq	p+q d. None of these	
	c. $\frac{pq}{p+q}$	u. None of these	
	t t	Study N	Mat
(21)	If $2s$ : $3t$ is the duplicate ratio of $2s - p$	Ŭ	
	a. $p^2 = 6st$	b. $P = 6st$	
	$c. \qquad 2p = 3st$	d. None of these	
	,	Study N	Mat
(22)	<i>If</i> $p : q = 2 : 3$ and $x : y = 4 : 5$ , then the	5	
	a. 71:82	b. 27:28	
	c. 17:28	d. None of these	
		Study N	Mat
(23)	The number which when subtracted fr	om each of the terms of the ratio 19 : 13 reduc	
(/	<i>it to 1 : 4 is</i>		0
	a. 15	b. 5	
	<i>c.</i> 1	d. None of these	
	v, <u>1</u>		



					Study Mat
(24)	U	and their daily expe	enses are in the		
	ratio 7 :	9. If each saves ₹ 50 per	r day, their daily ea		
	а.	(40, 50)	<i>b</i> .	(50, 40)	
	С.	(400, 500)	<i>d</i> .	None of these	
(25)				C 11 1 1 1	Study Mat
(25)		o between the speeds of t he speed of the first train		t the second train ri	ins 400 kms in 5
	а.	10 km/ hr	ь.	50 km/ hr	
	С.	70 km/ hr	<i>d</i> .	None of these	
					PYQ Dec. 21
(26)	5 femal	partment, the number of es join the department, t in the department is	•		•
	а.	9	<i>b</i> .	6	
	С.	3	<i>d</i> .	8	
					MTP Nov 20
(27) オ	U	ontains ₹187 in the forn e number of each type of 102, 136, 170 136, 102, 170 170, 102, 136		ind 10 paise coins i	n the ratio 3:4:5.
	d.	None of these			
	d.	None of these			PYQ Dec. 21
(28) オ	Incomes	s of R and S are in the ra		-	the ratio 4 : 5.
	Incomes	·		-	the ratio 4 : 5.
	Incomes Their to	s of R and S are in the ra otal expenditure is equal	to income of R. Wh	nat is the ratio of the	the ratio 4 : 5.
	Incomes Their to a.	s of R and S are in the ra otal expenditure is equal 23 : 36	to income of R. Wh b.	nat is the ratio of the 28 : 41	the ratio 4 : 5.
	Incomes Their to a. c. A vesse the solu the resu	s of R and S are in the ra otal expenditure is equal 23 : 36	to income of R. Wh b. d. facid and water in t the vessel and the sam	nat is the ratio of the 28 : 41 35 : 46 which water was 64 me quantity of wate	the ratio 4 : 5. eir savings? <b>PYQ July 21</b> %. Four liters of er was added. If
☆ (29)	Incomes Their to a. c. A vesse the solu the resu beginni a.	s of R and S are in the ra otal expenditure is equal 23 : 36 31 : 43 I contained a solution of ation were taken out of the alting solution contains ing in the vessel, was 12	to income of R. Wh b. d. Facid and water in w the vessel and the san 30% acid, the quan b.	at is the ratio of the 28 : 41 35 : 46 which water was 64 me quantity of wate tity (in liters) of the 36	the ratio 4 : 5. eir savings? <b>PYQ July 21</b> %. Four liters of er was added. If
☆ (29)	Incomes Their to a. c. A vesse the solu the resu beginni a. c.	s of R and S are in the ra otal expenditure is equal 23 : 36 31 : 43 I contained a solution of ation were taken out of the alting solution contains ing in the vessel, was 12	to income of R. Wh b. d. Facid and water in t the vessel and the san 30% acid, the quan b. d.	at is the ratio of the 28 : 41 35 : 46 which water was 64 me quantity of wate tity (in liters) of the 36 2	the ratio 4 : 5. eir savings? <b>PYQ July 21</b> %. Four liters of er was added. If e solution, in the <b>PYQ Nov. 20</b>
☆ (29) ☆	Incomes Their to a. c. A vesse the solu the resu beginni a. c. The ration How mation a.	s of R and S are in the ra otal expenditure is equal 23 : 36 31 : 43 el contained a solution of ution were taken out of th ulting solution contains ing in the vessel, was 12 24 o of number of boys and any boys and equal numb 19	to income of R. Wh b. d. Facid and water in a the vessel and the sau 30% acid, the quan b. d. the number of girls ber of girls should b b.	at is the ratio of the 28 : 41 35 : 46 which water was 64 me quantity of wate tity (in liters) of the 36 2 in a school is found the added to bring the 20	the ratio 4 : 5. eir savings? PYQ July 21 %. Four liters of er was added. If e solution, in the PYQ Nov. 20 d to be 15 : 32.
☆ (29) ☆ (30)	Incomes Their to a. c. A vesse the solu the resu beginni a. c. The ration How mat	s of R and S are in the ra otal expenditure is equal 23 : 36 31 : 43 I contained a solution of ation were taken out of th alting solution contains ing in the vessel, was 12 24 o of number of boys and any boys and equal number	to income of R. Wh b. d. facid and water in a te vessel and the san 30% acid, the quan b. d. the number of girls ber of girls should b	at is the ratio of the 28 : 41 35 : 46 which water was 64 me quantity of wate tity (in liters) of the 36 2 in a school is found the added to bring the	the ratio 4 : 5. eir savings? <b>PYQ July 21</b> %. Four liters of er was added. If e solution, in the <b>PYQ Nov. 20</b> d to be 15 : 32. e ratio to 2/3?
☆ (29) ☆ (30) ☆	Incomes Their to a. c. A vesse the solu the resu beginni a. c. The ratio How ma a. c.	s of R and S are in the ra otal expenditure is equal 23 : 36 31 : 43 el contained a solution of ution were taken out of th ulting solution contains ing in the vessel, was 12 24 o of number of boys and any boys and equal numb 19 23	to income of R. Wh b. d. Facid and water in a the vessel and the sau 30% acid, the quan b. d. the number of girls ber of girls should b b. d.	at is the ratio of the 28 : 41 35 : 46 which water was 64 me quantity of wate tity (in liters) of the 36 2 in a school is found the added to bring the 20 27	the ratio 4 : 5. eir savings? <b>PYQ July 21</b> %. Four liters of er was added. If e solution, in the <b>PYQ Nov. 20</b> It to be 15 : 32. e ratio to 2/3? <b>PYQ Dec 22</b>
☆ (29) ☆ (30)	Incomes Their to a. c. A vesse the solu the resu beginni a. c. The ration How mad a. c. A group days 28 the rem	s of R and S are in the ra otal expenditure is equal 23 : 36 31 : 43 el contained a solution of ation were taken out of the alting solution contains ing in the vessel, was 12 24 o of number of boys and my boys and equal numb 19 23 p of 400 soldiers posted a 80 soldiers from this grou caining ration will be suf	to income of R. Wh b. d. Facid and water in a the vessel and the san 30% acid, the quan b. d. the number of girls ber of girls should b b. d. at border area had a up were called back. ficient?	at is the ratio of the 28 : 41 35 : 46 which water was 64 me quantity of wate tity (in liters) of the 36 2 in a school is found e added to bring the 20 27 provision for 31 da Find the number o	the ratio 4 : 5. eir savings? <b>PYQ July 21</b> %. Four liters of er was added. If e solution, in the <b>PYQ Nov. 20</b> d to be 15 : 32. e ratio to 2/3? <b>PYQ Dec 22</b> eys. After 28
☆ (29) ☆ (30) ☆ (31)	Incomes Their to a. c. A vesse the solu the resu beginni a. c. The rati How ma a. c. A group days 28	s of R and S are in the ra otal expenditure is equal 23 : 36 31 : 43 el contained a solution of ation were taken out of the alting solution contains ing in the vessel, was 12 24 o of number of boys and any boys and equal numb 19 23 p of 400 soldiers posted a 80 soldiers from this grou	to income of R. Wh b. d. facid and water in a the vessel and the san 30% acid, the quan b. d. the number of girls ber of girls should b b. d. at border area had a up were called back.	at is the ratio of the 28 : 41 35 : 46 which water was 64 me quantity of wate tity (in liters) of the 36 2 in a school is found e added to bring the 20 27 provision for 31 da	the ratio 4 : 5. eir savings? <b>PYQ July 21</b> %. Four liters of er was added. If e solution, in the <b>PYQ Nov. 20</b> d to be 15 : 32. e ratio to 2/3? <b>PYQ Dec 22</b> eys. After 28

Proportion Basics				
Definition	<ul> <li>An equality of two ratios is called a proportion.</li> <li>Four quantities a, b, c, d are said to be in proportion if a:b=c:d or a:b::c:d</li> </ul>			
Terms	<ul> <li>The quantities a, b, c, d are called terms of the proportion; a, b, c and d are called its first, second, third and fourth terms respectively.</li> <li>Terms or proportion can also be called as Proportional</li> <li>First and fourth terms are called extremes (or extreme terms).</li> <li>Second and third terms are called means (or middle terms).</li> </ul>			
Cross Product Rule	<ul> <li>If a : b = c : d are in proportion then ad = bc</li> <li>Product of Extremes = Product of Means</li> </ul>			
Continued Proportion	• Three quantities a, b, c of the same kind (in same units) are said to be in continuous proportion if $a : b = b : c$ $\frac{a}{b} = \frac{b}{c} \Rightarrow b^2 = ac$ a = first proportional, c = third proportional andb is mean proportional (because b is GM of a and c)			

Properties of Proportion				
Invertendo	<i>If</i> $a : b = c : d$ , then b : a = d : c			
Alternendo	If $a : b = c : d$ , then a : c = b : d			
Componendo	If $a : b = c : d$ , then a + b : b = c + d : d			
Dividendo	If $a : b = c : d$ , then a - b : b = c - d : d			
Componendo and Dividendo	If $a: b = c: d$ , then $\frac{a+b}{a-b} = \frac{c+d}{c-d}$ or $\frac{a-b}{a+b} = \frac{c-d}{c+d}$			
Addendo	If $a:b = c:d = e:f = \dots = k$ , then $\frac{a+c+e+\dots}{b+d+f+\dots} = k$			
Subtrahendo	If $a:b = c:d = e:f = \dots = k$ , then $\frac{a-c-e-\dots}{b-d-f-\dots} = k$			

					Study Mat
(32)	The fourth	proportional to 4, 6, 8 is			2
. ,	a.	12	<i>b</i> .	32	
	с.	48	d.	None of these	
	0.	10		110100 05 111000	Study Mat
(33)	The third t	proportional to 12, 18 is			<i>comy</i> 11100
(00)	a.	24	b.	27	
	и. С.	36	<i>д</i> . <i>d</i> .	None of these	
	ι.	50	и.	inone of these	Study Mat
(34)	The mean	proportional between 25, 81	ic		Study Widt
(34)		40	<i>b</i> .	50	
	a.	40 45	<i>д</i> . <i>d</i> .		
	С.	43	и.	None of these	Chulu Mat
(25)		1.1.1 (1 (1		1 10 '	Study Mat
(35)		er which has the same ratio t			
	а.	11	<i>b</i> .	10	
	С.	21	d.	None of these	
					Study Mat
(36)	The fourth	proportional to $2a_{,}a^{2}$ , c is			
	а.	ac/2	<i>b</i> .	ac	
	С.	2/ac	<i>d</i> .	None of these	
					Study Mat
(37)	If four nur	nbers 1/2, 1/3, 1/5, 1/x are p	roportional ti	hen x is	
	а.	6/5	<i>b</i> .	5/6	
	С.	15/2	<i>d</i> .	None of these	
					Study Mat
(38)	The mean	proportional between $12x^2$ a	and $27y^2$ is		
	а.	18xy	Ь.	81xy	
	С.	8xy	<i>d</i> .	None of these	
					Study Mat
(39)	If $A = B/2$	= C/5, then A : B : C is			
	a.	3:5:2	Ь.	2:5:3	
	С.	1:2:5	<i>d</i> .	None of these	
				2	
					Study Mat
(40)	If a/3 = b/4	4 = c/7, then $a + b + c/c$ is			
	a.	1	<i>b</i> .	3	
	С.	2	d.	None of these	
					Study Mat
(41)	If $p/a = r/s$	= 2.5/1.5, the value of ps : q	r is		
()	л р, q т, s a.	3/5	ь.	1:1	
	и. С.	5/3	<i>d</i> .	None of these	
			и.		Study Mat
(42)	If $\gamma \cdot \mu = \gamma$	: w = 2.5 : 1.5, the value of (	(x + y) / (y + y)	7n) is	Study Will
(12)	$\begin{array}{c} 1 j \ x \ y = 2 \\ a. \end{array}$	1 . w – 2.5 . 1.5, the butue of (	<i>x</i> + <i>y</i> ) / ( <i>y</i> + <i>b</i> .	3/5	
	и. С.	5/3	<i>д</i> . <i>d</i> .	None of these	
	ι.	010	и.	Thome of these	



				Study Mat
(43)	If $(5x - 3y) / (5y - 3x) = 3/4$ , the v	alue of x : y is		0
	a. 2:9	<i>b</i> .	7:2	
	<i>c</i> . 7:9	d.	None of these	
				Study Mat
(44)	<i>If</i> $A : B = 3 : 2$ <i>and</i> $B : C = 3 : 5$ <i>, th</i>	en A : B : C is		
	a. 9:6:10	<i>b</i> .	6:9:10	
	<i>c</i> . 10:9:6	d.	None of these	
				Study Mat
(45)	If $x/2 = y/3 = z/7$ , then the value of	f(2x-5y+4z)/2y	s	
	a. 6/23	<i>b</i> .	23/6	
	c. 3/2	d.	17/6	
				Study Mat
(46)	<i>If</i> $x : y = 2 : 3$ , $y : z = 4 : 3$ <i>then</i> $x :$	y is		
	a. 2:3:4	b.	4:3:2	
	<i>c</i> . 3:2:4	d.	None of these	
			,	Study Mat
(47)	Division of ₹ 750 into 3 parts in t	the ratio 4 : 5 : 6 is		
	a. (200, 250, 300)	Ь.	(250, 250, 250)	
	c. (350, 250, 150)	d.	8 : 12: 9	
				Study Mat
(48)	The sum of the ages of 3 persons is	s 150 years. 10 year	s ago their ages we	v
	7 : 8 : 9. Their present ages are	5 5	8 8	
	a. (45, 50, 55)	Ь.	(40, 60, 50)	
	<i>c.</i> (35, 45, 70)	d.	None of these	
			, ,	Study Mat
(49)	The numbers 14, 16, 35, 42 are no	t in proportion. Th	e fourth term for w	~
	be in proportion is	, ,	5	5
	a. 45	Ь.	40	
	<i>c</i> . 32	d.	None of these	
			y	Study Mat
(50)	If $x/y = z/w$ , implies $y/x = w/z$ , the	n the process is call	ed	
	a. Dividendo	<i>b</i> .	Componendo	
	c. Alternendo	d.	None of these	
				Study Mat
(51)	If $p/q = r/s = p - r/q - s$ , the proces	s is called		5
	a. Subtrahendo	b.	Addendo	
	c. Invertendo	d.	None of these	
		~~ ~		
				ICAI SM
(52)	<i>If</i> $a/b = c/d$ , <i>implies</i> $(a + b) / (a - b)$	= (c + d) / (c - d).	the process is called	
	,, (		1	
	a. Componendo			
	b. Divinendo			
	c. Componendo & Divi	nendo		
	d. none of these			



			Study Mat
(53)	If $u/v = w/p$ , then $(u - v) = (w - p) / (w + v)$	p). This	process is called
	a. Invertendo	<i>b</i> .	Alternendo
	c. Addedndo	d.	None of these
			Study Mat
(54)	12, 16, *, 20 are in proportion. Then * is		
	a. 25	<i>b</i> .	14
	<i>c</i> . 15	d.	None of these
			Study Mat
(55)	4, *, 9, 13 ½ are in proportion. Then * is		
	a. 6	<i>b</i> .	8
	<i>c.</i> 9	d.	None of these
			Study Mat
(56)	The mean proportional between 1.4 gms a	nd 5.6 gr	ns is
	a. 28 gms	<i>b</i> .	2.8 gms
	c. 3.2 gms	d.	None of these
			Study Mat
(57)	If $\frac{a}{4} = \frac{b}{5} = \frac{c}{9}$ then $\frac{a+b+c}{c}$ is		
	a. 4	b.	2
	<i>c.</i> 7	d.	- None of these
			Study Mat
(58)	Two numbers are in the ratio 3 : 4; if 6 be	added to	
()	ratio will be 4 : 5, then the numbers are		,,
	a. 14, 20	b.	17, 19
	<i>c</i> . 18, 24	d.	None of these
			Study Mat
(59)	If $\frac{a}{4} = \frac{b}{5}$ then		
()	a + 4  b - 5	b.	a+4 $b+5$
	a. c. $\frac{a+4}{a-4} = \frac{b-5}{b+5}$ $\frac{a+4}{a-4} = \frac{b-5}{b+5}$	Ũ.	$\frac{a+4}{a-4} = \frac{b+5}{b-5}$
	$\begin{array}{ccc} a - 4 & b + 5 \\ a - 4 & b + 5 \end{array}$	d.	a - 4  b = 5 None of these
	$\frac{1}{a+4} = \frac{1}{b-5}$		
			Study Mat
(60)	If $a: b = 4: 1$ then $\sqrt{\frac{a}{b}} + \sqrt{\frac{b}{a}}$ is		
	a. 5/2	b.	4
	<i>c</i> . 5	d.	None of these
	X V Z		Study Mat
(61)	If $\frac{x}{b+c-a} = \frac{y}{c+a-b} = \frac{z}{a+b-c}$ then $(b-c)x$	+(c-a)	y + (a - b)z is
	a. 1	<i>b</i> .	0
	<i>c.</i> 5	d.	None of these

					PYQ Jan. 21
(62)	In a cer	tain business A and B rece	ived profit in a cer	tain ratio B an	d C received profits
	in the same ratio. If A gets $\gtrless$ 1600 and C gets				
	₹2500	then how much does B get	?		
	а.	₹2,000	<i>b</i> .	₹2,500	
	С.	₹1,000	<i>d</i> .	₹1,500	
					PYQ May 18
(63)	The me	ean proportional between 2	4 and 54 is:		
	а.	33	<i>b</i> .	34	
	С.	35	<i>d</i> .	36	
					MTP March 21
(64)	Whi	ch of the numbers are not i	in proportions?		
	a.	6,8,5,7	<i>b</i> .	7,3,14,6	
	С.	18,27,12,18	<i>d</i> .	8,6,12,9	

Indices Basics			
Base	Number which is raised to some power is called as Base		
Power	Number of times Base is multiplied by itself		
Index Entire Number including Base and Power is Index			
Indices	Plural of Index		
Example	$3^4 = 81$ Here Base is 3, Power is 4 and Index is $3^4$ and 81 is the result		
Base	Number which is raised to some power is called as Base		
Standard Results	<ul> <li>Any base raised to the power zero is defined to be 1 a<sup>0</sup> = 1     </li> <li>Roots can also be expressed in the form of power <sup>t</sup>√a = a<sup>1</sup>/<sub>r</sub> </li> </ul>		
Power Shifting Punch	• If $6^3 = x \Rightarrow 6 = x^{\frac{1}{3}}$ • If $5^{\frac{3}{2}} = y \Rightarrow 5 = y^{\frac{2}{3}}$		

Law of Indices		
Law 1	If two or more terms with same base are multiplied, we can make them one term having the same base and power as sum of all powers. $a^m \times a^n = a^{m+n}$	
Law 2	If two or more terms with same base are in division, we can make them one term having the same base and power as difference of power. $\frac{a^m}{a^n} = a^{m-n}$	
Law 3	<i>If a term having power is raised to another power, we can do product of powers to simplify the expression</i>	



	$\left(a^{m}\right)^{n}=a^{m\times n}$
Law 4	If a product of two or more terms is raised to power, we can split the two terms with same individual power to each one of them.
	$(a \times b)^n = a^n \times b^n$

				Study Mat
(65)	$4x^{-1/4}$ is expressed as			
	a. $-4x^{1/4}$	<i>b</i> .	$x^{-1}$	
	c. $4/x^{1/4}$	d.	None of these	
				Study Mat
(66)	The value of $8^{1/3}$ is			
	a. $\sqrt[3]{2}$	<i>b</i> .	4	
	<i>c</i> . 2	d.	None of these	
				Study Mat
(67)	The value of $2 \times (32)^{1/5}$ is	1	10	
	a. 2 c. 4	<i>b</i> .	10	
	<i>c</i> . 4	d.	None of these	Chu lu Mat
(co)	The value of $A/(22)^{1/5}$ is			Study Mat
(68)	The value of $4/(32)^{1/5}$ is a. 8	Ь.	2	
	a. 8 c. 4	<i>0.</i> d.	2 None of these	
	t. 1	и.	none of these	Study Mat
(69)	The value of (8/27) <sup>1/3</sup> is			Study Whit
(03)	a. 2/3	b.	3/2	
	c. 2/9	<i>d</i> .	None of these	
	. 210		ivence of mede	Study Mat
(70)	<i>The value of</i> $2(256)^{-1/8}$ <i>is</i>			
	a. 1	<i>b</i> .	2	
	<i>c</i> . 1/2	d.	None of these	
			<i>y</i>	ICAI SM
(71)	$2^{1/2}$ . $4^{3/4}$ is equal to			
	a. A fraction			
	b. A negative integer			
	c. A positive integer			
	d. None of these			
				Study Mat
(72)	$\left\{\frac{81x^4}{y^{-8}}\right\}^{1/4}$ has simplified value equal to			
	2	Ь.	$x^2y$	
	2 2	<i>0.</i> d.	x y None of these	
	$c. \qquad 9xy^2$	и.	none of these	Study Mat
(73)	$x^{a-b} \times x^{b-c} \times x^{c-a}$ is equal to			Study Widt
(70)	a. x	b.	1	
	<i>c</i> . <i>0</i>	<i>d</i> .	None of these	
		и.	i tone of muse	



		Study Mat
(74)	The value of $\left\{\frac{2p^2q^3}{3xy}\right\}^0$ where p, q, x, $y \neq 0$ is equal to	
	a. 0   b. 2/3	
	c. 1 d. None of thes	е
		Study Mat
(75)	$\{(3^3)^2 \times (4^2)^3 \times (5^3)^2\} / \{(3^2)^3 \times (4^3)^2 \times (5^2)^3\}$ is	
	a. <sup>3</sup> / <sub>4</sub> b. 4/5	
	c. 4/7 d. 1	
		Study Mat
(76)	Which is True? $a.   2^{o} > (1/2)^{o}   b.   2^{o} < (1/2)^{o}$	)
	a. $2^{\circ} > (1/2)^{\circ}$ b. $2^{\circ} < (1/2)^{\circ}$ c. $2^{\circ} = (1/2)^{\circ}$ d. None of thes	
	<i>c. 2</i> ( <i>1</i> /2) <i>u.</i> None of thes	e Study Mat
(77)	If $x^{1/p} = y^{1/q} = z^{1/r}$ and $xyz = 1$ , then the value of $p + q + r$ is	<i>ormiy</i> 11100
	<i>a.</i> 1 <i>b.</i> 0	
	c. 1/2 d. None of thes	е
		Study Mat
(78)	The value of $y^{a-b} \times y^{b-c} \times y^{c-a} \times y^{-a-b}$ is	
	$\begin{array}{cccc} a. & y^{a+b} & b. & y \\ c. & 1 & d. & 1/y^{a+b} \end{array}$	
	c. 1 d. $1/y^{a+b}$	
(79)	The True option is	Study Mat
(19)		
	a. $x^{2/3} = \sqrt[3]{x^2}$ b. $x^{2/3} = \sqrt{x^3}$	
(80)	a. $x^{2/3} = \sqrt[3]{x^2}$ b. $x^{2/3} = \sqrt{x^3}$ c. $x^{2/3} > \sqrt[3]{x^2}$ b. $x^{2/3} = \sqrt{x^3}$ d. $x^{2/3} < \sqrt[3]{x^2}$	Study Mat
(80)	a. $x^{2/3} = \sqrt[3]{x^2}$ b. $x^{2/3} = \sqrt{x^3}$ c. $x^{2/3} > \sqrt[3]{x^2}$ d. $x^{2/3} < \sqrt[3]{x^2}$ The simplified value of $16x^{-3}y^2 \times 8^{-1}x^3y^{-2}$ is	
(80)	a. $x^{2/3} = \sqrt[3]{x^2}$ b. $x^{2/3} = \sqrt{x^3}$ c. $x^{2/3} > \sqrt[3]{x^2}$ d. $x^{2/3} < \sqrt[3]{x^2}$ The simplified value of $16x^{-3}y^2 \times 8^{-1}x^3y^{-2}$ is	Study Mat
(80)	a. $x^{2/3} = \sqrt[3]{x^2}$ b. $x^{2/3} = \sqrt{x^3}$ c. $x^{2/3} > \sqrt[3]{x^2}$ d. $x^{2/3} < \sqrt[3]{x^2}$ The simplified value of $16x^{-3}y^2 \times 8^{-1}x^3y^{-2}$ is       a. $2xy$ b. $Xy/2$ c.       2       d.       None of thes	Study Mat
(80)	a. $x^{2/3} = \sqrt[3]{x^2}$ b. $x^{2/3} = \sqrt{x^3}$ c. $x^{2/3} > \sqrt[3]{x^2}$ d. $x^{2/3} < \sqrt[3]{x^2}$ The simplified value of $16x^{-3}y^2 \times 8^{-1}x^3y^{-2}$ is         a. $2xy$ b. $Xy/2$ c. $2$ d.       None of thes         The value of $(8/27)^{-1/3} \times (32/243)^{-1/5}$ is	Study Mat e
	a. $x^{2/3} = \sqrt[3]{x^2}$ b. $x^{2/3} = \sqrt{x^3}$ c. $x^{2/3} > \sqrt[3]{x^2}$ d. $x^{2/3} < \sqrt[3]{x^2}$ The simplified value of $16x^{-3}y^2 \times 8^{-1}x^3y^{-2}$ is         a. $2xy$ b. $Xy/2$ c.       2       d.       None of thes         The value of $(8/27)^{-1/3} \times (32/243)^{-1/5}$ is         a. $9/4$ b. $4/9$	Study Mat e Study Mat
	a. $x^{2/3} = \sqrt[3]{x^2}$ b. $x^{2/3} = \sqrt{x^3}$ c. $x^{2/3} > \sqrt[3]{x^2}$ d. $x^{2/3} < \sqrt[3]{x^2}$ The simplified value of $16x^{-3}y^2 \times 8^{-1}x^3y^{-2}$ is         a. $2xy$ b. $Xy/2$ c. $2$ d.       None of thes         The value of $(8/27)^{-1/3} \times (32/243)^{-1/5}$ is	Study Mat e Study Mat
(81)	a. $x^{2/3} = \sqrt[3]{x^2}$ b. $x^{2/3} = \sqrt{x^3}$ c. $x^{2/3} > \sqrt[3]{x^2}$ d. $x^{2/3} < \sqrt[3]{x^2}$ The simplified value of $16x^{-3}y^2 \times 8^{-1}x^3y^{-2}$ is       a. $2xy$ b. $Xy/2$ c.       2       d.       None of thes         The value of $(8/27)^{-1/3} \times (32/243)^{-1/5}$ is       a.       9/4       b. $4/9$ c.       2/3       d.       None of thes	Study Mat e Study Mat
	a. $x^{2/3} = \sqrt[3]{x^2}$ b. $x^{2/3} = \sqrt{x^3}$ c. $x^{2/3} > \sqrt[3]{x^2}$ d. $x^{2/3} < \sqrt[3]{x^2}$ The simplified value of $16x^{-3}y^2 \times 8^{-1}x^3y^{-2}$ is       a. $2xy$ b. $Xy/2$ c.       2       d.       None of thes         The value of $(8/27)^{-1/3} \times (32/243)^{-1/5}$ is       a.       9/4       b. $4/9$ c.       2/3       d.       None of thes	Study Mat e Study Mat
(81)	a. $x^{2/3} = \sqrt[3]{x^2}$ b. $x^{2/3} = \sqrt{x^3}$ c. $x^{2/3} > \sqrt[3]{x^2}$ d. $x^{2/3} < \sqrt[3]{x^2}$ The simplified value of $16x^{-3}y^2 \times 8^{-1}x^3y^{-2}$ is         a. $2xy$ b. $Xy/2$ c. $2$ $d$ .       None of thes         The value of $(8/27)^{-1/3} \times (32/243)^{-1/5}$ is         a. $9/4$ $b$ . $4/9$ c. $2/3$ $d$ .       None of thes         The value of $\left\{(x+y)^{2/3}(x-y)^{2/3}/\sqrt{x+y} \times \sqrt{(x-y)}^3\right\}^6$ is         a. $(x+y)^2$ $b$ . $(x-y)$	e e Study Mat e Study Mat
(81)	a. $x^{2/3} = \sqrt[3]{x^2}$ b. $x^{2/3} = \sqrt{x^3}$ c. $x^{2/3} > \sqrt[3]{x^2}$ d. $x^{2/3} < \sqrt[3]{x^2}$ The simplified value of $16x^{-3}y^2 \times 8^{-1}x^3y^{-2}$ is         a. $2xy$ b. $Xy/2$ c. $2$ $d$ .       None of thes         The value of $(8/27)^{-1/3} \times (32/243)^{-1/5}$ is         a. $9/4$ $b$ . $4/9$ c. $2/3$ $d$ .       None of thes         The value of $\left\{(x+y)^{2/3}(x-y)^{2/3}/\sqrt{x+y} \times \sqrt{(x-y)^3}\right\}^6$ is	e Study Mat e Study Mat e Study Mat
(81)	a. $x^{2/3} = \sqrt[3]{x^2}$ b. $x^{2/3} = \sqrt{x^3}$ c. $x^{2/3} > \sqrt[3]{x^2}$ d. $x^{2/3} < \sqrt[3]{x^2}$ The simplified value of $16x^{-3}y^2 \times 8^{-1}x^3y^{-2}$ is         a. $2xy$ b. $Xy/2$ c.       2       d.       None of thes         The value of $(8/27)^{-1/3} \times (32/243)^{-1/5}$ is         a. $9/4$ b. $4/9$ c. $2/3$ d.       None of thes         The value of $\left\{ (x + y)^{2/3}(x - y)^{2/3}/\sqrt{x + y} \times \sqrt{(x - y)^3} \right\}^6$ is         a. $(x + y)^2$ b. $(x - y)$ c. $x + y$ d.       None of thes	e e Study Mat e Study Mat
(81)	a. $x^{2/3} = \sqrt[3]{x^2}$ b. $x^{2/3} = \sqrt{x^3}$ c. $x^{2/3} > \sqrt[3]{x^2}$ d. $x^{2/3} < \sqrt[3]{x^2}$ The simplified value of $16x^{-3}y^2 \times 8^{-1}x^3y^{-2}$ is         a. $2xy$ b. $Xy/2$ c.       2       d.       None of thes         The value of $(8/27)^{-1/3} \times (32/243)^{-1/5}$ is         a. $9/4$ b. $4/9$ c. $2/3$ d.       None of thes         The value of $\{(x + y)^{2/3}(x - y)^{2/3}/\sqrt{x + y} \times \sqrt{(x - y)^3}\}^6$ is         a. $(x + y)^2$ b. $(x - y)$ c. $x + y$ d.       None of thes         Simplified value of $(125)^{2/3} \times \sqrt{25} \times \sqrt[3]{5}^3 \times 5^{1/2}$	e Study Mat e Study Mat e Study Mat
(81)	a. $x^{2/3} = \sqrt[3]{x^2}$ b. $x^{2/3} = \sqrt{x^3}$ c. $x^{2/3} > \sqrt[3]{x^2}$ d. $x^{2/3} < \sqrt[3]{x^2}$ The simplified value of $16x^{-3}y^2 \times 8^{-1}x^3y^{-2}$ is         a. $2xy$ b. $Xy/2$ c.       2       d.       None of thes         The value of $(8/27)^{-1/3} \times (32/243)^{-1/5}$ is         a. $9/4$ b. $4/9$ c. $2/3$ d.       None of thes         The value of $\left\{ (x + y)^{2/3}(x - y)^{2/3}/\sqrt{x + y} \times \sqrt{(x - y)^3} \right\}^6$ is         a. $(x + y)^2$ b. $(x - y)$ c. $x + y$ d.       None of thes	e Study Mat e Study Mat e Study Mat e Study Mat

				Study Mat
(84)	$\left[\left((2)^{\frac{1}{2}},(4)^{\frac{3}{4}},(8)^{\frac{5}{4}},(16)^{\frac{7}{8}},(32)^{\frac{9}{10}}\right)^{4}\right]^{3/2}$	.5		
	$\left[\left\{(2)^{\frac{1}{2}},(4)^{\frac{3}{4}},(8)^{\frac{5}{6}},(16)^{\frac{7}{8}},(32)^{\frac{9}{10}}\right\}^{\frac{4}{7}}\right]^{3/2}$	15		
	a. A fraction	Ь.	An integer	
	c. 1	d.	None of these	
				Study Mat
(85)	$[1 - {1 - (1 - x^2)^{-1}}^{-1}]^{-1/2}$ is equal			
	a. x	<i>b</i> .	1/x	
	<i>c</i> . 1	<i>d</i> .	None of these	Studu Mat
(86)	1 1			Study Mat
(00)	$\left[(x^n)^{n-\frac{1}{n}}\right]^{\frac{1}{n+1}}$ is equal to			
	$a. x^n$	Ь.	$x^{n+1}$	
	$c. \qquad x^{n-1}$	d.	None of these	
				Study Mat
(87)	$If a^3 - b^3 = (a - b)(a^2 + ab + b^2),$	then the sim	plified form of $\left[\frac{x^{l}}{dt}\right]^{l^{2}+1}$	$+lm+m^2$ ×
	$\sum_{m_1m^2+mn+n^2} \sum_{m_1n^2+ln+n^2} \sum_{m_1n^2+$		$[x^m]$	
	$\left[\frac{x^m}{x^n}\right]^{m^2+mn+n^2} \times \left[\frac{x^n}{x^l}\right]^{l^2+ln+n^2}$			
	<i>a</i> . 0	Ь.		
	<i>c. x</i>	<i>d</i> .	None of these	
(00)		. 1 .1		$\frac{ICAISM}{1/3}$
(88)	$If (a - b)^3 = a^3 - b^3 - 3ab(a - b)$	tick the corre	ct of these when $x =$	$p^{1/3} - p^{-1/3}$
	$a. \qquad x^3 + 3x = p + 1/p$			
	b. $x^3 + 3x = p - 1/p$			
	$c. \qquad x^3 + 3x = p + 1$			
	d. None of these			
(89)				Study Mat
	On simplification, $1/(1 + a^{m-n} + a^n)$	(n-p) + 1/(1 + 1)	$(+ a^{n-m} + a^{n-p}) + 1$	U
	$a^{p-m} + a^{p-n}$ ) is equal to			U
	$a^{p-m} + a^{p-n}$ ) is equal to a. 0	b.	а	U
	$a^{p-m} + a^{p-n}$ ) is equal to			/(1+
	$a^{p-m} + a^{p-n}$ ) is equal to a. 0 c. 1	b. d.	а	U
(90)	$a^{p-m} + a^{p-n}$ ) is equal to a. 0	b. d.	а	/(1+
	$a^{p-m} + a^{p-n}) \text{ is equal to}$ $a.  0$ $c.  1$ The value of $\left[\frac{x^a}{x^b}\right]^{a+b} \times \left[\frac{x^b}{x^c}\right]^{b+c} \times \left[\frac{x^c}{x^a}\right]$ $a.  1$	b. d.	а	/(1+
	$a^{p-m} + a^{p-n}) \text{ is equal to}$ $a. \qquad 0$ $c. \qquad 1$ The value of $\left[\frac{x^a}{x^b}\right]^{a+b} \times \left[\frac{x^b}{x^c}\right]^{b+c} \times \left[\frac{x^c}{x^a}\right]$	b. d. c+a	a 1/a	./(1 + Study Mat
(90)	$a^{p-m} + a^{p-n}) \text{ is equal to}$ $a.  0$ $c.  1$ The value of $\left[\frac{x^a}{x^b}\right]^{a+b} \times \left[\frac{x^b}{x^c}\right]^{b+c} \times \left[\frac{x^c}{x^a}\right]$ $a.  1$ $c.  2$	b. d. c+a b.	a 1/a 0	/(1+
	$a^{p-m} + a^{p-n}) \text{ is equal to}$ $a.  0$ $c.  1$ The value of $\left[\frac{x^a}{x^b}\right]^{a+b} \times \left[\frac{x^b}{x^c}\right]^{b+c} \times \left[\frac{x^c}{x^a}\right]^{a+b}$ $a.  1$ $c.  2$ If $x = 3^{\frac{1}{3}} + 3^{\frac{1}{3}}$ , then $3x^3 - 9x$ is	b. d. c+a b. d.	a 1/a 0 None of these	/(1 + Study Mat
(90)	$a^{p-m} + a^{p-n}) \text{ is equal to}$ $a. \qquad 0$ $c. \qquad 1$ The value of $\left[\frac{x^a}{x^b}\right]^{a+b} \times \left[\frac{x^b}{x^c}\right]^{b+c} \times \left[\frac{x^c}{x^a}\right]$ $a. \qquad 1$ $c. \qquad 2$ If $x = 3^{\frac{1}{3}} + 3^{\frac{1}{3}}$ , then $3x^3 - 9x$ is $a. \qquad 15$	b. d. c+a b. d. b.	a 1/a 0 None of these 10	/(1 + Study Mat
(90)	$a^{p-m} + a^{p-n}) \text{ is equal to}$ $a.  0$ $c.  1$ The value of $\left[\frac{x^a}{x^b}\right]^{a+b} \times \left[\frac{x^b}{x^c}\right]^{b+c} \times \left[\frac{x^c}{x^a}\right]^{a}$ $a.  1$ $c.  2$ If $x = 3^{\frac{1}{3}} + 3^{\frac{1}{3}}$ , then $3x^3 - 9x$ is	b. d. c+a b. d.	a 1/a 0 None of these	./(1 + Study Mat Study Mat
(90) (91)	$a^{p-m} + a^{p-n}) \text{ is equal to}$ a. 0 c. 1 The value of $\left[\frac{x^{a}}{x^{b}}\right]^{a+b} \times \left[\frac{x^{b}}{x^{c}}\right]^{b+c} \times \left[\frac{x^{c}}{x^{a}}\right]^{a}$ a. 1 c. 2 If $x = 3^{\frac{1}{3}} + 3^{\frac{1}{3}}$ , then $3x^{3} - 9x$ is a. 15 c. 12	b. d. c+a b. d. b. d.	a 1/a 0 None of these 10	/(1 + Study Mat
(90)	$a^{p-m} + a^{p-n}) \text{ is equal to}$ a. 0 c. 1 The value of $\left[\frac{x^{a}}{x^{b}}\right]^{a+b} \times \left[\frac{x^{b}}{x^{c}}\right]^{b+c} \times \left[\frac{x^{c}}{x^{a}}\right]^{a}$ a. 1 c. 2 If $x = 3^{\frac{1}{3}} + 3^{\frac{1}{3}}$ , then $3x^{3} - 9x$ is a. 15 c. 12 If $a^{x} = b, b^{y} = c, c^{z} = a$ , then xyz is	b. d. c+a b. d. b. d.	a 1/a 0 None of these 10 None of these	./(1 + Study Mat Study Mat
(90) (91)	$a^{p-m} + a^{p-n}) \text{ is equal to}$ a. 0 c. 1 The value of $\left[\frac{x^{a}}{x^{b}}\right]^{a+b} \times \left[\frac{x^{b}}{x^{c}}\right]^{b+c} \times \left[\frac{x^{c}}{x^{a}}\right]^{a}$ a. 1 c. 2 If $x = 3^{\frac{1}{3}} + 3^{\frac{1}{3}}$ , then $3x^{3} - 9x$ is a. 15 c. 12	b. d. c+a b. d. b. d.	a 1/a 0 None of these 10	./(1 + Study Mat Study Mat

				Study Mat
(93)	The value of $\left(\frac{x^a}{x^b}\right)^{(a^2+ab+b^2)} \times \left(\frac{x^b}{x^c}\right)^{(b^2+b)}$	$(x^{c+c^{2})} \times (x^{c})$	$(c^{2}+ca+a^{2})$	
	$a. \qquad 1 \qquad $	b.		
	c1	д.	None of these	
				Study Mat
(94)	If $2^{x} = 3^{y} = 6^{-z}, \frac{1}{x} + \frac{1}{y} + \frac{1}{z}$ is			
	a. 1	b.	0	
	<i>c</i> . 2	d.	None of these	
				PYQ Dec. 21
(95)	The value of $\frac{6^{n+4} + 3^{n+3} \times 2^{n+3}}{5 \times 6^n + 6^n}$ is			
	a. 232	<i>b</i> .	242	
	c. 252	d.	262	
				PYQ Nov. 19
(96) ☆	If $X = \sqrt{3} + \frac{1}{\sqrt{3}}$ then $\left(X - \frac{\sqrt{126}}{\sqrt{42}}\right) \left(X - \frac{\sqrt{126}}{\sqrt{42}}\right)$	$-\frac{1}{x-\frac{2\sqrt{3}}{3}}\right)$	=?	
	a. 5/6	<i>b</i> .	6/5	
	<i>c</i> . 2/3	d.	-3/5	
				PYQ Jun 23
(97)	If $x = y^a$ , $y = z^b$ , $z = x^c$ , then the value of a	abc is		
	a. 1	Ь.	2	
	<i>c.</i> 3	d.	4	
(2.2)		-		MTP Oct 21
(98)	Find the value of $\sqrt{6561} + \sqrt[4]{6561} + \sqrt[8]{6561}$			
	a. 81	<i>b</i> .	93	
	с. 121	d.	243	
(00)	( )150 ( )50			MTP June 22
(99)	If $(25)^{150} = (25x)^{50}$ , then the value of x w	vill be:		
	<i>a</i> . $5^3$	<i>b</i> .	$5^4$	
	<i>c</i> . $5^2$	d.	5	

Logarithm Basics			
Meaning of Log	The logarithm of a number to a given base is the <i>index or the power</i> to which the <i>base must be raised</i> to <i>produce</i> the <i>number</i> , <i>i.e.</i> to make it equal to the given number		
Mathematical Explanation of Log	If $a^{x} = n$ then $\log_{a} n = x$ Example: If $3^{4} = 81$ then $\log_{3} 81 = 4$		

Conditions under Logarithm Function	<ul> <li>Log can be calculated only for Positive Number</li> <li>Base should be positive and not equal to 1 n&gt;0,a&gt;0,a≠1</li> </ul>
Standard Results	<ul> <li>Log of a number with same base as number is equal to 1 log<sub>a</sub> a = 1</li> <li>Log of 1 (one) for any base is equal to zero log<sub>a</sub> 1=0</li> </ul>

Law of Logarithm			
Law 1	• Logarithm of the product of two numbers is equal to the sum of the logarithms of the numbers to the same base $log_a mn = log_a m + log_a n$		
Law 2	• The logarithm of the quotient of two numbers is equal to the difference of their logarithms to the same base $log_a \frac{m}{n} = log_a m - log_a n$		
Law 3	• Logarithm of the number raised to the power is equal to the index of the power multiplied by the logarithm of the number to the same base $log_a m^n = nlog_a m$		
Change of Base Theorem	• If the logarithm of a number to any base is given, then the logarithm of the same number to any other base can be determined from the following relation $log_b m = \frac{log m}{log b} = \frac{log_a m}{log_a b}$		
Special Relation	$\log_b a \times \log_a b = 1$		

					Study Mat
(100)	Log 6 +	log 5 is expressed as			
	а.	log 11	<i>b</i> .	log 30	
	С.	log 5/6	<i>d</i> .	None of these	
					Study Mat
(101)	$log_2 8$	is equal to			
	а.	2	<i>b</i> .	8	
	С.	3	<i>d</i> .	None of these	
					Study Mat
(102)	Log 32/	<i>/4 is equal to</i>			
	а.	log 32/log 4	<i>b</i> .	log 32 - log 4	
	с.	2 <sup>3</sup>	<i>d</i> .	None of these	

		ICAI SM
(103)	Log $(1 \times 2 \times 3)$ is equal to	
	$a. \qquad \log 1 + \log 2 + \log 3$	
	<i>b. log</i> 3	
	c. log 2	
	d. None of these	
(104)	The value of log 0.0001 to the base of 0.1 is	Study Mat
(104)	a4 b. 4	
	$c. \frac{1}{4}$ $d.$ None of these	
		Study Mat
(105)	If 2 log $x = 4 \log 3$ , the x is equal to	5
	a. 3 b. 9	
	c. 2 d. None of these	
		Study Mat
(106)	$log_{\sqrt{2}}$ 6 4 is equal to	
	a. 12 b. 6	
	c. 1 d. None of these	
_		Study Mat
(107)	$\log_{\sqrt{3}} 1728$ is equal to	
	a. $2\sqrt{3}$ b. 2	
	c. 6 d. None of these	
(100)		Study Mat
(108)	Log $(1/81)$ to the base 9 is equal to	
	<i>a.</i> 2 <i>b.</i> 1/2 <i>c.</i> -2 <i>d.</i> None of these	
	c2 d. None of these	Study Mat
(109)	Log 0.0625 o the base 2 is equal to	Study Wildt
(105)	a. 4 b. 5	
	c. 1 d. None of these	
		Study Mat
(110)	Given $log = 0.3010$ and $log = 0.4771$ the value of log 6 is	
	a. 0.9030 b. 0.9542	
	c. 0.7781 d. None of these	
		Study Mat
(111)	The value of $\log_2 \log_2 \log_2 106$ 16	
	a. 0 b. 2	
	c. 1 d. None of these	
(110)		Study Mat
(112)	The value of $\log \frac{1}{3}$ to the base 9 is	
	a1/2 b. 1/2	
	c. 1 d. None of these	
		Study Mat
(113)	If $\log x + \log y = \log (x + y)$ , y can be expressed as	
	$a. \qquad x-1 \qquad b. \qquad x$	
	$c. \qquad x/x-1 \qquad \qquad d. \qquad None of these$	

					Study Mat
(114)	The val	ue of log2[log2{log3( log	g <sub>3</sub> 2 7 <sup>3</sup> )}] is equal	! to	
	a.	1	<i>b</i> .	2	
	С.	0	<i>d</i> .	None of these	
					Study Mat
(115)	Iflog <sub>2</sub> x	$x + \log_4 x + \log_{16} x = 2$	21/4 , these x is eq	jual to	
	a.	8	<i>b</i> .	4	
	С.	16	<i>d</i> .	None of these	
				, i i i i i i i i i i i i i i i i i i i	Study Mat
(116)	Given t	hat $\log_{10} 2 = x$ and $\log_1 2$	$_0 3 = y$ , the valu	e of <b>log<sub>10</sub> 1160 is e</b>	xpressed as
	a.	x - y + 1	b.		
	С.	x-y-1	d.	None of these	
					Study Mat
(117)	Given t	hat $\log_{10} 2 = x$ and $\log_1 2 = x$	$a_{0}3 = v$ , the value	e of log <sub>10</sub> <sup>[1]</sup> 1 2 is	v
(117)		f x and y as	0.0 9,0000000	<i>ic c) vog</i> 1012 <i>vo</i>	
	•	x + 2y - 1	<i>b</i> .	x + y - 1	
	и. С.	$\frac{x+2y}{2x+y-1}$	d.	None of these	
	ι.	2x + y 1	и.	none of these	Study Mat
(118)	Cimon t	hat $\log x = m + n$ and $\log n$	u = m $u$ the real	$lup of log 1 0 x / w^2$	0
(110)		hat $\log x = m + n$ and $\log x = m + n$	y = m - n, the out	ue of log 1 0x/y	is expressed in
	•	f m and n as	1.		
	а.	1-m+3n		m-1+3n	
	С.	m + 3n + 1	<i>d</i> .	None of these	<i>c.</i> 1 1 <i>6 .</i>
(110)			1		Study Mat
(119)	The sim	plified value of $2 \log_{10} 5$	$+ \log_{10} 8 - \frac{1}{2} \log_{10} 8$	9 <sub>10</sub> 4 <i>is</i>	
	a.	1/2	<i>b</i> .	4	
	С.	2	d.	None of these	
					Study Mat
(120)	Log [1 -	$-\{1-(1-x^2)^{-1}\}^{-1}]^{-1}$	/ <sup>2</sup> can be written	as	
	a.	$\log x^2$	<i>b</i> .	log x	
	С.	Log 1/x	<i>d</i> .	None of these	
		0		ž	Study Mat
(121)	The sim	plified value of log $(\sqrt[4]{72})$	$(9\sqrt[3]{9-1} \ 27-4/3)_{ij}$	c	0
		<b>`</b>	,		
	а.	log 3	b.	log 2	
	С.	log 1/2	<i>d</i> .	None of these	
(100)			1		Study Mat
(122)		ue of $(\log_b a \times \log_c b \times$			
	а.	3	<i>b</i> .	0	
	С.	1	<i>d</i> .	None of these	
			_		Study Mat
(123)	The log	arithm of 64 to the base 2		_	
	а.	2	<i>b</i> .	$\sqrt{2}$	
	С.	1/2	<i>d</i> .	None of these	
					Study Mat
(124)	The val	ue of log <sub>8</sub> 25 given is log	$g^{10} 2 = 0.3010$		
	a.	1	<i>b</i> .	2	
	С.	1.5482	d.	None of these	
				2	



$ \begin{array}{cccccccccccccccccccccccccccccccccccc$					PYQ Dec. 21
$\begin{array}{cccccccccccccccccccccccccccccccccccc$		Find the value of log(	$(x^{6})$ , if $log(x) + 2$	$log(x^2) + 3log(x^3)$	=14
c.       5       d.       6         PYQ Jan. 21         (126)       if $\log_a(ab) = x$ , then $\log_b(ab)$ is $1/x$ $b.< \frac{1}{1+x} c.       \frac{x}{x-1}       d.       NOTE         \frac{x}{x-1}       d.       NOTE         (127)       The value of       \frac{1}{6} \frac{1}{5} \frac{1}{6} \frac{1}{5} \frac{1}{6} \frac{1}{5} \frac{1}{5} \frac{1}{5} \frac{1}{6} $	\$				
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$ \begin{array}{cccccccccccccccccccccccccccccccccccc$					PYQ Jan. 21
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	(126)	If $log_a(ab) = x$ , then I	$log_b(ab)$ is		
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	\$	a. 1/x		b. x	
$\begin{array}{c c c c c c c c c c c c c c c c c c c $					
$\begin{array}{c c c c c c c c c c c c c c c c c c c $		с. х		d. None of	these
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$		$\overline{x-1}$			
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$					PYQ June 19
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$		•			
a.2b.3c.5d.0Answer Key1a2d3c4a5c6d7a8c9a10c11d12d13a14c15d16a17c18b19b20c21a22c23a24c25c26b27a28a29c30a31d32a33b34c35d36a37c38a39c40c41b42c43d44a45d46d47a48a49b50d31a52c53d54c55a36a37c38a49b50d46d47a48a49b50d46d47a48a49b50d46d47a48a49b50d5657b58c59b60a61b72d73b74c <t< td=""><td>*</td><td><math>\log\left(1+\frac{1}{2}\right)+\log\left(1\right)</math></td><td><math>(\frac{1}{1})_{+}</math> + log</td><td><math>1 + \frac{1}{1}</math></td><td></td></t<>	*	$\log\left(1+\frac{1}{2}\right)+\log\left(1\right)$	$(\frac{1}{1})_{+}$ + log	$1 + \frac{1}{1}$	
c.5d. $d$ $0$ Answer Key1 $a$ $2$ $d$ $3$ $c$ $4$ $a$ $5$ $c$ 6 $d$ $7$ $a$ $8$ $c$ $9$ $a$ $100$ $c$ 11 $d$ $12$ $d$ $13$ $a$ $14$ $c$ $15$ $d$ 16 $a$ $17$ $c$ $18$ $b$ $19$ $b$ $200$ $c$ 21 $a$ $22$ $c$ $233$ $a$ $24$ $c$ $25$ $c$ 26 $b$ $27$ $a$ $28$ $a$ $29$ $c$ $300$ $a$ 31 $d$ $32$ $a$ $33$ $b$ $344$ $c$ $355$ $d$ 36 $a$ $37$ $c$ $38$ $a$ $499$ $b$ $500$ $d$ 44 $b$ $422$ $c$ $433$ $d$ $444$ $a$ $455$ $d$ 45 $d$ $47$ $a$ $488$ $a$ $499$ $b$ $500$ $d$ 46 $d$ $47$ $a$ $488$ $a$ $499$ $b$ $60$ $a$ $61$ $b$ $62$ $a$ $633$ $d$ $54$ $c$ $555$ $a$ $66$ $c$ $67$ $c$ $68$ $b$ $69$ $a$ $700$ $a$ $71$ $b$ $72$ $d$ $733$ $b$ $74$ $c$ $75$ $d$ $76$ $c$ $87$ $b$ $88$ <td></td> <td><math>10g_{5}(1+5)+10g_{5}(1+5)</math></td> <td><math>(6)^{1} \dots (6)^{1} \dots (6)^</math></td> <td>624</td> <td></td>		$10g_{5}(1+5)+10g_{5}(1+5)$	$(6)^{1} \dots (6)^{1} \dots (6)^$	624	
Answer Key1a2d3c4a5c6d7a8c9a10c11d12d13a14c15d16a17c18b19b20c21a22c23a24c25c26b27a28a29c30a31d32a33b34c35d36a37c38a39c40c41b42c43d44a45d46d47a48a49b50d51a52c53d54c55a56b57b58c59b60a61b62a63d64a65c66c67c68b69a70a71b72d73b74c75d71b72d33a94b95c86c87b88b89c90a91b92a93a<		<i>a</i> . 2		<i>b.</i> 3	
1a2d3c4a5c6d7a8c9a10c11d12d13a14c15d16a17c18b19b20c21a22c23a24c25c26b27a28a29c30a31d32a33b34c35d36a37c38a39c40c41b42c43d44a45d46d47a48a49b50d46d47a48a49b50d56b57b58c59b60a66c67c68b69a70a71b72d73b74c75d76c77b78d79a80c86c87b8889c90a91b92a93a104b105b101c102b103a104b105b </td <td></td> <td><i>c</i>. 5</td> <td></td> <td><i>d</i>. 0</td> <td></td>		<i>c</i> . 5		<i>d</i> . 0	
6d7a8c9a10c11d12d13a14c15d16a17c18b19b20c21a22c23a24c25c26b27a28a29c30a31d32a33b34c35d36a37c38a39c40c41b42c43d44a45d46d47a48a49b50d51a52c53d54c55a56b57b58c59b60a66c67c68b69a70a71b72d73b74c75d86c87b88b89c90a91b92a93a94b105b101c102103a104b105b106a107c118a119c120b111c112a113c114c115 <th></th> <th></th> <th>Answer Ke</th> <th>/</th> <th></th>			Answer Ke	/	
111       d       12       d       13       a       14       c       15       d         16       a       17       c       18       b       19       b       20       c         21       a       22       c       23       a       24       c       25       c         26       b       27       a       28       a       29       c       30       a         31       d       32       a       33       b       34       c       35       d         36       a       37       c       38       a       39       c       40       c         41       b       42       c       43       d       44       a       45       d         46       d       47       a       48       a       49       b       50       d         51       a       52       c       53       d       54       c       55       a         56       b       57       b       58       c       59       b       60       a         61       b       62       a       63 </td <td></td> <td></td> <td></td> <td></td> <td>5 c</td>					5 c
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36 $a$ $37$ $c$ $38$ $a$ $39$ $c$ $40$ $c$ $41$ $b$ $42$ $c$ $43$ $d$ $44$ $a$ $45$ $d$ $46$ $d$ $47$ $a$ $48$ $a$ $49$ $b$ $50$ $d$ $51$ $a$ $52$ $c$ $53$ $d$ $54$ $c$ $55$ $a$ $56$ $b$ $57$ $b$ $58$ $c$ $59$ $b$ $60$ $a$ $61$ $b$ $62$ $a$ $63$ $d$ $64$ $a$ $65$ $c$ $66$ $c$ $67$ $c$ $68$ $b$ $69$ $a$ $70$ $a$ $71$ $b$ $72$ $d$ $73$ $b$ $74$ $c$ $75$ $d$ $76$ $c$ $77$ $b$ $78$ $d$ $79$ $a$ $80$ $c$ $81$ $a$ $82$ $c$ $83$ $d$ $84$ $b$ $85$ $a$ $86$ $c$ $87$ $b$ $88$ $b$ $89$ $c$ $90$ $a$ $91$ $b$ $92$ $a$ $93$ $a$ $94$ $b$ $95$ $c$ $96$ $a$ $97$ $a$ $98$ $b$ $99$ $b$ $100$ $b$ $101$ $c$ $102$ $b$ $103$ $a$ $104$ $b$ $105$ $b$ $106$ $a$ $107$ $c$ $108$ $c$ $109$ $c$ $110$ $c$ $111$ <td></td> <td></td> <td></td> <td></td> <td></td>					
41       b       42       c       43       d       44       a       45       d         46       d       47       a       48       a       49       b       50       d         51       a       52       c       53       d       54       c       55       a         56       b       57       b       58       c       59       b       60       a         61       b       62       a       63       d       64       a       65       c         66       c       67       c       68       b       69       a       70       a         71       b       72       d       73       b       74       c       75       d         76       c       77       b       78       d       79       a       80       c         81       a       82       c       83       d       84       b       95       c         96       a       97       a       98       b       99       b       100       b         101       c       102       b       10					
46 $d$ $47$ $a$ $48$ $a$ $49$ $b$ $50$ $d$ $51$ $a$ $52$ $c$ $53$ $d$ $54$ $c$ $55$ $a$ $56$ $b$ $57$ $b$ $58$ $c$ $59$ $b$ $60$ $a$ $61$ $b$ $62$ $a$ $63$ $d$ $64$ $a$ $65$ $c$ $66$ $c$ $67$ $c$ $68$ $b$ $69$ $a$ $70$ $a$ $71$ $b$ $72$ $d$ $73$ $b$ $74$ $c$ $75$ $d$ $76$ $c$ $77$ $b$ $78$ $d$ $79$ $a$ $80$ $c$ $81$ $a$ $82$ $c$ $83$ $d$ $84$ $b$ $85$ $a$ $86$ $c$ $87$ $b$ $88$ $b$ $89$ $c$ $90$ $a$ $91$ $b$ $92$ $a$ $93$ $a$ $94$ $b$ $95$ $c$ $96$ $a$ $97$ $a$ $98$ $b$ $99$ $b$ $100$ $b$ $101$ $c$ $102$ $b$ $103$ $a$ $104$ $b$ $105$ $b$ $106$ $a$ $107$ $c$ $108$ $c$ $109$ $c$ $110$ $c$ $111$ $c$ $112$ $a$ $113$ $c$ $114$ $c$ $115$ $a$ $116$ $b$ $117$ $c$ $128$ $d$ $124$ $c$ $125$ $d$ <td></td> <td></td> <td></td> <td></td> <td></td>					
51 $a$ $52$ $c$ $53$ $d$ $54$ $c$ $55$ $a$ $56$ $b$ $57$ $b$ $58$ $c$ $59$ $b$ $60$ $a$ $61$ $b$ $62$ $a$ $63$ $d$ $64$ $a$ $65$ $c$ $66$ $c$ $67$ $c$ $68$ $b$ $69$ $a$ $70$ $a$ $71$ $b$ $72$ $d$ $73$ $b$ $74$ $c$ $75$ $d$ $76$ $c$ $77$ $b$ $78$ $d$ $79$ $a$ $80$ $c$ $81$ $a$ $82$ $c$ $83$ $d$ $84$ $b$ $85$ $a$ $86$ $c$ $87$ $b$ $88$ $b$ $89$ $c$ $90$ $a$ $91$ $b$ $92$ $a$ $93$ $a$ $94$ $b$ $95$ $c$ $96$ $a$ $97$ $a$ $98$ $b$ $99$ $b$ $100$ $b$ $101$ $c$ $102$ $b$ $103$ $a$ $104$ $b$ $105$ $b$ $106$ $a$ $107$ $c$ $108$ $c$ $109$ $c$ $110$ $c$ $111$ $c$ $112$ $a$ $113$ $c$ $114$ $c$ $115$ $a$ $116$ $b$ $117$ $c$ $118$ $a$ $119$ $c$ $120$ $b$ $121$ $a$ $122$ $c$ $123$ $d$ $124$ $c$ $125$ $d$ <					
56       b       57       b       58       c       59       b       60       a         61       b       62       a       63       d       64       a       65       c         66       c       67       c       68       b       69       a       70       a         71       b       72       d       73       b       74       c       75       d         76       c       77       b       78       d       79       a       80       c         81       a       82       c       83       d       84       b       85       a         96       a       97       a       93       a       94       b       95       c         96       a       97       a       98       b       99       b       100       b         101       c       102       b       103       a       104       b       105       b         106       a       107       c       108       c       109       c       110       c         1111       c       112       a					
61b $62$ a $63$ d $64$ a $65$ c $66$ c $67$ c $68$ b $69$ a $70$ a $71$ b $72$ d $73$ b $74$ c $75$ d $76$ c $77$ b $78$ d $79$ a $80$ c $81$ a $82$ c $83$ d $84$ b $85$ a $86$ c $87$ b $88$ b $89$ c $90$ a $91$ b $92$ a $93$ a $94$ b $95$ c $96$ a $97$ a $98$ b $99$ b $100$ b $101$ c $102$ b $103$ a $104$ b $105$ b $106$ a $107$ c $118$ a $119$ c $120$ b $121$ a $122$ c $123$ d $124$ c $125$ d					
66c67c68b69a70a71b72d73b74c75d76c77b78d79a80c81a82c83d84b85a86c87b88b89c90a91b92a93a94b95c96a97a98b99b100b101c102b103a104b105b106a107c108c109c110c111c112a113c114c115a121a122c123d124c125d					
71b72d73b74c75d76c77b78d79a80c81a82c83d84b85a86c87b88b89c90a91b92a93a94b95c96a97a98b99b100b101c102b103a104b105b106a107c108c109c110c111c112a113c114c115a121a122c123d124c125d					
76c77b78d79a80c81a82c83d84b85a86c87b88b89c90a91b92a93a94b95c96a97a98b99b100b101c102b103a104b105b106a107c108c109c110c111c112a113c114c115a121a122c123d124c125d					
81       a       82       c       83       d       84       b       85       a         86       c       87       b       88       b       89       c       90       a         91       b       92       a       93       a       94       b       95       c         96       a       97       a       98       b       99       b       100       b         101       c       102       b       103       a       104       b       105       b         106       a       107       c       108       c       109       c       110       c         111       c       112       a       113       c       114       c       115       a         116       b       117       c       118       a       119       c       120       b         121       a       122       c       123       d       124       c       125       d					
86       c       87       b       88       b       89       c       90       a         91       b       92       a       93       a       94       b       95       c         96       a       97       a       98       b       99       b       100       b         101       c       102       b       103       a       104       b       105       b         106       a       107       c       108       c       109       c       110       c         111       c       112       a       113       c       114       c       115       a         116       b       117       c       118       a       119       c       120       b         121       a       122       c       123       d       124       c       125       d					
91b92a93a94b95c96a97a98b99b100b101c102b103a104b105b106a107c108c109c110c111c112a113c114c115a116b117c118a119c120b121a122c123d124c125d					
96       a       97       a       98       b       99       b       100       b         101       c       102       b       103       a       104       b       105       b         106       a       107       c       108       c       109       c       110       c         111       c       112       a       113       c       114       c       115       a         116       b       117       c       118       a       119       c       120       b         121       a       122       c       123       d       124       c       125       d					
106a107c108c109c110c111c112a113c114c115a116b117c118a119c120b121a122c123d124c125d	96 a	97 a	98 b	99 b	100 b
111 c112 a113 c114 c115 a116 b117 c118 a119 c120 b121 a122 c123 d124 c125 d	101 с	102 b	103 a	104 b	105 b
116b117c118a119c120b121a122c123d124c125d	106 a	107 с	108 с	109 с	110 с
121 a 122 c 123 d 124 c 125 d	111 с	112 a	113 с	114 с	115 a
126 c 127 b			123 d	124 с	125 d
	126 c	127 b			

