2. *Common logarithms.*

1.	Log 31.59 1.4996 Log a 2.6182 Log $b^{1/3}$ □28.814 3 Log b □4.6442 b = 0.0004407 b = 0.0004	**M1** **M1** **A1** **B1**	Subt b logs Multip by 3
		04	
2.	$\text{Log}_{10}25 - \log_{10}4 + \log_{10}1600$ $\log_{10}\left(\frac{25}{4}\times 1600\right)$ 4	**M1** **M1** **A1**	
		03	
3	<table><tr><td>No. $(0.00246)^2$ 142 0.002 1.14 3.3527</td><td>Std. form $(2.46 \times 10^{-2})^2$ 1.42×10^2 2.0×10^{-3} 1.14×10^o 3.3527×10^o</td><td>Log 2.3909 x 2 4.7818 +2.1523 2.9341 3.3010 +0.0569 3.3579 2.9341 -3.3579 1.5762 1.5762 3 0.5254</td></tr></table>	 1M 1M 1M A1	 Correct logs addition Correct logs addition Correct logs substractions Correct answer
		4	
4	$\frac{\log\left(\frac{1}{4}\times 64\right)}{\log\left(\frac{1}{32}\div\frac{1}{8}\right)}$ $\frac{\log 2^4}{\log 2^{-2}}$ $\frac{4\log 2}{-2\log 2}$ -2	M_1 M_1 M_1 A_1 4	

[ ] [ ]

5. $\left[\ \right]^{x} \cdot 2^{6\ 2} = 2^{4\ 2}$ M1 for writing in index form

$2^{-3x}.2^{12} = 2^{8}$

$12 - 3x = 8$ M1

$x = {}^{4}/_{3}$

$= 1\ {}^{1}/_{3}$

3

6.	No. std form log 0.6845^2 $6.845x10^{-1}$ □1.8354x2 □1.6708 □1.6708 0.08416 $8.416x10^{-2}$ □2.9252 3 □1.6417 □1.6417 + □1.3125 0.005937 $5.937x10^{-3}$ -□3.7736 $3.459x10^{-1}$ ← □1.5389 0.3459		M1 M1 M1	
			04	
7	<table><tr><th>Number</th><th>log</th></tr><tr><td>8.694 0.1267 0.006974 6.039×10^{2} 602.9</td><td>0.9392 $\bar{1}.1028\times\frac{1}{3}=\bar{1}.7009$ $\bar{3}.8434$ $\bar{3}.5443\times\frac{3}{4}$ $\bar{1}.3861\times3=\bar{2}.1583$ 0.9392 $\bar{2}'1583$ 2.7809</td></tr></table>		M1 M1 M1 A1	All logs + - x of logs $\div\times of\ \log s$
			4 marks	

8.

	No.	*Log*	
	2849	*3.4547*	**All logs read correctly**
-		+	
	0.00574	*3. 7589*	**Correct Addn /subst. of logs.**
	1.2136	←	
-	*36.891.1*	*1. 5669*	
	0.023	*2.3617*	**Attempt to divide by 4**
		3.2052 →	
-			**- C.A.O**

$2.0084 \times \frac{1}{4}$

$3.178 \times 10^{-1} \rightarrow -1.5021$

$\rightarrow 0.3178$

9. $\log y = \log B + n \log x$

$n \log x = \log y - \log B$

$n = \frac{\log (y/B)}{\log x}$

10. $= 6 \log_2 4 + 10 \log_3 3$

$= 12 \log_2 2 + 10 \log_3 3$

$= 12 + 10$

11. $\log \frac{2x - 11}{2} = \frac{\log 3}{x}$

$(2x - 11) = {}^{3}/_{x}$

$2x^2 - 11x - 6 = 0$

$(2x + 1)(x - 6) = 0$

$x = -\frac{1}{2}$ or 6

$x = 6$

12.

No.	Log
0.5241	T.7194
$(0.5241)^2$	T.7194x2
	T.4388 +
83.59	1.9222
	1.3610
0.3563	T.5518
$3\sqrt{0.3563}$	(3+2.5518) ÷3
	T.8506
	0.3610 –
	1.8506
3.239×10^1	1.5104
= 32.4	

13.

No.	Log
38.32	1.5834
12.964	1.1127
	2.6961
86.37	1.9364
6.285	0.7783
	2.7347
	1.9587

$\frac{-3 + 2.9587}{3} = 1.9866$

$= 0.9695$

14. $H^3 = \frac{3d(L-d)}{10L}$

$3dL - 10H^3L = 3d^2$

$L(3d - 10H^3) = 3d^2$

$L = \frac{3d^2}{3d - 10H^3}$

15.

No.	Log
6.195	0.7920
11.82	1.0726
	1.8646
83.52	1.9218
	1.9428 x ¼
	4. + 3.9428
	4
0.9676	1.9857

16. $\log y^2 (x-1) = \log 9 \quad y^2 (x-1) = 9 \quad ....(1)$

$\log (xy) \log 6 \quad xy = 6 ....2$

from (2) $x = {}^6/_y$

substitute in (1) $y\frac{(6-1)}{y} = 9$

$6y - y^2 = 9$

$y^2 - 6y + 9 = 0$

$(y-3)^2 = 0$

$y = 3$

$\therefore x = 2$

5

17. ${}^4/_5 \log_{10} 25 + \log_{10} 25x2 - \log 10$

$4 \log 2 = \log_{10} 25x2 - 3\log 2$

$2 \log 10 + 2 \log 5$

$\text{Log } 10 \times 100$

18.

NO	LOG
0.9895 ⟶	-1.9954
$(0.9895)^2$ ⟶	1.9954 x 2
	1.9908
0.004974 ⟶	3.6968
	3.6876÷4
	1.4219 x 3
6.598	2.2657
	0.8195 –

Use sine rule

$3.579\ X10^2$ ⟵ OR 357.9	2.2657 2.5538

19. $\log 3x + 8 - \log 8 = \log (x-4)$

$\log \frac{(3x+8)}{8} = \log (x-4)$

$3x + 8 = x - 4$

$3x + 8 = 8x - 32$

$5x = 40$

20.

No.	Log
36.72 ⟵	1.5649
0.46^2 ⟵	2(T.6628)
	T.3256
185.4	0.8905
	2.2682
	$2.9223 \times \frac{1}{3} = \frac{3}{3} + \frac{1.6223}{3}$
3.474×10^{-1}	
Or 0.3474	1.5408

21.

No		Log
Sin 44.5		1.8457
Tan 14.9	1.4250	2.5686 -
Cos 82	1.1486 +	
	$\frac{1.2772}{2}$	
10×4.351		0.6386

22. From square roots $\sqrt{12.25} = 3.5$

$\frac{3.264 \times 1.215 \times 3.5 \times 107}{1.088 \times 0.4725 \times 107}$

$\frac{3264 \times 1215 \times 35}{1088 \times 4725}$

$\sqrt{27} = 3$

23. $\log_8 (x + 5) - \log_8 (x - 3) = \log_8 4$

$\log_8 \frac{(x+5)}{x-3} = \log_8 4$

$\frac{x+5}{x-3} = 4$

$4x - 12 = x + 5$

$3x = 17$

$x = 17 = 5^2/_3$

Or $\log_8 \frac{x+5}{} = \frac{2}{}$

$$8^{2}/_{3} = \frac{x+5}{x-3}^{x-3\ \ 3}$$

$$2^{3}(^{2}/_{3}) = \frac{x+5}{x-3}$$

$$2^{2} = \frac{x+5}{x-3} \Rightarrow 4 = \frac{x+5}{x-3}$$

$$4x - 12 = x + 5 \Rightarrow 3x = 17$$

$$x = \frac{17}{3} = 5^{2}/_{3}$$

24.

No 6.57^{2} $4.317\ X\ 10^{1}$ *43.17 + 6.57* *49.74* $(7.92)^{2}$ *30.08* $2.636\ X\ 10^{-2}$	*Log* *0.8176* *2x* *1.6352* *1.6967* *0.8987* *X2* *1.7974* *1.4783 + 3.2757* *2.4210* *= 0.02636* *= 0.0264 (4 d.p)*
No 6.57^{2} $4.317\ X\ 10^{1}$ *43.17 + 6.57* *49.74* $(7.92)^{2}$ *30.08* $2.636\ X\ 10^{-2}$	*Log* *0.8176* *2x* *1.6352* *1.6967* *0.8987* *X2* *1.7974* *1.4783 + 3.2757* *2.4210* *= 0.02636* *= 0.0264 (4 d.p)*

25. $Log\ 120 = log\ 4 + log\ 3 + log\ 10$
$= log22 + log3 + log\ 10$
$= 2log2 + log3 + log\ 10$
$= 2(0.30103) + 0.47712 + 1$
$= 2.07918$

26. $Log_2 (3x - 4) = {}^1/_3\ lo_2\ 8x^6 - log_2\ 4$
$Log_2 (3x - 4) = log_2 (2^3x^6) - log_2\ 4$
$Log_2 (3x - 4) = log_2\ 2x^2 - log_2\ 4$
$Log_2 (3x - 4) - log_2 \left[\ \ \right]$

$= 3x - 4 = \frac{2x^2}{4}$
$2x^2 - 12x + 16 = 0$
$x^2 - 6x + 8 = 0$
$x - 2x - 4x + 8 = 0$
$(x - 2)(x- 4) = 0$
$x = 2\ or\ x = 4$

27.

No	Log
5.627	0.7503
$(0.234)^3$	T. 3692 x 3
	2.8579
8.237	0.4779 $\quad \frac{0.9158}{2}$
2.399×10^{-3}	3.3800
	$= 0.002399$

28. $Det \quad 2 - \ -3 \ = 5$
$Area\ of\ A^IB^IC^I = 5 \times 15$
$= 75\ cm^2$

29. $Log10(6x-2) - log10 = log10(x-3)$
$Log \frac{(6x -2)}{10} = log\ (x-3)$
$\frac{6x -2}{10} = x -3$
$6x - 2 = 10x -30$
$x = 7$

30.

No.	Log
0.07526^2	$2.8766 \times 2 = 3.7532$
6.652	$0.8230 \quad = 0.8230$

4.9302

$\frac{4.9302}{3} = 6 + \frac{2.9302}{3}$

$= 2.9767$

$Antilog = 9.4776 \times 10^{-2}$

$= 0.094776$ (accept 0.09478)

No.	Log
4.283	0.6317
0.009478^2	3.9767 X 2 +
	5. 9534
	4.5851 -
Log 9.814	1.9964
	4. 5887 ÷ 5
2.0785×10^{-1}	1.3177

$= 0.20785$