L2-MATHMF



See back cover for an English translation of this cover

2



# Te Pāngarau me te Tauanga, Kaupae 2, 2021

PUKA TIKANGA TĀTAI mō 91261M, 91262M, 91267M

Tirohia tēnei puka hei whakatutuki i ngā tūmahi o ō Pukapuka Tūmahi, Tuhinga hoki.

Tirohia mēnā e tika ana te raupapatanga o ngā whārangi 2 – 3 kei roto i tēnei pukapuka, ka mutu, kāore tētahi o aua whārangi i te takoto kau.

KA TAEA TĒNEI PUKA TE PUPURI HEI TE MUTUNGA O TE WHAKAMĀTAUTAU.

## Whārite pūrua

Mēnā 
$$ax^2 + bx + c = 0$$
  
kāti  $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$   
ā  $\Delta = b^2 - 4ac$ 

## Taupū kōaro

Mēnā 
$$y = b^x$$
 kāti  $x = \log_b y$ 

$$\log_b(xy) = \log_b(x) + \log_b(y)$$

$$\log_b\left(\frac{x}{y}\right) = \log_b(x) - \log_b(y)$$

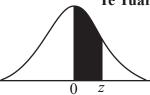
$$\log_b\left(x^n\right) = n\log_b x$$
Mēnā  $y = e^x$  kāti  $x = \log_e y$  (= ln  $y$ )

### Tuanaki

$$\frac{\mathrm{d}}{\mathrm{d}x}\left(x^n\right) = nx^{n-1}$$

Mēnā 
$$f'(x) = x^n$$
, kāti  $f(x) = \frac{x^{n+1}}{n+1} + c$ 

Te Tuaritanga Hangarite Aro Whānui



2

$$\left(z = \frac{x - \mu}{\sigma}\right)$$

Ko ia tau e whakaatu ana i te tūponotanga ka noho mai te taurangi matap $\bar{o}$ kere hangarite aro wh $\bar{a}$ nui o te Z ki waenganui i te 0 me te z.

					waenganari te o me te 2.							Huatango							
z	0	1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	7	8	9
0.0	0000	0040	0080	.0120	0160	0199	0239	0279	0319	0359	4	8	12	16	20	24	28	32	36
0.0				.0517							4		12		20			32	
0.1				.0910							4		12		19			31	
0.3				.1293							4		11		19			30	
0.3				.1664							4		11		18			29	
											+			14	10	22			
0.5	1			.2019							3		10		17			27	-
0.6	l .			.2357							3		10		16	-		26	
0.7				.2673							3	6	9		15			24	
0.8				.2967							3	6	8		14		-	22	-
0.9	.3159	.3186	.3212	.3238	.3264	.3289	.3315	.3340	.3365	.3389	3	5	8	10	13	15	18	20	23
1.0	.3413	.3438	.3461	.3485	.3508	.3531	.3554	.3577	.3599	.3621	2	5	7	9	12	14	16	18	21
1.1	.3643	.3665	.3686	.3708	.3729	.3749	.3770	.3790	.3810	.3830	2	4	6	8	10	12	14	16	19
1.2	.3849	.3869	.3888	.3907	.3925	.3944	.3962	.3980	.3997	.4015	2	4	5	7	9	11	13	15	16
1.3	.4032	.4049	.4066	.4082	.4099	.4115	.4131	.4147	.4162	.4177	2	3	5	6	8	10	11	13	14
1.4	.4192	.4207	.4222	.4236	.4251	.4265	.4279	.4292	.4306	.4319	1	3	4	6	7	8	10	11	13
1.5	4332	4345	4357	.4370	4382	4394	4406	4418	4429	4441	1	2	4	5	6	7	8	10	11
1.6				.4484							1	2	3	4	5	6	7	8	9
1.7				.4582							1	2	3	3	4	5	6	7	
1.8	l .			.4664							1	1	2	3	4	4	5	6	
1.9				.4732							1	1	2	2	3	4	4	5	
2.0	4772	1770	1702	.4788	4702	4709	1902	1909	1912	1017	0	1	1	2	2	3	3	4	4
2.0				.4834							0	1	1	2	2	2	3	3	4
2.1				.4871								1	1	1	2	2	2	3	3
2.3				.4901							0	0	1	1	1	2	2	2	
2.4				.4901							0	0	1	1	1	1	1	2	2
											ľ		-		-	-			
2.5				.4943							0	0	0	1	1	1	1	1	1
2.6				.4957							0	0	0	0	1	1	1	1	1
2.7				.4968							0	0	0	0	0	1	1	1	1
2.8	l			.4977							0	0	0	0	0	0	0	0	1
2.9	.4981	.4982	.4982	.4983	.4984	.4984	.4985	.4985	.4986	.4986	0	0	0	0	0	0	0	0	1
3.0	.4987	.4987	.4987	.4988	.4988	.4989	.4989	.4989	.4990	.4990	0	0	0	0	0	0	0	0	0
3.1	.4990	.4991	.4991	.4991	.4992	.4992	.4992	.4992	.4993	.4993	0	0	0	0	0	0	0	0	0
3.2	.4993	.4993	.4994	.4994	.4994	.4994	.4994	.4995	.4995	.4995	0	0	0	0	0	0	0	0	0
3.3	.4995	.4995	.4995	.4996	.4996	.4996	.4996	.4996	.4996	.4997	0	0	0	0	0	0	0	0	0
3.4	.4997	.4997	.4997	.4997	.4997	.4997	.4997	.4997	.4998	.4998	0	0	0	0	0	0	0	0	0
3.5	.4998	.4998	.4998	.4998	.4998	.4998	.4998	.4998	.4998	.4998	0	0	0	0	0	0	0	0	0
3.6				.4999							0	0	0	0	0	0	0	0	
3.7				.4999							0	0	0	0	0	0	0	0	
3.8				.4999							0	0	0	0	0	0	0	0	
3.9				.5000							0	0	0	0	0	0	0	0	0
											1 1			1 1	-		1 1		-

## **Quadratic Equations**

If 
$$ax^2 + bx + c = 0$$
  
then  $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$   
and  $\Delta = b^2 - 4ac$ 

#### Logarithms

If 
$$y = b^x$$
 then  $x = \log_b y$   

$$\log_b(xy) = \log_b(x) + \log_b(y)$$

$$\log_b\left(\frac{x}{y}\right) = \log_b(x) - \log_b(y)$$

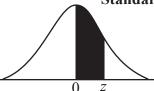
$$\log_b\left(x^n\right) = n\log_b x$$
If  $y = e^x$  then  $x = \log_e y$  (= ln y)

### Calculus

$$\frac{\mathrm{d}}{\mathrm{d}x}\left(x^n\right) = nx^{n-1}$$

If 
$$f'(x) = x^n$$
, then  $f(x) = \frac{x^{n+1}}{n+1} + c$ 

#### **Standard Normal Distribution**



3

$$\left(z = \frac{x - \mu}{\sigma}\right)$$

Each entry gives the probability that the standardised normal random variable Z lies between 0 and z.

Differences

										Differences									
z	0	1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	7	8	9
0.0	.0000	.0040	.0080	.0120	.0160	.0199	.0239	.0279	.0319	.0359	4	8	12	16	20	24	28	32	36
0.1				.0517							4		12		20		l	32	
0.2				.0910							4		12		19			31	
0.3				.1293							4		11		19			30	
0.4				.1664							4	-	11		18			29	-
0.5	.1915	.1950	.1985	.2019	.2054	.2088	.2123	.2157	2190	.2224	3	7	10	14	17	21	24	27	31
0.6				.2357							3		10		16			26	
0.7	2580	2612	2642	.2673	2704	2734	2764	2794	2823	2852	3	6	9	12	15	18	21	24	2
0.8				.2967							3	6	8		14	-		22	
0.9				.3238							3	5	8		13			20	
1.0	.3413	.3438	.3461	.3485	.3508	.3531	.3554	.3577	.3599	.3621	2	5	7	9	12	14	16	18	2
1.1	.3643	.3665	.3686	.3708	.3729	.3749	.3770	.3790	.3810	.3830	2	4	6	8	10	12	14	16	1
1.2				.3907							2	4	5	7	9	11	13	15	1
1.3				.4082							2	3	5	6	8	10	11	13	1
1.4				.4236							1	3	4	6	7	8	l	11	
1.5	.4332	.4345	.4357	.4370	.4382	.4394	.4406	.4418	.4429	.4441	1	2	4	5	6	7	8	10	1
1.6	.4452	.4463	.4474	.4484	.4495	.4505	.4515	.4525	.4535	.4545	1	2	3	4	5	6	7	8	
1.7				.4582							1	2	3	3	4	5	6	7	
1.8				.4664							1	1	2	3	4	4	5	6	
1.9				.4732							1	1	2	2	3	4	4	5	
2.0	.4772	.4778	.4783	.4788	.4793	.4798	.4803	.4808	.4812	.4817	0	1	1	2	2	3	3	4	
2.1	.4821	.4826	.4830	.4834	.4838	.4842	.4846	.4850	.4854	.4857	0	1	1	2	2	2	3	3	
2.2	.4861	.4864	.4868	.4871	.4875	.4878	.4881	.4884	.4887	.4890	0	1	1	1	2	2	2	3	
2.3	.4893	.4896	.4898	.4901	.4904	.4906	.4909	.4911	.4913	.4916	0	0	1	1	1	2	2	2	
2.4	.4918	.4920	.4922	.4925	.4927	.4929	.4931	.4932	.4934	.4936	0	0	1	1	1	1	1	2	
2.5	.4938	.4940	.4941	.4943	.4945	.4946	.4948	.4949	.4951	.4952	0	0	0	1	1	1	1	1	
2.6	.4953	.4955	.4956	.4957	.4959	.4960	.4961	.4962	.4963	.4964	0	0	0	0	1	1	1	1	
2.7	.4965	.4966	.4967	.4968	.4969	.4970	.4971	.4972	.4973	.4974	0	0	0	0	0	1	1	1	
2.8	.4974	.4975	.4976	.4977	.4977	.4978	.4979	.4979	.4980	.4981	0	0	0	0	0	0	0	0	
2.9	.4981	.4982	.4982	.4983	.4984	.4984	.4985	.4985	.4986	.4986	0	0	0	0	0	0	0	0	
3.0	.4987	.4987	.4987	.4988	.4988	.4989	.4989	.4989	.4990	.4990	0	0	0	0	0	0	0	0	
3.1	.4990	.4991	.4991	.4991	.4992	.4992	.4992	.4992	.4993	.4993	0	0	0	0	0	0	0	0	
3.2	.4993	.4993	.4994	.4994	.4994	.4994	.4994	.4995	.4995	.4995	0	0	0	0	0	0	0	0	
3.3	.4995	.4995	.4995	.4996	.4996	.4996	.4996	.4996	.4996	.4997	0	0	0	0	0	0	0	0	
3.4	.4997	.4997	.4997	.4997	.4997	.4997	.4997	.4997	.4998	.4998	0	0	0	0	0	0	0	0	
3.5	.4998	.4998	.4998	.4998	.4998	.4998	.4998	.4998	.4998	.4998	0	0	0	0	0	0	0	0	
3.6	.4998	.4998	.4999	.4999	.4999	.4999	.4999	.4999	.4999	.4999	0	0	0	0	0	0	0	0	
3.7	.4999	.4999	.4999	.4999	.4999	.4999	.4999	.4999	.4999	.4999	0	0	0	0	0	0	0	0	
3.8	.4999	.4999	.4999	.4999	.4999	.4999	.4999	.5000	.5000	.5000	0	0	0	0	0	0	0	0	
3.9	.5000	.5000	.5000	.5000	.5000	.5000	.5000	.5000	.5000	.5000	0	0	0	0	0	0	0	0	

#### L2-MATHMF

# English translation of the wording on the front cover

# **Level 2 Mathematics and Statistics, 2021**

FORMULAE SHEET for 91261M, 91262M, 91267M

Refer to this booklet to answer the questions in your Question and Answer Booklets.

Check that this booklet has pages 2–3 in the correct order and that none of these pages is blank.

YOU MAY KEEP THIS SHEET AT THE END OF THE EXAMINATION.