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# Level 3 Certificate

# MATHEMATICAL STUDIES

Paper 2A Statistical Techniques

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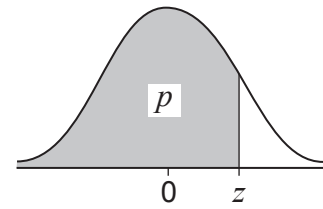
## Statistical Tables

### **Information**

These statistical tables are required for use with Mathematical Studies paper 2A only.

**Table 1 Normal distribution function**

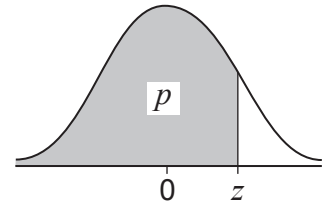
The table gives the probability,  $p$ , that a normally distributed random variable  $Z$ , with mean = 0 and variance = 1, is less than or equal to  $z$ .



| $z$        | 0.00    | 0.01    | 0.02    | 0.03    | 0.04    | 0.05    | 0.06    | 0.07    | 0.08    | 0.09    | $z$        |
|------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|------------|
| <b>0.0</b> | 0.50000 | 0.50399 | 0.50798 | 0.51197 | 0.51595 | 0.51994 | 0.52392 | 0.52790 | 0.53188 | 0.53586 | <b>0.0</b> |
| <b>0.1</b> | 0.53983 | 0.54380 | 0.54776 | 0.55172 | 0.55567 | 0.55962 | 0.56356 | 0.56749 | 0.57142 | 0.57535 | <b>0.1</b> |
| <b>0.2</b> | 0.57926 | 0.58317 | 0.58706 | 0.59095 | 0.59483 | 0.59871 | 0.60257 | 0.60642 | 0.61026 | 0.61409 | <b>0.2</b> |
| <b>0.3</b> | 0.61791 | 0.62172 | 0.62552 | 0.62930 | 0.63307 | 0.63683 | 0.64058 | 0.64431 | 0.64803 | 0.65173 | <b>0.3</b> |
| <b>0.4</b> | 0.65542 | 0.65910 | 0.66276 | 0.66640 | 0.67003 | 0.67364 | 0.67724 | 0.68082 | 0.68439 | 0.68793 | <b>0.4</b> |
| <b>0.5</b> | 0.69146 | 0.69497 | 0.69847 | 0.70194 | 0.70540 | 0.70884 | 0.71226 | 0.71566 | 0.71904 | 0.72240 | <b>0.5</b> |
| <b>0.6</b> | 0.72575 | 0.72907 | 0.73237 | 0.73565 | 0.73891 | 0.74215 | 0.74537 | 0.74857 | 0.75175 | 0.75490 | <b>0.6</b> |
| <b>0.7</b> | 0.75804 | 0.76115 | 0.76424 | 0.76730 | 0.77035 | 0.77337 | 0.77637 | 0.77935 | 0.78230 | 0.78524 | <b>0.7</b> |
| <b>0.8</b> | 0.78814 | 0.79103 | 0.79389 | 0.79673 | 0.79955 | 0.80234 | 0.80511 | 0.80785 | 0.81057 | 0.81327 | <b>0.8</b> |
| <b>0.9</b> | 0.81594 | 0.81859 | 0.82121 | 0.82381 | 0.82639 | 0.82894 | 0.83147 | 0.83398 | 0.83646 | 0.83891 | <b>0.9</b> |
| <b>1.0</b> | 0.84134 | 0.84375 | 0.84614 | 0.84849 | 0.85083 | 0.85314 | 0.85543 | 0.85769 | 0.85993 | 0.86214 | <b>1.0</b> |
| <b>1.1</b> | 0.86433 | 0.86650 | 0.86864 | 0.87076 | 0.87286 | 0.87493 | 0.87698 | 0.87900 | 0.88100 | 0.88298 | <b>1.1</b> |
| <b>1.2</b> | 0.88493 | 0.88686 | 0.88877 | 0.89065 | 0.89251 | 0.89435 | 0.89617 | 0.89796 | 0.89973 | 0.90147 | <b>1.2</b> |
| <b>1.3</b> | 0.90320 | 0.90490 | 0.90658 | 0.90824 | 0.90988 | 0.91149 | 0.91309 | 0.91466 | 0.91621 | 0.91774 | <b>1.3</b> |
| <b>1.4</b> | 0.91924 | 0.92073 | 0.92220 | 0.92364 | 0.92507 | 0.92647 | 0.92785 | 0.92922 | 0.93056 | 0.93189 | <b>1.4</b> |
| <b>1.5</b> | 0.93319 | 0.93448 | 0.93574 | 0.93699 | 0.93822 | 0.93943 | 0.94062 | 0.94179 | 0.94295 | 0.94408 | <b>1.5</b> |
| <b>1.6</b> | 0.94520 | 0.94630 | 0.94738 | 0.94845 | 0.94950 | 0.95053 | 0.95154 | 0.95254 | 0.95352 | 0.95449 | <b>1.6</b> |
| <b>1.7</b> | 0.95543 | 0.95637 | 0.95728 | 0.95818 | 0.95907 | 0.95994 | 0.96080 | 0.96164 | 0.96246 | 0.96327 | <b>1.7</b> |
| <b>1.8</b> | 0.96407 | 0.96485 | 0.96562 | 0.96638 | 0.96712 | 0.96784 | 0.96856 | 0.96926 | 0.96995 | 0.97062 | <b>1.8</b> |
| <b>1.9</b> | 0.97128 | 0.97193 | 0.97257 | 0.97320 | 0.97381 | 0.97441 | 0.97500 | 0.97558 | 0.97615 | 0.97670 | <b>1.9</b> |
| <b>2.0</b> | 0.97725 | 0.97778 | 0.97831 | 0.97882 | 0.97932 | 0.97982 | 0.98030 | 0.98077 | 0.98124 | 0.98169 | <b>2.0</b> |
| <b>2.1</b> | 0.98214 | 0.98257 | 0.98300 | 0.98341 | 0.98382 | 0.98422 | 0.98461 | 0.98500 | 0.98537 | 0.98574 | <b>2.1</b> |
| <b>2.2</b> | 0.98610 | 0.98645 | 0.98679 | 0.98713 | 0.98745 | 0.98778 | 0.98809 | 0.98840 | 0.98870 | 0.98899 | <b>2.2</b> |
| <b>2.3</b> | 0.98928 | 0.98956 | 0.98983 | 0.99010 | 0.99036 | 0.99061 | 0.99086 | 0.99111 | 0.99134 | 0.99158 | <b>2.3</b> |
| <b>2.4</b> | 0.99180 | 0.99202 | 0.99224 | 0.99245 | 0.99266 | 0.99286 | 0.99305 | 0.99324 | 0.99343 | 0.99361 | <b>2.4</b> |
| <b>2.5</b> | 0.99379 | 0.99396 | 0.99413 | 0.99430 | 0.99446 | 0.99461 | 0.99477 | 0.99492 | 0.99506 | 0.99520 | <b>2.5</b> |
| <b>2.6</b> | 0.99534 | 0.99547 | 0.99560 | 0.99573 | 0.99585 | 0.99598 | 0.99609 | 0.99621 | 0.99632 | 0.99643 | <b>2.6</b> |
| <b>2.7</b> | 0.99653 | 0.99664 | 0.99674 | 0.99683 | 0.99693 | 0.99702 | 0.99711 | 0.99720 | 0.99728 | 0.99736 | <b>2.7</b> |
| <b>2.8</b> | 0.99744 | 0.99752 | 0.99760 | 0.99767 | 0.99774 | 0.99781 | 0.99788 | 0.99795 | 0.99801 | 0.99807 | <b>2.8</b> |
| <b>2.9</b> | 0.99813 | 0.99819 | 0.99825 | 0.99831 | 0.99836 | 0.99841 | 0.99846 | 0.99851 | 0.99856 | 0.99861 | <b>2.9</b> |
| <b>3.0</b> | 0.99865 | 0.99869 | 0.99874 | 0.99878 | 0.99882 | 0.99886 | 0.99889 | 0.99893 | 0.99896 | 0.99900 | <b>3.0</b> |
| <b>3.1</b> | 0.99903 | 0.99906 | 0.99910 | 0.99913 | 0.99916 | 0.99918 | 0.99921 | 0.99924 | 0.99926 | 0.99929 | <b>3.1</b> |
| <b>3.2</b> | 0.99931 | 0.99934 | 0.99936 | 0.99938 | 0.99940 | 0.99942 | 0.99944 | 0.99946 | 0.99948 | 0.99950 | <b>3.2</b> |
| <b>3.3</b> | 0.99952 | 0.99953 | 0.99955 | 0.99957 | 0.99958 | 0.99960 | 0.99961 | 0.99962 | 0.99964 | 0.99965 | <b>3.3</b> |
| <b>3.4</b> | 0.99966 | 0.99968 | 0.99969 | 0.99970 | 0.99971 | 0.99972 | 0.99973 | 0.99974 | 0.99975 | 0.99976 | <b>3.4</b> |
| <b>3.5</b> | 0.99977 | 0.99978 | 0.99978 | 0.99979 | 0.99980 | 0.99981 | 0.99981 | 0.99982 | 0.99983 | 0.99983 | <b>3.5</b> |
| <b>3.6</b> | 0.99984 | 0.99985 | 0.99985 | 0.99986 | 0.99986 | 0.99987 | 0.99987 | 0.99988 | 0.99988 | 0.99989 | <b>3.6</b> |
| <b>3.7</b> | 0.99989 | 0.99990 | 0.99990 | 0.99990 | 0.99991 | 0.99991 | 0.99992 | 0.99992 | 0.99992 | 0.99992 | <b>3.7</b> |
| <b>3.8</b> | 0.99993 | 0.99993 | 0.99993 | 0.99994 | 0.99994 | 0.99994 | 0.99994 | 0.99995 | 0.99995 | 0.99995 | <b>3.8</b> |
| <b>3.9</b> | 0.99995 | 0.99995 | 0.99996 | 0.99996 | 0.99996 | 0.99996 | 0.99996 | 0.99996 | 0.99997 | 0.99997 | <b>3.9</b> |

**Table 2 Percentage points of the normal distribution**

The table gives the values of  $z$  satisfying  $P(Z \leq z) = p$ , where  $Z$  is the normally distributed random variable with mean = 0 and variance = 1.



|             |              |              |              |              |              |              |              |              |              |              |             |
|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|-------------|
| $p$         | <b>0.00</b>  | <b>0.01</b>  | <b>0.02</b>  | <b>0.03</b>  | <b>0.04</b>  | <b>0.05</b>  | <b>0.06</b>  | <b>0.07</b>  | <b>0.08</b>  | <b>0.09</b>  | $p$         |
| <b>0.5</b>  | 0.0000       | 0.0251       | 0.0502       | 0.0753       | 0.1004       | 0.1257       | 0.1510       | 0.1764       | 0.2019       | 0.2275       | <b>0.5</b>  |
| <b>0.6</b>  | 0.2533       | 0.2793       | 0.3055       | 0.3319       | 0.3585       | 0.3853       | 0.4125       | 0.4399       | 0.4677       | 0.4958       | <b>0.6</b>  |
| <b>0.7</b>  | 0.5244       | 0.5534       | 0.5828       | 0.6128       | 0.6433       | 0.6745       | 0.7063       | 0.7388       | 0.7722       | 0.8064       | <b>0.7</b>  |
| <b>0.8</b>  | 0.8416       | 0.8779       | 0.9154       | 0.9542       | 0.9945       | 1.0364       | 1.0803       | 1.1264       | 1.1750       | 1.2265       | <b>0.8</b>  |
| <b>0.9</b>  | 1.2816       | 1.3408       | 1.4051       | 1.4758       | 1.5548       | 1.6449       | 1.7507       | 1.8808       | 2.0537       | 2.3263       | <b>0.9</b>  |
| $p$         | <b>0.000</b> | <b>0.001</b> | <b>0.002</b> | <b>0.003</b> | <b>0.004</b> | <b>0.005</b> | <b>0.006</b> | <b>0.007</b> | <b>0.008</b> | <b>0.009</b> | $p$         |
| <b>0.95</b> | 1.6449       | 1.6546       | 1.6646       | 1.6747       | 1.6849       | 1.6954       | 1.7060       | 1.7169       | 1.7279       | 1.7392       | <b>0.95</b> |
| <b>0.96</b> | 1.7507       | 1.7624       | 1.7744       | 1.7866       | 1.7991       | 1.8119       | 1.8250       | 1.8384       | 1.8522       | 1.8663       | <b>0.96</b> |
| <b>0.97</b> | 1.8808       | 1.8957       | 1.9110       | 1.9268       | 1.9431       | 1.9600       | 1.9774       | 1.9954       | 2.0141       | 2.0335       | <b>0.97</b> |
| <b>0.98</b> | 2.0537       | 2.0749       | 2.0969       | 2.1201       | 2.1444       | 2.1701       | 2.1973       | 2.2262       | 2.2571       | 2.2904       | <b>0.98</b> |
| <b>0.99</b> | 2.3263       | 2.3656       | 2.4089       | 2.4573       | 2.5121       | 2.5758       | 2.6521       | 2.7478       | 2.8782       | 3.0902       | <b>0.99</b> |

**END OF STATISTICAL TABLES**

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