# 國立高雄大學一百學年度研究所碩士班招生考試試題

科目：統計學
考試時間：100 分鐘

系所：
亞太工商管理學系(甲組、乙組)　是否使用計算機：是
本科原始成績：100 分

**本試題共八題，各題的配分如各小題所示。**

**(注意：1.請依題號順序做答於答案紙上。 2.答案若有小數，請計算至小數點後第四位再四捨五入至小數點後第三位。 3.在第4、5頁附有Normal、t、$\chi^2$、F、Poisson的機率表格。)**

1. 一迴歸模式$\hat{Y}$考慮四個自變數 X1、X2、X3、X4，為了避免共線性(collinearity)的問題，分別以每一自變數為 dependent variable，其餘自變數為 independent variables，進行迴歸分析後分別得到$R_j^2$如下表所示。請問哪一個自變數應該從這個迴歸模式中刪除？ (5 分)

| Dependent variable | Independent variables | $R_j^2$ |
|---|---|---|
| X1 | X2、X3、X4 | 0.09 |
| X2 | X1、X3、X4 | 0.50 |
| X3 | X1、X2、X4 | 0.75 |
| X4 | X2、X3、X4 | 0.92 |

2. (A)有一項通關測驗，如果答對 5 個問題就可過關，已知每題答對的機率都是 0.4，且題目都是獨立的，請問恰好答完第 8 個問題過關的機率為何？ (5 分)
   (B)承(A)，平均需回答幾個問題才會過關？(4 分)
   (C)亞太銀行設在高大公司的 ATM 提款機，在平日每小時平均有 8 個顧客使用，請問下一個顧客在 10 到 15 分鐘之間到達的機率為何？(4 分)

3. (A)Samples of size 60 (n=60) are drawn from a Binomial population with population proportion 0.3. If $\hat{p}$ denotes sample proportion and $P(\hat{p} < M) = 0.1$, what is the value of $M$ ？(5 分)
   (B)Given a normal population with μ = 80, you select a sample of n = 10 and compute the sample standard deviation s = 20. If $P(\overline{X} > R) = 0.9$, what is the value of $R$ ？(5 分)

4. 某一組合件由三種零件($X_1$、$X_2$、$X_3$)組裝而成，這三種零件的生產線是獨立的，已知這三種零件的特性值(長度)(單位:$\mu m$)之平均數和標準差如下表所示。組合件必須管控的特性值為 $Y = X_1 + 2X_2 - 3X_3$，且組合件的規格要求為 [110, 135]。低於規格下限需重加工、每件重加工成本 8 元，高於規格上限則報廢、每件報廢成本 15 元。每天平均生產這個組合件 500 件。

| **零件** | **平均數($\mu_i$)** | **標準差($\sigma_i$)** |
|---|---|---|
| $X_1$ | 100 | 6 |
| $X_2$ | 55 | 4 |
| $X_3$ | 30 | 2 |

   (A)如果這三種零件的長度是常態分配，請問組合件平均每天重加工成本為多少元？(4 分)
   請問組合件平均每天報廢成本為多少元？(4 分)
   (B)如果這三種零件的長度不確定是何種分配，且組合件的規格要求改為 [105, 135]，請問組合件平均每天最多有幾件不合格？(4 分)

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5. 某一城市每天汽車意外事件在過去 100 天裡，其次數分配如下表所示。在α = 0.05 下，請問這些資料是否顯示該城市每天汽車意外事件次數呈現 Poisson 分配。

| 意外事件次數 | 0 | 1 | 2 | 3 | 4 | ≥ 5 |
|---|---|---|---|---|---|---|
| 發生天數(天) | 28 | 35 | 28 | 7 | 2 | 0 |

(A) 請問這個假設的 $H_0$ 和 $H_1$ 分別為何？ (4 分)

(B) 如果這個假設檢定的拒絕域為 $\left(\chi^2 > \chi^2_{xritical\ value}\right)$，

請問 $\chi^2$ = ？ (5 分)　　$\chi^2_{critical\ value}$ = ？ (3 分)

(C) 請問該城市每天汽車意外事件次數是否呈現 Poisson 分配。(2 分)

6. 欲建立 $x$ 和 $y$ 的線性迴歸方程式 $\hat{y} = a + bx$，經由抽樣 20 組樣本計算得知：

$\sum_{i=1}^{20} x_i = 350$ 、 $\sum_{i=1}^{20} y_i = 900$ 、 $\sum_{i=1}^{20} (x_i - \bar{x})^2 = 650$ 、 $\sum_{i=1}^{20} (y_i - \bar{y})^2 = 2{,}400$ 、 $\sum_{i=1}^{20} (x_i - \bar{x})(y_i - \bar{y}) = -850$

(A) 請問 $x$ 和 $y$ 的相關係數(coefficient of correlation) $r$ = ？。(4 分)

(B) 請問 $y$ 對 $x$ 之迴歸估計標準誤 $S_{y|x}$ = ? (4 分)

(C) 請問係數 $a$ = ？ (2 分)　　$b$ = ？ (2 分)

(D) 使用α=0.01，進行迴歸係數的檢定 $\begin{cases} H_0 : \beta = 0 \\ H_1 : \beta < 0 \end{cases}$，請問您的決策為何？ (4 分)

(E) 請建立 $E(y|x = 40)$ 的 95% 信賴區間。(4 分)

7. 一項完全隨機設計欲檢定四種處理方法的效果是否有差別，實驗資料如下表所示。

| Treatment 1 | Treatment 2 | Treatment 3 | Treatment 4 |
|---|---|---|---|
| $\bar{x}_1 = 95.6$ | $\bar{x}_2 = 78.3$ | $\bar{x}_3 = 85.9$ | $\bar{x}_4 = 58.5$ |
| $s_1 = 21.3$ | $s_2 = 16.4$ | $s_3 = 14.2$ | $s_4 = 11.8$ |
| $n_1 = 18$ | $n_2 = 15$ | $n_3 = 19$ | $n_4 = 12$ |

(A) 請問 Mean square error (MSE) = ？ (6 分)

(B) 使用α=0.05，如果$\left(F > F_{critical\ value}\right)$則檢定決策為四種處理方法的效果有差異，

請問 $F$ = ? (5 分)　　$F_{critical\ value}$ = ? (3 分)

8. 一項二因子(A、B)三水準的實驗資料如下表所示。經由計算後得 A 因子的均方值(Mean Square for factor A) MSA =784、交互作用差異值 SSAB=1,108、總差異 SSTotal=6,094

| A 因子水準 | B 因子水準 | $y_1$ | $y_2$ | $y_3$ |
|---|---|---|---|---|
| 1 | 1 | 94 | 95 | 93 |
| 1 | 2 | 86 | 87 | 88 |
| 1 | 3 | 83 | 85 | 87 |
| 2 | 1 | 92 | 88 | 93 |
| 2 | 2 | 79 | 85 | 82 |
| 2 | 3 | 68 | 63 | 64 |
| 3 | 1 | 90 | 91 | 92 |
| 3 | 2 | 70 | 77 | 75 |
| 3 | 3 | 48 | 44 | 43 |

(A) 請問 B 因子的均方值(Mean Square for factor B) MSB = ? (6 分)

(B) 請問 Mean Square Error (MSE) = ? (6 分)

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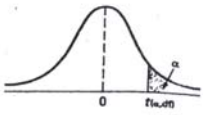
## The Cumulative Standardized Normal Distribution

Entry represents area under the cumulative standardized normal distribution from $-\infty$ to $Z$


| Z | 0.00 | 0.01 | 0.02 | 0.03 | 0.04 | 0.05 | 0.06 | 0.07 | 0.08 | 0.09 |
|---|---|---|---|---|---|---|---|---|---|---|
| 0.0 | 0.5000 | 0.5040 | 0.5080 | 0.5120 | 0.5160 | 0.5199 | 0.5239 | 0.5279 | 0.5319 | 0.5359 |
| 0.1 | 0.5398 | 0.5438 | 0.5478 | 0.5517 | 0.5557 | 0.5596 | 0.5636 | 0.5675 | 0.5714 | 0.5753 |
| 0.2 | 0.5793 | 0.5832 | 0.5871 | 0.5910 | 0.5948 | 0.5987 | 0.6026 | 0.6064 | 0.6103 | 0.6141 |
| 0.3 | 0.6179 | 0.6217 | 0.6255 | 0.6293 | 0.6331 | 0.6368 | 0.6406 | 0.6443 | 0.6480 | 0.6517 |
| 0.4 | 0.6554 | 0.6591 | 0.6628 | 0.6664 | 0.6700 | 0.6736 | 0.6772 | 0.6808 | 0.6844 | 0.6879 |
| 0.5 | 0.6915 | 0.6950 | 0.6985 | 0.7019 | 0.7054 | 0.7088 | 0.7123 | 0.7157 | 0.7190 | 0.7224 |
| 0.6 | 0.7257 | 0.7291 | 0.7324 | 0.7357 | 0.7389 | 0.7422 | 0.7454 | 0.7486 | 0.7518 | 0.7549 |
| 0.7 | 0.7580 | 0.7612 | 0.7642 | 0.7673 | 0.7704 | 0.7734 | 0.7764 | 0.7794 | 0.7823 | 0.7852 |
| 0.8 | 0.7881 | 0.7910 | 0.7939 | 0.7967 | 0.7995 | 0.8023 | 0.8051 | 0.8078 | 0.8106 | 0.8133 |
| 0.9 | 0.8159 | 0.8186 | 0.8212 | 0.8238 | 0.8264 | 0.8289 | 0.8315 | 0.8340 | 0.8365 | 0.8389 |
| 1.0 | 0.8413 | 0.8438 | 0.8461 | 0.8485 | 0.8508 | 0.8531 | 0.8554 | 0.8577 | 0.8599 | 0.8621 |
| 1.1 | 0.8643 | 0.8665 | 0.8686 | 0.8708 | 0.8729 | 0.8749 | 0.8770 | 0.8790 | 0.8810 | 0.8830 |
| 1.2 | 0.8849 | 0.8869 | 0.8888 | 0.8907 | 0.8925 | 0.8944 | 0.8962 | 0.8980 | 0.8997 | 0.9015 |
| 1.3 | 0.9032 | 0.9049 | 0.9066 | 0.9082 | 0.9099 | 0.9115 | 0.9131 | 0.9147 | 0.9162 | 0.9177 |
| 1.4 | 0.9192 | 0.9207 | 0.9222 | 0.9236 | 0.9251 | 0.9265 | 0.9279 | 0.9292 | 0.9306 | 0.9319 |
| 1.5 | 0.9332 | 0.9345 | 0.9357 | 0.9370 | 0.9382 | 0.9394 | 0.9406 | 0.9418 | 0.9429 | 0.9441 |
| 1.6 | 0.9452 | 0.9463 | 0.9474 | 0.9484 | 0.9495 | 0.9505 | 0.9515 | 0.9525 | 0.9535 | 0.9545 |
| 1.7 | 0.9554 | 0.9564 | 0.9573 | 0.9582 | 0.9591 | 0.9599 | 0.9608 | 0.9616 | 0.9625 | 0.9633 |
| 1.8 | 0.9641 | 0.9649 | 0.9656 | 0.9664 | 0.9671 | 0.9678 | 0.9686 | 0.9693 | 0.9699 | 0.9706 |
| 1.9 | 0.9713 | 0.9719 | 0.9726 | 0.9732 | 0.9738 | 0.9744 | 0.9750 | 0.9756 | 0.9761 | 0.9767 |
| 2.0 | 0.9772 | 0.9778 | 0.9783 | 0.9788 | 0.9793 | 0.9798 | 0.9803 | 0.9808 | 0.9812 | 0.9817 |
| 2.1 | 0.9821 | 0.9826 | 0.9830 | 0.9834 | 0.9838 | 0.9842 | 0.9846 | 0.9850 | 0.9854 | 0.9857 |
| 2.2 | 0.9861 | 0.9864 | 0.9868 | 0.9871 | 0.9875 | 0.9878 | 0.9881 | 0.9884 | 0.9887 | 0.9890 |
| 2.3 | 0.9893 | 0.9896 | 0.9898 | 0.9901 | 0.9904 | 0.9906 | 0.9909 | 0.9911 | 0.9913 | 0.9916 |
| 2.4 | 0.9918 | 0.9920 | 0.9922 | 0.9925 | 0.9927 | 0.9929 | 0.9931 | 0.9932 | 0.9934 | 0.9936 |
| 2.5 | 0.9938 | 0.9940 | 0.9941 | 0.9943 | 0.9945 | 0.9946 | 0.9948 | 0.9949 | 0.9951 | 0.9952 |
| 2.6 | 0.9953 | 0.9955 | 0.9956 | 0.9957 | 0.9959 | 0.9960 | 0.9961 | 0.9962 | 0.9963 | 0.9964 |
| 2.7 | 0.9965 | 0.9966 | 0.9967 | 0.9968 | 0.9969 | 0.9970 | 0.9971 | 0.9972 | 0.9973 | 0.9974 |
| 2.8 | 0.9974 | 0.9975 | 0.9976 | 0.9977 | 0.9977 | 0.9978 | 0.9979 | 0.9979 | 0.9980 | 0.9981 |
| 2.9 | 0.9981 | 0.9982 | 0.9982 | 0.9983 | 0.9984 | 0.9984 | 0.9985 | 0.9985 | 0.9986 | 0.9986 |
| 3.0 | 0.99865 | 0.99869 | 0.99874 | 0.99878 | 0.99882 | 0.99886 | 0.99889 | 0.99893 | 0.99897 | 0.99900 |
| 3.1 | 0.99903 | 0.99906 | 0.99910 | 0.99913 | 0.99916 | 0.99918 | 0.99921 | 0.99924 | 0.99926 | 0.99929 |
| 3.2 | 0.99931 | 0.99934 | 0.99936 | 0.99938 | 0.99940 | 0.99942 | 0.99944 | 0.99946 | 0.99948 | 0.99950 |
| 3.3 | 0.99952 | 0.99953 | 0.99955 | 0.99957 | 0.99958 | 0.99960 | 0.99961 | 0.99962 | 0.99964 | 0.99965 |
| 3.4 | 0.99966 | 0.99968 | 0.99969 | 0.99970 | 0.99971 | 0.99972 | 0.99973 | 0.99974 | 0.99975 | 0.99976 |
| 3.5 | 0.99977 | 0.99978 | 0.99978 | 0.99979 | 0.99980 | 0.99981 | 0.99981 | 0.99982 | 0.99983 | 0.99983 |
| 3.6 | 0.99984 | 0.99985 | 0.99985 | 0.99986 | 0.99986 | 0.99987 | 0.99987 | 0.99988 | 0.99988 | 0.99989 |
| 3.7 | 0.99989 | 0.99990 | 0.99990 | 0.99990 | 0.99991 | 0.99991 | 0.99992 | 0.99992 | 0.99992 | 0.99992 |
| 3.8 | 0.99993 | 0.99993 | 0.99993 | 0.99994 | 0.99994 | 0.99994 | 0.99994 | 0.99995 | 0.99995 | 0.99995 |
| 3.9 | 0.99995 | 0.99995 | 0.99996 | 0.99996 | 0.99996 | 0.99996 | 0.99996 | 0.99996 | 0.99997 | 0.99997 |

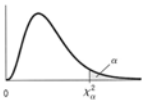
## Critical Values of t

For a particular number of degrees of freedom, entry represents the critical value of $t$ corresponding to a specified upper-tail area ($\alpha$).




| Degrees of Freedom | Upper-Tail Areas 0.25 | 0.10 | 0.05 | 0.025 | 0.01 | 0.005 |
|---|---|---|---|---|---|---|
| 1 | 1.0000 | 3.0777 | 6.3138 | 12.7062 | 31.8207 | 63.6574 |
| 2 | 0.8165 | 1.8856 | 2.9200 | 4.3027 | 6.9646 | 9.9248 |
| 3 | 0.7649 | 1.6377 | 2.3534 | 3.1824 | 4.5407 | 5.8409 |
| 4 | 0.7407 | 1.5332 | 2.1318 | 2.7764 | 3.7469 | 4.6041 |
| 5 | 0.7267 | 1.4759 | 2.0150 | 2.5706 | 3.3649 | 4.0322 |
| 6 | 0.7176 | 1.4398 | 1.9432 | 2.4469 | 3.1427 | 3.7074 |
| 7 | 0.7111 | 1.4149 | 1.8946 | 2.3646 | 2.9980 | 3.4995 |
| 8 | 0.7064 | 1.3968 | 1.8595 | 2.3060 | 2.8965 | 3.3554 |
| 9 | 0.7027 | 1.3830 | 1.8331 | 2.2622 | 2.8214 | 3.2498 |
| 10 | 0.6998 | 1.3722 | 1.8125 | 2.2281 | 2.7638 | 3.1693 |
| 11 | 0.6974 | 1.3634 | 1.7959 | 2.2010 | 2.7181 | 3.1058 |
| 12 | 0.6955 | 1.3562 | 1.7823 | 2.1788 | 2.6810 | 3.0545 |
| 13 | 0.6938 | 1.3502 | 1.7709 | 2.1604 | 2.6503 | 3.0123 |
| 14 | 0.6924 | 1.3450 | 1.7613 | 2.1448 | 2.6245 | 2.9768 |
| 15 | 0.6912 | 1.3406 | 1.7531 | 2.1315 | 2.6025 | 2.9467 |
| 16 | 0.6901 | 1.3368 | 1.7459 | 2.1199 | 2.5835 | 2.9208 |
| 17 | 0.6892 | 1.3334 | 1.7396 | 2.1098 | 2.5669 | 2.8982 |
| 18 | 0.6884 | 1.3304 | 1.7341 | 2.1009 | 2.5524 | 2.8784 |
| 19 | 0.6876 | 1.3277 | 1.7291 | 2.0930 | 2.5395 | 2.8609 |
| 20 | 0.6870 | 1.3253 | 1.7247 | 2.0860 | 2.5280 | 2.8453 |

## Percentiles of the chi-squared distribution.




| Right-tail probability | df | α 0.10 | 0.05 | 0.025 | 0.01 | 0.005 |
|---|---|---|---|---|---|---|
| Values of $\chi^2_\alpha$ | 1 | 2.706 | 3.841 | 5.024 | 6.635 | 7.879 |
| | 2 | 4.605 | 5.991 | 7.378 | 9.210 | 10.597 |
| | 3 | 6.251 | 7.815 | 9.348 | 11.345 | 12.838 |
| | 4 | 7.779 | 9.488 | 11.143 | 13.277 | 14.860 |
| | 5 | 9.236 | 11.070 | 12.833 | 15.086 | 16.750 |
| | 6 | 10.645 | 12.592 | 14.449 | 16.812 | 18.548 |
| | 7 | 12.017 | 14.067 | 16.013 | 18.475 | 20.278 |
| | 8 | 13.362 | 15.507 | 17.535 | 20.090 | 21.955 |
| | 9 | 14.684 | 16.919 | 19.023 | 21.666 | 23.589 |
| | 10 | 15.987 | 18.307 | 20.483 | 23.209 | 25.188 |
| | 11 | 17.275 | 19.675 | 21.920 | 24.725 | 26.757 |
| | 12 | 18.549 | 21.026 | 23.337 | 26.217 | 28.300 |
| | 13 | 19.812 | 22.362 | 24.736 | 27.688 | 29.819 |
| | 14 | 21.064 | 23.685 | 26.119 | 29.141 | 31.319 |
| | 15 | 22.307 | 24.996 | 27.488 | 30.578 | 32.801 |
| | 16 | 23.542 | 26.296 | 28.845 | 32.000 | 34.267 |
| | 17 | 24.769 | 27.587 | 30.191 | 33.409 | 35.718 |
| | 18 | 25.989 | 28.869 | 31.526 | 34.805 | 37.156 |
| | 19 | 27.204 | 30.143 | 32.852 | 36.191 | 38.582 |
| | 20 | 28.412 | 31.410 | 34.170 | 37.566 | 39.997 |
| | 21 | 29.615 | 32.671 | 35.479 | 38.932 | 41.401 |
| | 22 | 30.813 | 33.924 | 36.781 | 40.290 | 42.796 |
| | 23 | 32.007 | 35.172 | 38.076 | 41.638 | 44.181 |
| | 24 | 33.196 | 36.415 | 39.364 | 42.980 | 45.559 |
| | 25 | 34.382 | 37.653 | 40.647 | 44.314 | 46.928 |
| | 26 | 35.563 | 38.885 | 41.923 | 45.642 | 48.290 |
| | 27 | 36.741 | 40.113 | 43.195 | 46.963 | 49.645 |
| | 28 | 37.916 | 41.337 | 44.461 | 48.278 | 50.994 |
| | 29 | 39.087 | 42.557 | 45.722 | 59.588 | 52.336 |
| | 30 | 40.256 | 43.773 | 46.979 | 50.892 | 53.672 |
| | 40 | 51.805 | 55.759 | 59.342 | 63.691 | 66.767 |
| | 50 | 63.167 | 67.505 | 71.420 | 76.154 | 79.490 |
| | 60 | 74.397 | 79.082 | 83.298 | 88.381 | 91.955 |
| | 70 | 85.527 | 90.531 | 95.023 | 100.424 | 104.213 |
| | 80 | 96.578 | 101.879 | 106.628 | 112.328 | 116.320 |
| | 90 | 107.565 | 113.145 | 118.135 | 124.115 | 128.296 |
| | 100 | 118.499 | 124.343 | 129.563 | 135.811 | 140.177 |

背面尚有試題

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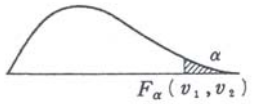


$F$ 分配右尾百分點 $F_\alpha(v_1, v_2)$

$\alpha = 0.05$

| $v_2$ \ $v_1$ | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 161.45 | 199.50 | 215.71 | 224.58 | 230.16 | 233.99 | 236.77 | 238.88 | 240.54 |
| 2 | 18.513 | 19.000 | 19.164 | 19.247 | 19.296 | 19.330 | 19.353 | 19.371 | 19.385 |
| 3 | 10.128 | 9.5521 | 9.2766 | 9.1172 | 9.0135 | 8.9406 | 8.8868 | 8.8452 | 8.8123 |
| 4 | 7.7086 | 6.9443 | 6.5914 | 6.3883 | 6.2560 | 6.1631 | 6.0942 | 6.0410 | 5.9988 |
| 5 | 6.6079 | 5.7861 | 5.4095 | 5.1922 | 5.0503 | 4.9503 | 4.8759 | 4.8183 | 4.7725 |
| 6 | 5.9874 | 5.1433 | 4.7571 | 4.5337 | 4.3874 | 4.2839 | 4.2066 | 4.1468 | 4.0990 |
| 7 | 5.5914 | 4.7374 | 4.3468 | 4.1203 | 3.9715 | 3.8660 | 3.7870 | 3.7257 | 3.6767 |
| 8 | 5.3177 | 4.4590 | 4.0662 | 3.8378 | 3.6875 | 3.5806 | 3.5005 | 3.4381 | 3.3881 |
| 9 | 5.1174 | 4.2565 | 3.8626 | 3.6331 | 3.4817 | 3.3738 | 3.2927 | 3.2296 | 3.1789 |
| 10 | 4.9646 | 4.1028 | 3.7083 | 3.4780 | 3.3258 | 3.2172 | 3.1355 | 3.0717 | 3.0204 |
| 11 | 4.8443 | 3.9823 | 3.5874 | 3.3567 | 3.2039 | 3.0946 | 3.0123 | 2.9480 | 2.8962 |
| 12 | 4.7472 | 3.8853 | 3.4903 | 3.2592 | 3.1059 | 2.9961 | 2.9134 | 2.8486 | 2.7964 |
| 13 | 4.6672 | 3.8056 | 3.4105 | 3.1791 | 3.0254 | 2.9153 | 2.8321 | 2.7669 | 2.7144 |
| 14 | 4.6001 | 3.7389 | 3.3439 | 3.1122 | 2.9582 | 2.8477 | 2.7642 | 2.6987 | 2.6458 |
| 15 | 4.5431 | 3.6823 | 3.2874 | 3.0556 | 2.9013 | 2.7905 | 2.7066 | 2.6408 | 2.5876 |
| 16 | 4.4940 | 3.6337 | 3.2389 | 3.0069 | 2.8524 | 2.7413 | 2.6572 | 2.5911 | 2.5377 |
| 17 | 4.4513 | 3.5915 | 3.1968 | 2.9647 | 2.8100 | 2.6987 | 2.6143 | 2.5480 | 2.4943 |
| 18 | 4.4139 | 3.5546 | 3.1599 | 2.9277 | 2.7729 | 2.6613 | 2.5767 | 2.5102 | 2.4563 |
| 19 | 4.3808 | 3.5219 | 3.1274 | 2.8951 | 2.7401 | 2.6283 | 2.5435 | 2.4768 | 2.4227 |
| 20 | 4.3513 | 3.4928 | 3.0984 | 2.8661 | 2.7109 | 2.5990 | 2.5140 | 2.4471 | 2.3928 |
| 21 | 4.3248 | 3.4668 | 3.0725 | 2.8401 | 2.6848 | 2.5727 | 2.4876 | 2.4205 | 2.3661 |
| 22 | 4.3009 | 3.4434 | 3.0491 | 2.8167 | 2.6613 | 2.5491 | 2.4638 | 2.3965 | 2.3419 |
| 23 | 4.2793 | 3.4221 | 3.0280 | 2.7955 | 2.6400 | 2.5277 | 2.4422 | 2.3748 | 2.3201 |
| 24 | 4.2597 | 3.4028 | 3.0088 | 2.7763 | 2.6207 | 2.5082 | 2.4226 | 2.3551 | 2.3002 |
| 25 | 4.2417 | 3.3852 | 2.9912 | 2.7587 | 2.6030 | 2.4904 | 2.4047 | 2.3371 | 2.2821 |
| 26 | 4.2252 | 3.3690 | 2.9751 | 2.7426 | 2.5868 | 2.4741 | 2.3883 | 2.3205 | 2.2655 |
| 27 | 4.2100 | 3.3541 | 2.9604 | 2.7278 | 2.5719 | 2.4591 | 2.3732 | 2.3053 | 2.2501 |
| 28 | 4.1960 | 3.3404 | 2.9467 | 2.7141 | 2.5581 | 2.4453 | 2.3593 | 2.2913 | 2.2360 |
| 29 | 4.1830 | 3.3277 | 2.9340 | 2.7014 | 2.5454 | 2.4324 | 2.3463 | 2.2782 | 2.2229 |
| 30 | 4.1709 | 3.3158 | 2.9223 | 2.6896 | 2.5336 | 2.4205 | 2.3343 | 2.2662 | 2.2107 |
| 40 | 4.0848 | 3.2317 | 2.8387 | 2.6060 | 2.4495 | 2.3359 | 2.2490 | 2.1802 | 2.1240 |
| 60 | 4.0012 | 3.1504 | 2.7581 | 2.5252 | 2.3683 | 2.2540 | 2.1665 | 2.0970 | 2.0401 |
| 120 | 3.9201 | 3.0718 | 2.6802 | 2.4472 | 2.2900 | 2.1750 | 2.0867 | 2.0164 | 1.9588 |
| ∞ | 3.8415 | 2.9957 | 2.6049 | 2.3719 | 2.2141 | 2.0986 | 2.0096 | 1.9384 | 1.8000 |

Poisson 分配值 $P(X \leq c) = \sum_{x=0}^{c} e^{-\lambda} \frac{\lambda^x}{x!}$

| | $\lambda$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| $c$ | .10 | .20 | .30 | .40 | .50 | .60 | .70 | .80 | .90 | 1.00 |
| 0 | .905 | .819 | .741 | .670 | .607 | .549 | .497 | .449 | .407 | .368 |
| 1 | .995 | .982 | .963 | .938 | .910 | .878 | .844 | .809 | .772 | .736 |
| 2 | 1.000 | .999 | .996 | .992 | .986 | .977 | .966 | .953 | .937 | .920 |
| 3 | 1.000 | 1.000 | 1.000 | .999 | .998 | .997 | .994 | .991 | .987 | .981 |
| 4 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | .999 | .999 | .998 | .996 |
| 5 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | .999 |
| 6 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 |
| 7 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 |

| | $\lambda$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| $c$ | 1.10 | 1.20 | 1.30 | 1.40 | 1.50 | 1.60 | 1.70 | 1.80 | 1.90 | 2.00 |
| 0 | .333 | .301 | .273 | .247 | .223 | .202 | .183 | .165 | .150 | .135 |
| 1 | .699 | .663 | .627 | .592 | .558 | .525 | .493 | .463 | .434 | .406 |
| 2 | .900 | .879 | .857 | .833 | .809 | .783 | .757 | .731 | .704 | .677 |
| 3 | .974 | .966 | .957 | .946 | .934 | .921 | .907 | .891 | .875 | .857 |
| 4 | .995 | .992 | .989 | .986 | .981 | .976 | .970 | .964 | .956 | .947 |
| 5 | .999 | .998 | .998 | .997 | .996 | .994 | .992 | .990 | .987 | .983 |
| 6 | 1.000 | 1.000 | 1.000 | .999 | .999 | .999 | .998 | .997 | .997 | .995 |
| 7 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | .999 | .999 | .999 |
| 8 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 |
| 9 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 |