

私立臺北醫學院九十學年度第一學期期中考試(試)題紙

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|----|-----|---|------|-------------|----|----|
| 系級 | 科目 | 目 | 授課教師 | 考試日期 | 學號 | 姓名 |
| 保健 | 微積分 | | 潘力誠 | 81年1月11日第 節 | | |

※①請注意本試題共 2 張。如發現頁數不足及空白頁或缺印，應當場請求補齊，否則缺少部份概以零分計。
 ②每張試題卷務必填寫(學號)、(姓名)。

Q1. Find the volumes of the solids obtained by rotating the region bounded by $y=1-x^2, y=1+x^2, 0 \leq x \leq 1$ (10%)

Q2. Determine the length of $f(x)=\frac{1}{4}x^2 - \frac{1}{2}\ln x$ from $x=1$ to $x=e$. (10%)

Q3. Evaluate $\int_0^1 2xe^{x^2} dx$ (10%)

Q4. Evaluate $\int_0^{\sqrt{7}} 7x^3\sqrt{1+x^2} dx$ (10%)

Q5. Given the number x in the following table is normally distributed. Find intervals such that 99% of the area is included and $P(x \in [-0.1, 0.1])$ (10%)

| | | | | |
|--------|--------|--------|--------|--------|
| -1.633 | 0.542 | 0.250 | -0.166 | 0.032 |
| 1.114 | 0.882 | 1.265 | -0.202 | 0.151 |
| 1.151 | -1.210 | -0.927 | 0.425 | 0.290 |
| -1.939 | 0.891 | -0.227 | 0.602 | 0.873 |
| 0.385 | -0.649 | -0.577 | 0.237 | -0.289 |

Q6. Give data points: 0.01, 0.01, 0.96, 0.17, 0.04, 0.26, 0.43, 0.25, 0.23, 0.68. Find the mean, standard deviation and 95% confidence intervals. (10%)

Q7. As test for the HIV virus shows a positive result in 99% of all cases when the virus is actually present, and in 5% of all cases when the virus is not present (a false positive result). If such a test is administered to a randomly chosen individual, what is the probability that the test result is positive? We assume that the prevalence of the virus in the population is 1/200. (10%)

Q8. What is the probability that the offspring of a $Cc \times Cc$ cross is of genotype cc ? (10%)

Q9. We consider the flowering pea plants again. Suppose that 20 independent offspring result from $Cc \times Cc$ crosses. Find the probability that at most two offspring have white flowers. Compute the expected value and the variance of the number of offspring with white flowers. (10%)

Q10. Suppose that you obtain 50 independent offspring from a cross

$$Rr / Yy \times Rr / Yy$$

where 25 seeds are round yellow, 9 are round green, 12 are wrinkled yellow, and 4 wrinkled green. Find the probability of this outcome. (10%)

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| 系級 | 科目 | 授課教師 | 考試日期 | 學號 | 姓名 |
| 保健 | 微積分 | 潘力誠 | ____年____月____日第____節 | | |

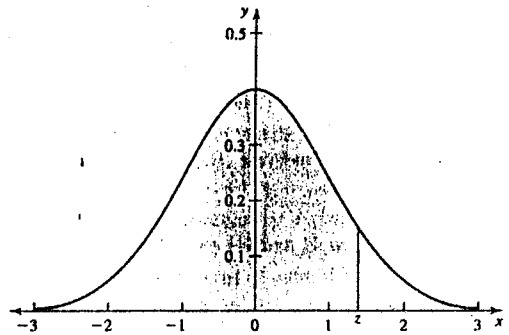
※①請注意本試題共 2 張。如發現頁數不足及空白頁或缺印，應當場請求補齊，否則缺少部份概以零分計。
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Q11. To study food preferences in the lady beetle *Coleomegilla maculata*, we present each beetle with three different food choices: maize pollen, egg masses of the European corn borer and aphids. We suspect that 20% of the time the beetle prefers the aphids, 35% of the time egg masses, and 45% of the time pollen. We carry out this experiment with 30 beetles, and find that 8 beetles prefer aphids, 10 egg masses, and 12 pollen. Compute the probability of this event, assuming that the trials are independent. (10%)

Q12. Give 5 experital data points. (60,61) (63,63) (68,67) (70,72) (75,74) Find a linea regression model to represent those data and coefficient of determination r^2 . (10%)

B TABLE OF THE STANDARD NORMAL DISTRIBUTION

Areas under the Standard Normal Curve from $-\infty$ to z (see Figure B.1).



◀ Figure B.1

| z | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|-----|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0.0 | .5000 | .5040 | .5080 | .5120 | .5160 | .5199 | .5239 | .5279 | .5319 | .5359 |
| 0.1 | .5398 | .5438 | .5478 | .5517 | .5557 | .5596 | .5636 | .5675 | .5714 | .5754 |
| 0.2 | .5793 | .5832 | .5871 | .5910 | .5948 | .5987 | .6026 | .6064 | .6103 | .6141 |
| 0.3 | .6179 | .6217 | .6255 | .6293 | .6331 | .6368 | .6406 | .6443 | .6480 | .6517 |
| 0.4 | .6554 | .6591 | .6628 | .6664 | .6700 | .6736 | .6772 | .6808 | .6844 | .6879 |
| 0.5 | .6915 | .6950 | .6985 | .7019 | .7054 | .7088 | .7123 | .7157 | .7190 | .7224 |
| 0.6 | .7258 | .7291 | .7324 | .7357 | .7389 | .7422 | .7454 | .7486 | .7518 | .7549 |
| 0.7 | .7580 | .7612 | .7642 | .7673 | .7704 | .7734 | .7764 | .7794 | .7823 | .7852 |
| 0.8 | .7881 | .7910 | .7939 | .7967 | .7996 | .8023 | .8051 | .8078 | .8106 | .8133 |
| 0.9 | .8159 | .8186 | .8212 | .8238 | .8264 | .8289 | .8315 | .8340 | .8365 | .8389 |
| 1.0 | .8413 | .8438 | .8461 | .8485 | .8508 | .8531 | .8554 | .8577 | .8599 | .8621 |
| 1.1 | .8643 | .8665 | .8686 | .8708 | .8729 | .8749 | .8770 | .8790 | .8810 | .8830 |
| 1.2 | .8849 | .8869 | .8888 | .8907 | .8925 | .8944 | .8962 | .8980 | .8997 | .9015 |
| 1.3 | .9032 | .9049 | .9065 | .9082 | .9099 | .9115 | .9131 | .9147 | .9162 | .9177 |
| 1.4 | .9192 | .9207 | .9222 | .9236 | .9251 | .9265 | .9279 | .9292 | .9306 | .9319 |
| 1.5 | .9332 | .9345 | .9357 | .9370 | .9382 | .9394 | .9406 | .9418 | .9429 | .9441 |
| 1.6 | .9452 | .9463 | .9474 | .9484 | .9495 | .9505 | .9515 | .9525 | .9535 | .9545 |
| 1.7 | .9554 | .9564 | .9573 | .9582 | .9591 | .9599 | .9608 | .9616 | .9625 | .9633 |
| 1.8 | .9641 | .9649 | .9656 | .9664 | .9671 | .9678 | .9686 | .9693 | .9699 | .9706 |
| 1.9 | .9713 | .9719 | .9726 | .9732 | .9738 | .9744 | .9750 | .9756 | .9761 | .9767 |
| 2.0 | .9772 | .9778 | .9783 | .9788 | .9793 | .9798 | .9803 | .9808 | .9812 | .9817 |
| 2.1 | .9821 | .9826 | .9830 | .9834 | .9838 | .9842 | .9846 | .9850 | .9854 | .9857 |
| 2.2 | .9861 | .9864 | .9868 | .9871 | .9875 | .9878 | .9881 | .9884 | .9887 | .9890 |
| 2.3 | .9893 | .9896 | .9898 | .9901 | .9904 | .9906 | .9909 | .9911 | .9913 | .9916 |
| 2.4 | .9918 | .9920 | .9922 | .9925 | .9927 | .9929 | .9931 | .9932 | .9934 | .9936 |
| 2.5 | .9938 | .9940 | .9941 | .9943 | .9945 | .9946 | .9948 | .9949 | .9951 | .9952 |
| 2.6 | .9953 | .9955 | .9956 | .9957 | .9959 | .9960 | .9961 | .9962 | .9963 | .9964 |
| 2.7 | .9965 | .9966 | .9967 | .9968 | .9969 | .9970 | .9971 | .9972 | .9973 | .9974 |
| 2.8 | .9974 | .9975 | .9976 | .9977 | .9977 | .9978 | .9979 | .9979 | .9980 | .9981 |
| 2.9 | .9981 | .9982 | .9982 | .9983 | .9984 | .9984 | .9985 | .9985 | .9986 | .9986 |

Revised:

Q1. Find the volumes of the solids obtained by rotating the region bounded by given curves about x-axis. $y=1-x^2, y=1+x^2, 0 \leq x \leq 1$ (10%)

