2017 年真题参考答案

一、选择题

(1)A.　(2)C.　(3)D.　(4)C.　(5)A.　(6)B.　(7)A.　(8)B.

二、填空题

(9)0.　(10)$e^{-x}(C_1\cos\sqrt{2}x+C_2\sin\sqrt{2}x)$.　(11)$-1$.　(12)$\dfrac{1}{(1+x)^2}$.　(13)2.　(14)2.

三、解答题

(15)$\left.\dfrac{dy}{dx}\right|_{x=0}=f_1'(1,1)$,$\left.\dfrac{d^2y}{dx^2}\right|_{x=0}=f_{11}''(1,1)+f_1'(1,1)-f_2'(1,1)$.

(16)$\dfrac{1}{4}$.

(17)极大值为 $y(1)=1$,极小值为 $y(-1)=0$.

(18)证明略.

(19)(Ⅰ)$\begin{cases}x^2+y^2=2x,\\ z=0;\end{cases}$

(Ⅱ)64.

(20)(Ⅰ)证明略;

(Ⅱ)$\boldsymbol{x}=c(1,2,-1)^{\mathrm{T}}+(1,1,1)^{\mathrm{T}}$,$c$ 为任意常数.

(21)$a=2$,$\boldsymbol{Q}=\begin{pmatrix}-\dfrac{1}{\sqrt{2}} & \dfrac{1}{\sqrt{3}} & \dfrac{1}{\sqrt{6}}\\ 0 & -\dfrac{1}{\sqrt{3}} & \dfrac{2}{\sqrt{6}}\\ \dfrac{1}{\sqrt{2}} & \dfrac{1}{\sqrt{3}} & \dfrac{1}{\sqrt{6}}\end{pmatrix}$.

(22)(Ⅰ)$\dfrac{4}{9}$;

(Ⅱ)$f_Z(z)=\begin{cases}z, & 0<z<1,\\ z-2, & 2<z<3,\\ 0, & \text{其他}.\end{cases}$

(23)(Ⅰ)$f_{Z_1}(z)=\begin{cases}\sqrt{\dfrac{2}{\pi}}\dfrac{1}{\sigma}e^{-\frac{z^2}{2\sigma^2}}, & z>0,\\ 0, & z\leqslant 0;\end{cases}$

(Ⅱ)$\hat{\sigma}=\sqrt{\dfrac{\pi}{2}}\overline{Z}$,其中 $\overline{Z}=\dfrac{1}{n}\sum\limits_{i=1}^{n}Z_i$;

(Ⅲ)$\hat{\sigma}=\sqrt{\dfrac{1}{n}\sum\limits_{i=1}^{n}Z_i^2}$.