

[illegible]

9. ①  $f(x) = \begin{cases} x-1, & x \leq 0 \\ x+1, & 0 \leq x \leq 2 \\ x-1, & x \geq 2 \end{cases}$   
 ②  $x \leq x-1$  时,  $f(x-1) = x$   
 ③  $x \in [0, 2]$  时,  $f(x) = x+1$   
 ④  $x \geq x-1$  时,  $f(x) = x-1$   
 ⑤  $f(x) = f(x-1)$  时,  $f(x)$  有以 1 为周期的性质.  
 ⑥  $0 \leq x-1 \leq 2$  且  $0 \leq x \leq 2$  时,  $f(x-1) = x+1$   
 ⑦  $0 \leq x \leq 2$  时,  $f(x) = x+1$ , 此时  $f(x-1) = x+1$   
 综上所述,  $f(x-1) = x+1$ .  
 ⑧ ⑨ ⑩ ⑪ ⑫ ⑬ ⑭ ⑮ ⑯ ⑰ ⑱ ⑲ ⑳ ㉑ ㉒ ㉓ ㉔ ㉕ ㉖ ㉗ ㉘ ㉙ ㉚ ㉛ ㉜ ㉝ ㉞ ㉟ ㊱ ㊲ ㊳ ㊴ ㊵ ㊶ ㊷ ㊸ ㊹ ㊺ ㊻ ㊼ ㊽ ㊾ ㊿ ㏀ ㏁ ㏂ ㏃ ㏄ ㏅ ㏆ ㏇ ㏈ ㏉ ㏊ ㏋ ㏌ ㏍ ㏎ ㏏ ㏐ ㏑ ㏒ ㏓ ㏔ ㏕ ㏖ ㏗ ㏘ ㏙ ㏚ ㏛ ㏜ ㏝ ㏞ ㏟ ㏠ ㏡ ㏢ ㏣ ㏤ ㏥ ㏦ ㏧ ㏨ ㏩ ㏪ ㏫ ㏬ ㏭ ㏮ ㏯ ㏰ ㏱ ㏲ ㏳ ㏴ ㏵ ㏶ ㏷ ㏸ ㏹ ㏺ ㏻ ㏼ ㏽ ㏾ ㏿ 㐀 㐁 㐂 㐃 㐄 㐅 㐆 㐇 㐈 㐉 㐊 㐋 㐌 㐍 㐎 㐏 㐐 㐑 㐒 㐓 㐔 㐕 㐖 㐗 㐘 㐙 㐚 㐛 㐜 㐝 㐞 㐟 㐠 㐡 㐢 㐣 㐤 㐥 㐦 㐧 㐨 㐩 㐪 㐫 㐬 㐭 㐮 㐯 㐰 㐱 㐲 㐳 㐴 㐵 㐶 㐷 㐸 㐹 㐺 㐻 㐼 㐽 㐾 㐿 㑀 㑁 㑂 㑃 㑄 㑅 㑆 㑇 㑈 㑉 㑊 㑋 㑌 㑍 㑎 㑏 㑐 㑑 㑒 㑓 㑔 㑕 㑖 㑗 㑘 㑙 㑚 㑛 㑜 㑝 㑞 㑟 㑠 㑡 㑢 㑣 㑤 㑥 㑦 㑧 㑨 㑩 㑪 㑫 㑬 㑭 㑮 㑯 㑰 㑱 㑲 㑳 㑴 㑵 㑶 㑷 㑸 㑹 㑺 㑻 㑼 㑽 㑾 㑿 㒀 㒁 㒂 㒃 㒄 㒅 㒆 㒇 㒈 㒉 㒊 㒋 㒌 㒍 㒎 㒏 㒐 㒑 㒒 㒓 㒔 㒕 㒖 㒗 㒘 㒙 㒚 㒛 㒜 㒝 㒞 㒟 㒠 㒡 㒢 㒣 㒤 㒥 㒦 㒧 㒨 㒩 㒪 㒫 㒬 㒭 㒮 㒯 㒰 㒱 㒲 㒳 㒴 㒵 㒶 㒷 㒸 㒹 㒺 㒻 㒼 㒽 㒾 㒿 㓀 㓁 㓂 㓃 㓄 㓅 㓆 㓇 㓈 㓉 㓊 㓋 㓌 㓍 㓎 㓏 㓐 㓑 㓒 㓓 㓔 㓕 㓖 㓗 㓘 㓙 㓚 㓛 㓜 㓝 㓞 㓟 㓠 㓡 㓢 㓣 㓤 㓥 㓦 㓧 㓨 㓩 㓪 㓫 㓬 㓭 㓮 㓯 㓰 㓱 㓲 㓳 㓴 㓵 㓶 㓷 㓸 㓹 㓺 㓻 㓼 㓽 㓾 㓿 㔀 㔁 㔂 㔃 㔄 㔅 㔆 㔇 㔈 㔉 㔊 㔋 㔌 㔍 㔎 㔏 㔐 㔑 㔒 㔓 㔔 㔕 㔖 㔗 㔘 㔙 㔚 㔛 㔜 㔝 㔞 㔟 㔠 㔡 㔢 㔣 㔤 㔥 㔦 㔧 㔨 㔩 㔪 㔫 㔬 㔭 㔮 㔯 㔰 㔱 㔲 㔳 㔴 㔵 㔶 㔷 㔸 㔹 㔺 㔻 㔼 㔽 㔾 㔿 㕀 㕁 㕂 㕃 㕄 㕅 㕆 㕇 㕈 㕉 㕊 㕋 㕌 㕍 㕎 㕏 㕐 㕑 㕒 㕓 㕔 㕕 㕖 㕗 㕘 㕙 㕚 㕛 㕜 㕝 㕞 㕟 㕠 㕡 㕢 㕣 㕤 㕥 㕦 㕧 㕨 㕩 㕪 㕫 㕬 㕭 㕮 㕯 㕰 㕱 㕲 㕳 㕴 㕵 㕶 㕷 㕸 㕹 㕺 㕻 㕼 㕽 㕾 㕿 㖀 㖁 㖂 㖃 㖄 㖅 㖆 㖇 㖈 㖉 㖊 㖋 㖌 㖍 㖎 㖏 㖐 㖑 㖒 㖓 㖔 㖕 㖖 㖗 㖘 㖙 㖚 㖛 㖜 㖝 㖞 㖟 㖠 㖡 㖢 㖣 㖤 㖥 㖦 㖧 㖨 㖩 㖪 㖫 㖬 㖭 㖮 㖯 㖰 㖱 㖲 㖳 㖴 㖵 㖶 㖷 㖸 㖹 㖺 㖻 㖼 㖽 㖾 㖿 㗀 㗁 㗂 㗃 㗄 㗅 㗆 㗇 㗈 㗉 㗊 㗋 㗌 㗍 㗎 㗏 㗐 㗑 㗒 㗓 㗔 㗕 㗖 㗗 㗘 㗙 㗚 㗛 㗜 㗝 㗞 㗟 㗠 㗡 㗢 㗣 㗤 㗥 㗦 㗧 㗨 㗩 㗪 㗫 㗬 㗭 㗮 㗯 㗰 㗱 㗲 㗳 㗴 㗵 㗶 㗷 㗸 㗹 㗺 㗻 㗼 㗽 㗾 㗿 㘀 㘁 㘂 㘃 㘄 㘅 㘆 㘇 㘈 㘉 㘊 㘋 㘌 㘍 㘎 㘏 㘐 㘑 㘒 㘓 㘔 㘕 㘖 㘗 㘘 㘙 㘚 㘛 㘜 㘝 㘞 㘟 㘠 㘡 㘢 㘣 㘤 㘥 㘦 㘧 㘨 㘩 㘪 㘫 㘬 㘭 㘮 㘯 㘰 㘱 㘲 㘳 㘴 㘵 㘶 㘷 㘸 㘹 㘺 㘻 㘼 㘽 㘾 㘿 㙀 㙁 㙂 㙃 㙄 㙅 㙆 㙇 㙈 㙉 㙊 㙋 㙌 㙍 㙎 㙏 㙐 㙑 㙒 㙓 㙔 㙕 㙖 㙗 㙘 㙙 㙚 㙛 㙜 㙝 㙞 㙟 㙠 㙡 㙢 㙣 㙤 㙥 㙦 㙧 㙨 㙩 㙪 㙫 㙬 㙭 㙮 㙯 㙰 㙱 㙲 㙳 㙴 㙵 㙶 㙷 㙸 㙹 㙺 㙻 㙼 㙽 㙾 㙿 㚀 㚁 㚂 㚃 㚄 㚅 㚆 㚇 㚈 㚉 㚊 㚋 㚌 㚍 㚎 㚏 㚐 㚑 㚒 㚓 㚔 㚕 㚖 㚗 㚘 㚙 㚚 㚛 㚜 㚝 㚞 㚟 㚠 㚡 㚢 㚣 㚤 㚥 㚦 㚧 㚨 㚩 㚪 㚫 㚬 㚭 㚮 㚯 㚰 㚱 㚲 㚳 㚴 㚵 㚶 㚷 㚸 㚹 㚺 㚻 㚼 㚽 㚾 㚿 㜀 㜁 㜂 㜃 㜄 㜅 㜆 㜇 㜈 㜉 㜊 㜋 㜌 㜍 㜎 㜏 㜐 㜑 㜒 㜓 㜔 㜕 㜖 㜗 㜘 㜙 㜚 㜛 㜜 㜝 㜞 㜟 㜠 㜡 㜢 㜣 㜤 㜥 㜦 㜧 㜨 㜩 㜪 㜫 㜬 㜭 㜮 㜯 㜰 㜱 㜲 㜳 㜴 㜵 㜶 㜷 㜸 㜹 㜺 㜻 㜼 㜽 㜾 㜿 㝀 㝁 㝂 㝃 㝄 㝅 㝆 㝇 㝈 㝉 㝊 㝋 㝌 㝍 㝎 㝏 㝐 㝑 㝒 㝓 㝔 㝕 㝖 㝗 㝘 㝙 㝚 㝛 㝜 㝝 㝞 㝟 㝠 㝡 㝢 㝣 㝤 㝥 㝦 㝧 㝨 㝩 㝪 㝫 㝬 㝭 㝮 㝯 㝰 㝱 㝲 㝳 㝴 㝵 㝶 㝷 㝸 㝹 㝺 㝻 㝼 㝽 㝾

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9.29.

10.  $\lim_{x \rightarrow 0} \frac{e^{3x} - \cos(x)}{(1+x)^2} = 1$

11.  $\lim_{n \rightarrow \infty} \frac{2^{n+1} + 3^{n+1}}{2^n + 3^n} = 3$

12.  $\lim_{x \rightarrow 0} \frac{(1+x)^2 - 1}{x} = 2$

13.  $\lim_{x \rightarrow 1} \left( \frac{1}{x-1} - \frac{1}{x-1} \right) = 0$

14.  $\lim_{x \rightarrow 1} \left( \frac{1}{x-1} - \frac{1}{x-1} \right) = 0$

15.  $\lim_{x \rightarrow 1} \left( \frac{1}{x-1} - \frac{1}{x-1} \right) = 0$

16.  $\lim_{x \rightarrow 1} \left( \frac{1}{x-1} - \frac{1}{x-1} \right) = 0$

17.  $\lim_{x \rightarrow 1} \left( \frac{1}{x-1} - \frac{1}{x-1} \right) = 0$

18.  $\lim_{x \rightarrow 1} \left( \frac{1}{x-1} - \frac{1}{x-1} \right) = 0$

19.  $\lim_{x \rightarrow 1} \left( \frac{1}{x-1} - \frac{1}{x-1} \right) = 0$

20.  $\lim_{x \rightarrow 1} \left( \frac{1}{x-1} - \frac{1}{x-1} \right) = 0$

$\sqrt{3} \cdot \frac{\sqrt{6}}{2} = \frac{\sqrt{18}}{2}$

$\frac{\sqrt{18}}{2} = \frac{\sqrt{9 \cdot 2}}{2}$

$\frac{3\sqrt{2}}{2}$

$\frac{3\sqrt{2}}{2} + (-\frac{3\sqrt{2}}{2})$

$\frac{3\sqrt{2}}{2} - \frac{3\sqrt{2}}{2} = 0$

$\frac{3\sqrt{2}}{2} - \frac{3\sqrt{2}}{2}$

$\checkmark$

[illegible]

7.  $\lim_{x \rightarrow 0} \frac{2x^2 - 3x + 1}{x^2 + 2x - 3} = \frac{1}{-3}$   
 $\lim_{x \rightarrow 0} \frac{2x^2 - 3x + 1}{x^2 + 2x - 3} = \frac{1}{-3}$   
 $\lim_{x \rightarrow 0} \frac{2x^2 - 3x + 1}{x^2 + 2x - 3} = \frac{1}{-3}$   
 8.  $\lim_{x \rightarrow 0} \frac{\cos(2x) - \cos(x)}{x} = \frac{0}{0}$   
 $\lim_{x \rightarrow 0} \frac{\cos(2x) - \cos(x)}{x} = \frac{0}{0}$   
 $\lim_{x \rightarrow 0} \frac{\cos(2x) - \cos(x)}{x} = \frac{0}{0}$   
 9.  $\lim_{x \rightarrow 0} \frac{\arcsin(x)}{x} = \frac{0}{0}$   
 $\lim_{x \rightarrow 0} \frac{\arcsin(x)}{x} = \frac{0}{0}$   
 $\lim_{x \rightarrow 0} \frac{\arcsin(x)}{x} = \frac{0}{0}$   
 10.  $\lim_{x \rightarrow 0} \frac{1 - \cos(x)}{x^2} = \frac{0}{0}$   
 $\lim_{x \rightarrow 0} \frac{1 - \cos(x)}{x^2} = \frac{0}{0}$   
 $\lim_{x \rightarrow 0} \frac{1 - \cos(x)}{x^2} = \frac{0}{0}$   
 11.  $\lim_{x \rightarrow 0} \frac{\ln(\cos(x))}{x^2} = \frac{0}{0}$   
 $\lim_{x \rightarrow 0} \frac{\ln(\cos(x))}{x^2} = \frac{0}{0}$   
 $\lim_{x \rightarrow 0} \frac{\ln(\cos(x))}{x^2} = \frac{0}{0}$   
 12.  $\lim_{x \rightarrow 0} \frac{\ln(\cos(x))}{x^2} = \frac{0}{0}$   
 $\lim_{x \rightarrow 0} \frac{\ln(\cos(x))}{x^2} = \frac{0}{0}$   
 $\lim_{x \rightarrow 0} \frac{\ln(\cos(x))}{x^2} = \frac{0}{0}$

[illegible]

[illegible]

$$\begin{aligned} & \lim_{n \rightarrow \infty} \frac{\ln(n!) - \ln(n)}{n} \\ &= \lim_{n \rightarrow \infty} \frac{\ln(n!)}{n} - \lim_{n \rightarrow \infty} \frac{\ln(n)}{n} \\ &= \lim_{n \rightarrow \infty} \frac{\ln(n!)}{n} - 0 \\ &= \lim_{n \rightarrow \infty} \frac{\ln(n!)}{n} \end{aligned}$$

[illegible]

(5) 证明:  
 $\rightarrow$  证:  
 设  $f(x) = x^2 - 2x + 1$   $\times$   
 $\therefore f(x) = 0$  时,  $f(x) = 2$ , 即  $x^2 - 2x + 1 = 2$  等式不成立  
 若  $0 < x < 1$ ,  $g(x) = 1 - x$ ,  $g(x) = 0$  时,  $x = 1$ , 在区间  $(0, 1)$  内  
 证  $f(x)g(x) = 0$   
 $\therefore$  在  $(0, 1)$  上无零点  
 $f(x) = x^2 - 2x + 1$   
 $f(x) = 0 \Rightarrow x = 1$   
 $\therefore$  此函数在  $(0, 1)$  内必无零点

(6) 证明:  
 $\rightarrow$  证:  
 设  $f(x) = x^2 - 2x + 1$   $\times$  (若  $0 < x < 1$  则  $f(x) = 2$  等式不成立)  
 若  $1 < x < 2$  时,  $g(x) = 2 - x$ ,  $g(x) = 0$  时  $x = 2$  在区间  $(1, 2)$  内  
 $f(x) = x^2 - 2x + 1$  在  $(1, 2)$  内  $f(x) = 0$  时  $x = 1$   
 $f(x)g(x) = 0$   $\therefore$  在  $(1, 2)$  内必无零点  
 $\therefore$  在  $(0, 2)$  内无零点  
 若  $x > 2$  时  $g(x) = x - 2$ ,  $g(x) = 0$  时  $x = 2$  在区间  $(2, +\infty)$  内  
 $f(x) = x^2 - 2x + 1$  在  $(2, +\infty)$  内  $f(x) = 0$  时  $x = 1$   
 $f(x)g(x) = 0$   $\therefore$  在  $(2, +\infty)$  内必无零点  
 $\therefore$  在  $(0, +\infty)$  内无零点



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10月18日  
韦伟

①  $y = \frac{\ln(x^2 + 2x - 3)}{x^2}$

②  $y = \frac{1}{x^2} \ln(x^2 + 2x - 3)$

③  $y = \frac{1}{x^2} \ln(x^2 + 2x - 3)$

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㊿  $y = \frac{1}{x^2} \ln(x^2 + 2x - 3)$

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$y = C_1 e^{3x} + C_2 e^{-3x}$   
 $y' = 3C_1 e^{3x} - 3C_2 e^{-3x}$   
 $y'' = 9C_1 e^{3x} + 9C_2 e^{-3x}$   
 $6y = 6C_1 e^{3x} + 6C_2 e^{-3x}$   
 $y'' - y' = 6C_1 e^{3x} + 6C_2 e^{-3x} - 3C_1 e^{3x} + 3C_2 e^{-3x}$   
 $= 3C_1 e^{3x} + 9C_2 e^{-3x}$   
 $= 6y$   
 $y'' - y' - 6y = 0$

11月17日

每日一题

洛必达法则  $\lim_{x \rightarrow 0} \frac{x^2 + e^x}{\cos x} = 2$

(1) 原式  $\lim_{x \rightarrow 0} \frac{x^2 + e^x}{\cos x} = \frac{\lim_{x \rightarrow 0} (2x + e^x)}{\lim_{x \rightarrow 0} (-\sin x)}$

$\lim_{x \rightarrow 0} (2x + e^x) = 2$

$\lim_{x \rightarrow 0} (-\sin x) = 0$

(2) 原式  $\lim_{x \rightarrow 0} \frac{x^2 + e^x}{\cos x} = \frac{\lim_{x \rightarrow 0} (2x + e^x)}{\lim_{x \rightarrow 0} (-\sin x)}$

$\lim_{x \rightarrow 0} (2x + e^x) = 2$

$\lim_{x \rightarrow 0} (-\sin x) = 0$

(3) 原式  $\lim_{x \rightarrow 0} \frac{x^2 + e^x}{\cos x} = \frac{\lim_{x \rightarrow 0} (2x + e^x)}{\lim_{x \rightarrow 0} (-\sin x)}$

$\lim_{x \rightarrow 0} (2x + e^x) = 2$

$\lim_{x \rightarrow 0} (-\sin x) = 0$

(4) 原式  $\lim_{x \rightarrow 0} \frac{x^2 + e^x}{\cos x} = \frac{\lim_{x \rightarrow 0} (2x + e^x)}{\lim_{x \rightarrow 0} (-\sin x)}$

$\lim_{x \rightarrow 0} (2x + e^x) = 2$

$\lim_{x \rightarrow 0} (-\sin x) = 0$

(5) 原式  $\lim_{x \rightarrow 0} \frac{x^2 + e^x}{\cos x} = \frac{\lim_{x \rightarrow 0} (2x + e^x)}{\lim_{x \rightarrow 0} (-\sin x)}$

$\lim_{x \rightarrow 0} (2x + e^x) = 2$

$\lim_{x \rightarrow 0} (-\sin x) = 0$

(6) 原式  $\lim_{x \rightarrow 0} \frac{x^2 + e^x}{\cos x} = \frac{\lim_{x \rightarrow 0} (2x + e^x)}{\lim_{x \rightarrow 0} (-\sin x)}$

$\lim_{x \rightarrow 0} (2x + e^x) = 2$

$\lim_{x \rightarrow 0} (-\sin x) = 0$

(7) 原式  $\lim_{x \rightarrow 0} \frac{x^2 + e^x}{\cos x} = \frac{\lim_{x \rightarrow 0} (2x + e^x)}{\lim_{x \rightarrow 0} (-\sin x)}$

$\lim_{x \rightarrow 0} (2x + e^x) = 2$

$\lim_{x \rightarrow 0} (-\sin x) = 0$

$\lim_{x \rightarrow 0} \frac{2x + e^x}{-\sin x} = \frac{\lim_{x \rightarrow 0} (2 + e^x)}{\lim_{x \rightarrow 0} (-\cos x)}$

$\lim_{x \rightarrow 0} (2 + e^x) = 3$

$\lim_{x \rightarrow 0} (-\cos x) = -1$

$\lim_{x \rightarrow 0} \frac{2x + e^x}{-\sin x} = \frac{3}{-1} = -3$

$\lim_{x \rightarrow 0} \frac{x^2 + e^x}{\cos x} = -3$

[illegible]

[illegible]

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[illegible]

[illegible]

①)  $y = \frac{1 - \cos x}{x} \quad (0/0)$

$$\lim_{x \rightarrow 0} \frac{1 - \cos x}{x} = \frac{1 - \cos x}{x} \cdot \frac{1 + \cos x}{1 + \cos x} = \frac{1 - \cos^2 x}{x(1 + \cos x)} = \frac{\sin^2 x}{x(1 + \cos x)}$$

令  $y = \sin x$

$$\lim_{x \rightarrow 0} \frac{\sin^2 x}{x(1 + \cos x)} = 0/0 \quad \checkmark$$

取  $x = \sin x$  则  $\lim_{x \rightarrow 0} \frac{\sin^2 x}{x(1 + \cos x)} = 0$

②)  $\lim_{x \rightarrow 0} \frac{1 - \cos x}{x} = 0$

取  $x = \sin x$  则  $\lim_{x \rightarrow 0} \frac{1 - \cos x}{x} = 0$

(3)  $y = e^{\frac{1}{x}} + 1$

$$\lim_{x \rightarrow 0^+} (e^{\frac{1}{x}} + 1) = +\infty$$

取  $x = \frac{1}{n}$  则  $\lim_{x \rightarrow 0^+} (e^{\frac{1}{x}} + 1) = +\infty$

④)  $y = e^{\frac{1}{x}} + 1$

$$\lim_{x \rightarrow 0^+} (e^{\frac{1}{x}} + 1) = +\infty$$

取  $x = \frac{1}{n}$  则  $\lim_{x \rightarrow 0^+} (e^{\frac{1}{x}} + 1) = +\infty$

⑤)  $y = e^{\frac{1}{x}} + 1$

$$\lim_{x \rightarrow 0^+} (e^{\frac{1}{x}} + 1) = +\infty$$

取  $x = \frac{1}{n}$  则  $\lim_{x \rightarrow 0^+} (e^{\frac{1}{x}} + 1) = +\infty$

⑥)  $y = e^{\frac{1}{x}} + 1$

$$\lim_{x \rightarrow 0^+} (e^{\frac{1}{x}} + 1) = +\infty$$

取  $x = \frac{1}{n}$  则  $\lim_{x \rightarrow 0^+} (e^{\frac{1}{x}} + 1) = +\infty$

⑦)  $y = e^{\frac{1}{x}} + 1$

$$\lim_{x \rightarrow 0^+} (e^{\frac{1}{x}} + 1) = +\infty$$

取  $x = \frac{1}{n}$  则  $\lim_{x \rightarrow 0^+} (e^{\frac{1}{x}} + 1) = +\infty$

⑧)  $y = e^{\frac{1}{x}} + 1$

$$\lim_{x \rightarrow 0^+} (e^{\frac{1}{x}} + 1) = +\infty$$

取  $x = \frac{1}{n}$  则  $\lim_{x \rightarrow 0^+} (e^{\frac{1}{x}} + 1) = +\infty$

⑨)  $y = e^{\frac{1}{x}} + 1$

$$\lim_{x \rightarrow 0^+} (e^{\frac{1}{x}} + 1) = +\infty$$

取  $x = \frac{1}{n}$  则  $\lim_{x \rightarrow 0^+} (e^{\frac{1}{x}} + 1) = +\infty$

⑩)  $y = e^{\frac{1}{x}} + 1$

$$\lim_{x \rightarrow 0^+} (e^{\frac{1}{x}} + 1) = +\infty$$

取  $x = \frac{1}{n}$  则  $\lim_{x \rightarrow 0^+} (e^{\frac{1}{x}} + 1) = +\infty$

[illegible]

⑧ 验证结果与 (10)

$$W(0) = 5Q - 2(0)$$

$$= 5 \cdot 1000 - 0 = 5000$$

$$W'(Q) = 5 - 0.001Q$$

令  $W'(Q) = 0$ , 得  $Q = 5000$

故产量为 5000 时

⑨ 解:  $\therefore R = 10Q - Q^2 \therefore P = 7 - Q$

由图可知:

产量  $Q = 7 \times 300 = 2100$

有利润  $2100 = 2100 = 7 \times 300$

故  $P = 7 - 300 = -293$

这不符合,  $-Q = 1000 - 300$

$$\therefore P = 7 - 1000 = -993$$

$$W \times R = Q \cdot (-\frac{Q}{100} + 10)$$

$$= -\frac{Q^2}{100} + 10Q$$

$$\therefore R'(Q) = -\frac{2Q}{100} + 10$$

∴ 进 100 件  $R'(100) = 9.8$

故  $R(100) = 9.8$

故进 100 件  $R(100) = 9.8$

[illegible]

[illegible]

[illegible]

(1)  $\int_0^1 (x^2 + 2x + 1) dx = \left[ \frac{1}{3}x^3 + x^2 + x \right]_0^1 = \frac{1}{3} + 1 + 1 = \frac{7}{3}$   
 (2)  $\int_0^1 (x^2 + 2x + 1) dx = \left[ \frac{1}{3}x^3 + x^2 + x \right]_0^1 = \frac{1}{3} + 1 + 1 = \frac{7}{3}$   
 (3)  $\int_0^1 (x^2 + 2x + 1) dx = \left[ \frac{1}{3}x^3 + x^2 + x \right]_0^1 = \frac{1}{3} + 1 + 1 = \frac{7}{3}$   
 (4)  $\int_0^1 (x^2 + 2x + 1) dx = \left[ \frac{1}{3}x^3 + x^2 + x \right]_0^1 = \frac{1}{3} + 1 + 1 = \frac{7}{3}$   
 (5)  $\int_0^1 (x^2 + 2x + 1) dx = \left[ \frac{1}{3}x^3 + x^2 + x \right]_0^1 = \frac{1}{3} + 1 + 1 = \frac{7}{3}$   
 (6)  $\int_0^1 (x^2 + 2x + 1) dx = \left[ \frac{1}{3}x^3 + x^2 + x \right]_0^1 = \frac{1}{3} + 1 + 1 = \frac{7}{3}$   
 (7)  $\int_0^1 (x^2 + 2x + 1) dx = \left[ \frac{1}{3}x^3 + x^2 + x \right]_0^1 = \frac{1}{3} + 1 + 1 = \frac{7}{3}$   
 (8)  $\int_0^1 (x^2 + 2x + 1) dx = \left[ \frac{1}{3}x^3 + x^2 + x \right]_0^1 = \frac{1}{3} + 1 + 1 = \frac{7}{3}$   
 (9)  $\int_0^1 (x^2 + 2x + 1) dx = \left[ \frac{1}{3}x^3 + x^2 + x \right]_0^1 = \frac{1}{3} + 1 + 1 = \frac{7}{3}$   
 (10)  $\int_0^1 (x^2 + 2x + 1) dx = \left[ \frac{1}{3}x^3 + x^2 + x \right]_0^1 = \frac{1}{3} + 1 + 1 = \frac{7}{3}$

[illegible]



$$\begin{aligned} \text{(5) 令 } x &= 3 \sec \theta, \text{ 则 } dx = 3 \sec \theta \tan \theta d\theta \\ \text{原式} &= \int \frac{3 \sec \theta}{3 \sec \theta} + 3 \sec \theta \tan \theta d\theta \\ &= \int \tan \theta d\theta \\ &= \int \frac{\sin \theta}{\cos \theta} d\theta = -\ln |\cos \theta| \\ &= -\ln |\cos \theta| + C \\ \text{因为 } \frac{1}{\sec \theta} &= \cos \theta = \frac{1}{\sec \theta} = \frac{1}{\frac{x}{3}} = \frac{3}{x} \\ \text{所以 } \cos \theta &= \frac{3}{x} \\ &= -\ln \frac{3}{x} = -\ln 3 + \ln x = \ln x + C \end{aligned}$$

$$\begin{aligned} (1) \text{ 令 } x &= \sin \theta, \text{ 则 } dx = \cos \theta d\theta \\ Kx &= \int \frac{\cos \theta \cdot \cos \theta}{\sin \theta \cdot \cos \theta} d\theta \\ &= \int \frac{\cos \theta}{\sin \theta} d\theta = \ln |\sin \theta| + C \\ &= \ln |x| + C \end{aligned}$$

[illegible]

$$\begin{aligned} \text{1-)} & \quad 2x = 2 \cos \theta, \quad dx = -2 \sin \theta \, d\theta \\ & \quad \int_{\theta=\frac{\pi}{2}}^{\theta=\frac{3\pi}{2}} \frac{1}{4 \sin \theta} \cdot 2 \cos \theta \, d\theta \\ & = \int_{\frac{\pi}{2}}^{\frac{3\pi}{2}} \frac{\cos \theta}{2 \sin \theta} \, d\theta \\ & = \frac{1}{2} \int_{\frac{\pi}{2}}^{\frac{3\pi}{2}} \frac{1}{\sin \theta} \, d\theta \\ & = \frac{1}{2} \int_{\frac{\pi}{2}}^{\frac{3\pi}{2}} \csc \theta \, d\theta \\ & = -\frac{1}{2} \ln |\csc \theta + \cot \theta| + C \\ & \quad \text{at } x = 2 \cos \theta \\ & \quad \text{at } \theta = \frac{\pi}{2} \quad \csc \theta = 2, \quad \cot \theta = 0 \\ & \quad \text{at } \theta = \frac{3\pi}{2} \quad \csc \theta = -\frac{1}{2}, \quad \cot \theta = 0 \\ & \quad \text{at } \theta = \frac{3\pi}{2} \quad \csc \theta = -\frac{1}{2}, \quad \cot \theta = 0 \\ & \quad \text{at } \theta = \frac{3\pi}{2} \quad \csc \theta = -\frac{1}{2}, \quad \cot \theta = 0 \\ & \quad \text{at } \theta = \frac{3\pi}{2} \quad \csc \theta = -\frac{1}{2}, \quad \cot \theta = 0 \end{aligned}$$

$$\begin{aligned} (2) \text{ 令 } u &= \sqrt{x}, \quad x = u^2 \Rightarrow dx = 2u \, du \\ \text{则 } \int \frac{1}{\sqrt{x}} dx &= \int \frac{2u}{u^2} du \\ &= \int \frac{2}{u} du = 2 \int \frac{1}{u} du \\ &= 2 \ln |u| + C \\ &= 2 \ln \sqrt{x} + C \\ &= \ln x + C \end{aligned}$$

[illegible]

[illegible]

(7)  $\int_0^1 x^2 + x e^{x^2}$   
 $= \frac{1}{3} x^3 + \frac{1}{2} \int_0^1 2x e^{x^2} dx$   
 $= \frac{1}{3} x^3 + \frac{1}{2} e^{x^2} \Big|_0^1 + C$

(8)  $\int_0^1 x \arcsin(x) dx$   
 $= x \arcsin(x) - \int_0^1 \frac{x}{\sqrt{1-x^2}} dx$   
 $= x \arcsin(x) - \frac{1}{2} \int_0^1 \frac{1}{\sqrt{1-x^2}} dx$   
 $= x \arcsin(x) - \frac{1}{2} \left( \frac{1}{2} \ln |1-x^2| \right) + C$

(9)  $\int_0^{\pi/2} \ln x \sin x dx$   
 $= \ln x \sin x - \int_0^{\pi/2} \sin x dx$   
 $= \ln x \sin x - \frac{\cos x}{-1} \Big|_0^{\pi/2}$   
 $= \ln x \sin x - \cos x \Big|_0^{\pi/2} = \cos(\pi/2) - \cos(0) = -1$

(10)  $\int_0^{\pi/2} x^2 \sin x dx$   
 $= -x^2 \cos x + \int_0^{\pi/2} 2x \cos x dx$   
 $= -x^2 \cos x + 2 \int_0^{\pi/2} x \cos x dx$   
 $= -x^2 \cos x + 2 \left( x \sin x - \int_0^{\pi/2} \sin x dx \right)$   
 $= -x^2 \cos x + 2x \sin x + 2 \cos x \Big|_0^{\pi/2} = 2 \cos(\pi/2) - 2 \cos(0) = -2$

[illegible]

[illegible]

$$\begin{aligned} \text{Ans: } & \left( \frac{1}{1+x} - \frac{1}{(1+x)^2} \right) e^x = \frac{e^x}{1+x} + C \\ & = \int \frac{1}{1+x} dx - \int \frac{1}{(1+x)^2} dx \\ & = \int \frac{1}{1+x} dx - \int \frac{u^{-2}}{du} du \\ & = \frac{e^x}{1+x} - \int \frac{1}{u} du + \int \frac{e^x}{1+x} dx \\ & = \frac{e^x}{1+x} + \int \frac{1}{1+x} dx - \int \frac{1}{1+x} dx \end{aligned}$$

[illegible]

1. 求下列函数的导数: 高数课本 P104 例 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836,

下式を \$x\$ の関数として整理する。

①  $f(x) = 2x^2 + 2x + 1$

②  $f(x) = 2x^2 + 2x + 1$

③  $f(x) = 2x^2 + 2x + 1$

④  $f(x) = 2x^2 + 2x + 1$

⑤  $f(x) = 2x^2 + 2x + 1$

⑥  $f(x) = 2x^2 + 2x + 1$

⑦  $f(x) = 2x^2 + 2x + 1$

⑧  $f(x) = 2x^2 + 2x + 1$

⑨  $f(x) = 2x^2 + 2x + 1$

⑩  $f(x) = 2x^2 + 2x + 1$

⑪  $f(x) = 2x^2 + 2x + 1$

⑫  $f(x) = 2x^2 + 2x + 1$

⑬  $f(x) = 2x^2 + 2x + 1$

⑭  $f(x) = 2x^2 + 2x + 1$

⑮  $f(x) = 2x^2 + 2x + 1$

⑯  $f(x) = 2x^2 + 2x + 1$

⑰  $f(x) = 2x^2 + 2x + 1$

⑱  $f(x) = 2x^2 + 2x + 1$

⑲  $f(x) = 2x^2 + 2x + 1$

⑳  $f(x) = 2x^2 + 2x + 1$

㉑  $f(x) = 2x^2 + 2x + 1$

㉒  $f(x) = 2x^2 + 2x + 1$

㉓  $f(x) = 2x^2 + 2x + 1$

㉔  $f(x) = 2x^2 + 2x + 1$

㉕  $f(x) = 2x^2 + 2x + 1$

㉖  $f(x) = 2x^2 + 2x + 1$

㉗  $f(x) = 2x^2 + 2x + 1$

㉘  $f(x) = 2x^2 + 2x + 1$

㉙  $f(x) = 2x^2 + 2x + 1$

㉚  $f(x) = 2x^2 + 2x + 1$

㉛  $f(x) = 2x^2 + 2x + 1$

㉜  $f(x) = 2x^2 + 2x + 1$

㉝  $f(x) = 2x^2 + 2x + 1$

㉞  $f(x) = 2x^2 + 2x + 1$

㉟  $f(x) = 2x^2 + 2x + 1$

㊱  $f(x) = 2x^2 + 2x + 1$

㊲  $f(x) = 2x^2 + 2x + 1$

㊳  $f(x) = 2x^2 + 2x + 1$

㊴  $f(x) = 2x^2 + 2x + 1$

㊵  $f(x) = 2x^2 + 2x + 1$

㊶  $f(x) = 2x^2 + 2x + 1$

㊷  $f(x) = 2x^2 + 2x + 1$

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㊽  $f(x) = 2x^2 + 2x + 1$

㊾  $f(x) = 2x^2 + 2x + 1$

㊿  $f(x) = 2x^2 + 2x + 1$

例 12 例 21  
 5-1.  
 解: (1)  $\frac{d}{dx} x^2 + 1 = \frac{d}{dx} x^2 + 1$   
 (2)  $- \sin x + 3$   
 (3)  $\frac{d}{dx} x^2 + 1$   
 (4)  $\frac{d}{dx} 2 \ln(x+1)$   
 例 13: (1)  $y = \frac{1}{x} \ln x$ , 求导  
 $(\frac{1}{x} \ln x)' = \frac{1}{x} \ln x - \frac{1}{x^2}$   
 (2)  $y = \sin x + \cos x$ , 求导  
 $(\sin x + \cos x)' = \cos x - \sin x$   
 例 14: (1)  $f(x) = \frac{x}{x^2+1} + \ln(1 + \frac{x}{x^2+1})$   
 $= \frac{x}{x^2+1} + \ln(1 + \frac{x}{x^2+1})$   
 $= \frac{x}{x^2+1} + \ln(1 + \frac{x}{x^2+1})$   
 (2)  $f(x) = \frac{1}{2} (\ln x)^2 + x \ln x$   
 $= x (\ln x + \frac{1}{x})$   
 例 15: 求导:  $f(x) = 1, f'(x) = 0, f''(x) = 0$   
 $\int f(x) dx = \int 0 dx = 0 + C$   
 $\int f(x) dx = \int 0 dx = 0 + C$   
 $\int f(x) dx = \int 0 dx = 0 + C$   
 $\int f(x) dx = \int 0 dx = 0 + C$

[illegible]

[illegible]

1. Trigonometrische Funktionen

2. Winkel

3. Einheitskreis

4. Winkeladdition

5. Winkelsubtraktion

6. Winkelmultiplikation

7. Winkeldivision

8. Winkelpotenz

9. Winkellogarithmus

10. Winkelabsolut

11. Winkelrelativ

12. Winkelabsolut

13. Winkelrelativ

14. Winkelabsolut

15. Winkelrelativ

16. Winkelabsolut

17. Winkelrelativ

18. Winkelabsolut

19. Winkelrelativ

20. Winkelabsolut

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