错题锻炼 8.31

-- 题目打印版 --

[x] Each question on one page

[x] Answers at the end

[x] 53 questions + 8 comprehensive

Training 1: Limit Calculation Compound Traps

Focus: Limit with integral + Hidden piecewise + e definition

Q 1.1【★★】

lim_{x->0} [integral_0^x |t| sin(t) dt] / x^3

Integral contains |t| -> hidden piecewise; x at limit -> type 1

--- Write Your Answer Here ---

Training 1: Limit Calculation Compound Traps

Focus: Limit with integral + Hidden piecewise + e definition

Q 1.2【★★】

lim_{x->0} [integral_0^1 sin(xt)/|t| dt] / x

Be careful at t=0; integrand contains x -> type 2

--- Write Your Answer Here ---

Training 1: Limit Calculation Compound Traps

Focus: Limit with integral + Hidden piecewise + e definition

Q 1.3【★★★】

lim_{x->0} [integral_0^{x^2} (e^{(t-x)^2} - 1 - (t-x)^2) sin(t) dt] / x^7

Hybrid type 1/2; e^u - 1 - u is classic 'first non-zero term' form

--- Write Your Answer Here ---

Training 1: Limit Calculation Compound Traps

Focus: Limit with integral + Hidden piecewise + e definition

Q 1.4【★★】

lim_{n->infty} [(n + n^{1/n}) / n]^n

Base is fraction -> rewrite as 1 + small; 1^infty type

--- Write Your Answer Here ---

Training 1: Limit Calculation Compound Traps

Focus: Limit with integral + Hidden piecewise + e definition

Q 1.5【★★★】

x_n = (1 + sin(n)/n)^n, find lim_{n->infty} x_n

1^infty type; sin(n) oscillates without converging at integers

--- Write Your Answer Here ---

Training 1: Limit Calculation Compound Traps

Focus: Limit with integral + Hidden piecewise + e definition

Q 1.6【★★★】

lim_{x->0} [ln(1+x)/x]^{1/x}

Base -> 1, exponent -> infinity; not (1+1/n)^n form

--- Write Your Answer Here ---

Training 1: Limit Calculation Compound Traps

Focus: Limit with integral + Hidden piecewise + e definition

Q 1.7【★★★】

f(x) = (e^{1/x} - 1)/(e^{1/x} + 1) * sgn(x), does lim_{x->0} f(x) exist?

Contains e^1/x (must consider both sides) and sgn(x) (hidden piecewise)

--- Write Your Answer Here ---

Training 1: Limit Calculation Compound Traps

Focus: Limit with integral + Hidden piecewise + e definition

Q 1.8【★★★】

f strictly increasing on R, lim_{x->-inf} f=0, lim_{x->+inf} f=1. Does lim_{x->1} f^{-1}(x) exist?

Strictly increasing -> inverse exists; lim f(x)=1 never reached -> range is open interval

--- Write Your Answer Here ---

Training 2: Taylor Expansion Precision Strike

Focus: Asymptotic expansion + Precision loss trap

Q 2.1【★★】

Find equivalent infinitesimal of sqrt(1+2x) - sqrt(1-3x) as x->0

Subtraction form, both terms approach 1; must check 'main term cancellation'

--- Write Your Answer Here ---

Training 2: Taylor Expansion Precision Strike

Focus: Asymptotic expansion + Precision loss trap

Q 2.2【★★★】

lim_{x->0} [ln(1+x) - x + x^2/2 - x^3/3] / x^4

First three terms of ln(1+x) cancel; denominator x^4 -> expand to x^4

--- Write Your Answer Here ---

Training 2: Taylor Expansion Precision Strike

Focus: Asymptotic expansion + Precision loss trap

Q 2.3【★★★】

lim_{x->0} [arctan(x) - sin(x)] / x^5

Difference of two odd functions; denominator x^5 -> expand to x^5

--- Write Your Answer Here ---

Training 2: Taylor Expansion Precision Strike

Focus: Asymptotic expansion + Precision loss trap

Q 2.4【★★★】

lim_{x->0} [cuberoot(1+x) - 1 - x/3 + x^2/9] / x^3

First two terms of cube root cancel -> must expand to x^3

--- Write Your Answer Here ---

Training 2: Taylor Expansion Precision Strike

Focus: Asymptotic expansion + Precision loss trap

Q 2.5【★★★】

$\lim_{n\to\infty} n\left[\ln(n+1) - \ln(n) - \frac{1}{n}\right]$

Sequence limit, $n\to\infty$; main term cancellation

--- Write Your Answer Here ---

Training 2: Taylor Expansion Precision Strike

Focus: Asymptotic expansion + Precision loss trap

Q 2.6【★★★】

lim_{n->infty} n^2 [(1+1/n)^{n+1} - e]

(1+1/n)^n+1 -> e (decreasing); careful: exponent is n+1, not n!

--- Write Your Answer Here ---

Training 2: Taylor Expansion Precision Strike

Focus: Asymptotic expansion + Precision loss trap

Q 2.7【★★★】

lim_{n->infty} n [e^2 - (1+2/n)^n]

(1+2/n)^n -> e^2 (standard form)

--- Write Your Answer Here ---

Training 2: Taylor Expansion Precision Strike

Focus: Asymptotic expansion + Precision loss trap

Q 2.8【★★★★】

a_n = n^{1/n} - 1, find lim_{n->infty} n*a_n / ln(n)

n^1/n = e^ln(n)/n; first order expansion is ln(n)/n

--- Write Your Answer Here ---

Training 2: Taylor Expansion Precision Strike

Focus: Asymptotic expansion + Precision loss trap

Q 2.9【★★★】

f(x) = x^2/(1+x^2), find f^{(10)}(0)

Use Taylor expansion to find high-order derivative

--- Write Your Answer Here ---

Training 2: Taylor Expansion Precision Strike

Focus: Asymptotic expansion + Precision loss trap

Q 2.10【★★★★】

cos(x) approx 1 - x^2/2, error <= 10^{-4}, find max delta. Then find lim 1/delta^4 * integral_0^delta [cos(x) - (1-x^2/2)] dx

Lagrange remainder; integral then limit -> type 1 variable limit integral

--- Write Your Answer Here ---

Training 3: Multi-dimensional Discontinuity Identification

Focus: Hidden piecewise + Inverse function discontinuity

Q 3.1【★★★】

f(x) = {x+1, x<0; x^2, x>=0} (1) Is f strictly monotonic? (2) Find discontinuity of f^{-1}

Piecewise function + find inverse -> inverse function topic

--- Write Your Answer Here ---

Training 3: Multi-dimensional Discontinuity Identification

Focus: Hidden piecewise + Inverse function discontinuity

Q 3.2【★★★】

f(x) = {2x+1, x<=1; x+2, x>1} (1) Prove f strictly increasing (2) Find f^{-1} (3) Find discontinuity of f^{-1}

Check left and right limits at switching point x=1

--- Write Your Answer Here ---

Training 3: Multi-dimensional Discontinuity Identification

Focus: Hidden piecewise + Inverse function discontinuity

Q 3.3【★★★★】

f(x) = {x^2, x in [-2,-1]; x, x in (-1,1); sqrt(x), x in [1,4]} Find range and discontinuity of f^{-1}

Three segments, each strictly monotonic; must compute limits at switching points

--- Write Your Answer Here ---

Training 3: Multi-dimensional Discontinuity Identification

Focus: Hidden piecewise + Inverse function discontinuity

Q 3.4【★★★】

f strictly increasing, lim_{x->2-} f=5, lim_{x->2+} f=8, f(2)=5. Find discontinuity of f^{-1}

Need to determine removable vs jump at x=2

--- Write Your Answer Here ---

Training 3: Multi-dimensional Discontinuity Identification

Focus: Hidden piecewise + Inverse function discontinuity

Q 3.5【★★★】

f(x) = {sin(2x)/x, x!=0; a, x=0} (1) Find a for continuity (2) First class discontinuity (3) Second class discontinuity

Parameter + discontinuity classification -> must discuss a

--- Write Your Answer Here ---

Training 3: Multi-dimensional Discontinuity Identification

Focus: Hidden piecewise + Inverse function discontinuity

Q 3.6【★★★★】

f(x) = {ln(1+x)/x, x>0; a, x=0; sin(x)/x, x<0} (1) Find limits (2) Find a for continuity (3) Jump discontinuity?

Two-sided limits need separate computation (different expressions)

--- Write Your Answer Here ---

Training 3: Multi-dimensional Discontinuity Identification

Focus: Hidden piecewise + Inverse function discontinuity

Q 3.7【★★★】

f(x) = {1/x * sin(1/x), x!=0; a, x=0} Find a for continuity at x=0

1/x * sin(1/x) oscillates and diverges as x->0

--- Write Your Answer Here ---

Training 3: Multi-dimensional Discontinuity Identification

Focus: Hidden piecewise + Inverse function discontinuity

Q 3.8【★★★】

g continuous at x=0, f(u) = {u, u!=0; 1, u=0}. Is f(g(x)) continuous at x=0?

Composite function continuity; key is whether f is continuous at g(0)

--- Write Your Answer Here ---

Training 3: Multi-dimensional Discontinuity Identification

Focus: Hidden piecewise + Inverse function discontinuity

Q 3.9【★★★★】

f(x) = {x+1, x>=0; -x, x<0}, g(x)=x^2. Find discontinuity of f(g(x))

g(x)=x^2 >= 0, always in x>=0 region of f

--- Write Your Answer Here ---

Training 3: Multi-dimensional Discontinuity Identification

Focus: Hidden piecewise + Inverse function discontinuity

Q 3.10【★★★★★】

f(x+y)=f(x)+f(y) (Cauchy), f continuous at x=0. Prove: (1) f continuous on R (2) f(x)=f(1)*x

Cauchy + continuity -> linear; abstract function discontinuity

--- Write Your Answer Here ---

Training 4: Chain Rule Counter-Intuition

Focus: Composite function continuity/differentiability

Q 4.1【★★★】

f(u)=u^2, g(x)=|x|, F(x)=f(g(x)). (1) Is F continuous/differentiable at x=0? (2) Find F'(0)

Inner |x| not differentiable at 0; outer u^2 smooth; can't use chain rule!

--- Write Your Answer Here ---

Training 4: Chain Rule Counter-Intuition

Focus: Composite function continuity/differentiability

Q 4.2【★★★】

f(u)=|u|, g(x)=x, F(x)=f(g(x)). Is F differentiable at x=0?

Outer |u| not differentiable, inner g(x)=x smooth

--- Write Your Answer Here ---

Training 4: Chain Rule Counter-Intuition

Focus: Composite function continuity/differentiability

Q 4.3【★★★】

f(u)=u^3, g(x)=|x|, F(x)=|x|^3. (1) Is F differentiable at x=0? (2) Find F'(0)

|x|^3 is odd power (power function smooths out corner)

--- Write Your Answer Here ---

Training 4: Chain Rule Counter-Intuition

Focus: Composite function continuity/differentiability

Q 4.4【★★★★】

f(u)=|u|, g(x)=|x|, F(x)=f(g(x)). (1) Simplify F(x) (2) Discuss continuity and differentiability at x=0

Double corner

--- Write Your Answer Here ---

Training 4: Chain Rule Counter-Intuition

Focus: Composite function continuity/differentiability

Q 4.5【★★★】

f(u)=u^2, g(x)={x+1,x>=0; -x,x<0}, F(x)=f(g(x)). (1) Simplify F(x) (2) Discuss differentiability at x=0

Outer smooth u^2; inner piecewise g, g not differentiable at 0

--- Write Your Answer Here ---

Training 4: Chain Rule Counter-Intuition

Focus: Composite function continuity/differentiability

Q 4.6【★★★】

f(u)={u+1, u>=0; -u, u<0}, g(x)=x^2, F(x)=f(g(x)). Discuss continuity and differentiability at x=0

g(x)=x^2 >= 0, avoids u<0 region of f

--- Write Your Answer Here ---

Training 4: Chain Rule Counter-Intuition

Focus: Composite function continuity/differentiability

Q 4.7【★★★★】

f has second derivative at 0, f(0)=1, f'(0)=2, f''(0)=3; g(x)=x^2. Find d^2/dx^2 f(g(x)) at x=0

Second-order chain rule

--- Write Your Answer Here ---

Training 4: Chain Rule Counter-Intuition

Focus: Composite function continuity/differentiability

Q 4.8【★★★★】

Find dy/dx at x=0, where y = e^{sin^2(x^3)}

4-layer nesting; missing any layer derivative = wrong

--- Write Your Answer Here ---

Training 4: Chain Rule Counter-Intuition

Focus: Composite function continuity/differentiability

Q 4.9【★★★】

f continuous at u=1, g continuous at x=0, g(0)=1. Is F(x)=f(g(x)) continuous at x=0?

Chain rule for continuity theorem

--- Write Your Answer Here ---

Training 4: Chain Rule Counter-Intuition

Focus: Composite function continuity/differentiability

Q 4.10【★★★★】

F(x)=f(g(x)) continuous at x=0. Can we conclude f is continuous at g(0)?

Continuity reverse inference trap; reverse doesn't hold

--- Write Your Answer Here ---

Training 4: Chain Rule Counter-Intuition

Focus: Composite function continuity/differentiability

Q 4.11【★★★★】

f differentiable at 0, g differentiable at 0, g(0)=0. F(x)=f(g(x)) differentiable at 0, find F'(0)

Standard chain rule application

--- Write Your Answer Here ---

Training 4: Chain Rule Counter-Intuition

Focus: Composite function continuity/differentiability

Q 4.12【★★★★★】

f differentiable at 0, f(0)=0, f'(0)=2; g(x)=x^2*sin(1/x) (x!=0), g(0)=0. Discuss F(x)=f(g(x)) at x=0

Is g(x) continuous but not differentiable at 0?

--- Write Your Answer Here ---

Training 5: Recursion Finals

Focus: Implicit recursion + Asymptotic order

Q 5.1【★★★★】

x_{n+1} = ln(1+x_n), x_1 in (0,1). (1) Prove lim x_n exists and find it (2) Find lim n*x_n

Explicit recursion x_n+1=f(x_n); f(0)=0 is fixed point

--- Write Your Answer Here ---

Training 5: Recursion Finals

Focus: Implicit recursion + Asymptotic order

Q 5.2【★★★★】

sin(x_{n+1}) + x_{n+1} = sin(x_n), x_n in (0,pi). (1) Prove lim x_n exists (2) Find lim x_{n+1}/x_n

Implicit recursion; must construct auxiliary function

--- Write Your Answer Here ---

Training 5: Recursion Finals

Focus: Implicit recursion + Asymptotic order

Q 5.3【★★★★】

x_{n+1} = (1/2)(x_n + a/x_n), a>0 (Newton iteration). (1) Prove lim x_n = sqrt(a) (2) Find convergence order

Newton iteration; error is quadratic -> quadratic convergence

--- Write Your Answer Here ---

Training 5: Recursion Finals

Focus: Implicit recursion + Asymptotic order

Q 5.4【★★★★】

x_1=1, x_{n+1}=sin(x_n). (1) Prove lim x_n=0 (2) Find lim sqrt(n)*x_n

sin(x) approx x - x^3/6; use Stolz-Cesaro for slow convergence

--- Write Your Answer Here ---

Training 5: Recursion Finals

Focus: Implicit recursion + Asymptotic order

Q 5.5【★★★★】

x_1=1, x_{n+1}=sqrt(n+x_n). (1) Prove x_n -> +inf (2) Find lim x_n/sqrt(n)

Recursion contains n, need to analyze growth rate

--- Write Your Answer Here ---

Ultimate Comprehensive Exam

Difficulty: ★★★★ | 8 Questions | 100 Points

Q 1 【★★★】MC

f(x)=ln(1+x^2)/x, x!=0; a, x=0. Find a for f differentiable at x=0.nA. a=0 B. a=1 C. a=2 D. Never differentiable

--- Write Your Answer Here ---

Ultimate Comprehensive Exam

Difficulty: ★★★★ | 8 Questions | 100 Points

Q 2 【★★★】MC

lim_x->0 [integral_0^x^2 (e^t - 1 - t) sin(xt) dt] / x^7nA. 0 B. 1/60 C. 1/30 D. 1/12

--- Write Your Answer Here ---

Ultimate Comprehensive Exam

Difficulty: ★★★★ | 8 Questions | 100 Points

Q 3 【★★★】MC

f(x)=|x|sin(x). Is f differentiable at x=0? If so, f'(0)=?nA. No B. f'(0)=1 C. f'(0)=0 D. f'(0)=-1

--- Write Your Answer Here ---

Ultimate Comprehensive Exam

Difficulty: ★★★★ | 8 Questions | 100 Points

Q 4 【★★★】MC

lim_n->infty n^2 [n^1/n - 1 - ln(n)/n]nA. 0 B. 1/2 C. (ln(n))^2/(2n) D. DNE

--- Write Your Answer Here ---

Ultimate Comprehensive Exam

Difficulty: ★★★★ | 8 Questions | 100 Points

Q 5 【★★★ 20pts】

lim_{x->0} [1 - cos(x)*sqrt(cos(2x))*cuberoot(cos(3x))] / x^2

Multiple function product -> Taylor expand to x^2

--- Write Your Answer Here ---

Ultimate Comprehensive Exam

Difficulty: ★★★★ | 8 Questions | 100 Points

Q 6 【★★★★ 20pts】

f(x)={1/|x|^{1/2}, 0<|x|<1; 0, x=0}. Find discontinuity type at x=0

|x|^-1/2 at x=0 -> check if diverges

--- Write Your Answer Here ---

Ultimate Comprehensive Exam

Difficulty: ★★★★ | 8 Questions | 100 Points

Q 7 【★★★★ 20pts】

lim_{n->infty} sum_{k=1}^n (k/n^2) * sqrt(1+k/n)

Sum + n->infty -> definite integral definition

--- Write Your Answer Here ---

Ultimate Comprehensive Exam

Difficulty: ★★★★ | 8 Questions | 100 Points

Q 8 【★★★★★ 20pts】

x_{n+1} = cos(x_n) + ln(1+x_n), x_1 in (0,1). (1) Prove lim x_n exists (2) Find lim x_n (3) Find lim x_n/sqrt(1-cos(x_n))

Explicit recursion; fixed point analysis; asymptotic order

--- Write Your Answer Here ---

!!! ANSWER SECTION !!!

Complete all questions before viewing

Training 1 Answers

Q 1.1 Answer:

1/3

-> Absolute value -> integration by parts -> Taylor expand -> numerator x^3/3

Training 1 Answers

Q 1.2 Answer:

1

-> Substitute u=xt -> integral_0^x sin(u)/u du ~ x

Training 1 Answers

Q 1.3 Answer:

0

-> Estimate order: integrand O(x^6), interval length x^2 -> overall O(x^8) > denominator x^7

Training 1 Answers

Q 1.4 Answer:

e

-> Rewrite as (1+n^1/n-1)^n, n*(n^1/n-1)=n^1/n->1 -> e^1=e

Training 1 Answers

Q 1.5 Answer:

DNE

-> ln(x_n) ~ sin(n) oscillates, does not converge

Training 1 Answers

Q 1.6 Answer:

1/sqrt(e)

-> Take ln -> expand -> ln L = -1/2

Training 1 Answers

Q 1.7 Answer:

1

-> Both left and right limits = 1

Training 1 Answers

Q 1.8 Answer:

+inf

-> f range (0,1) -> f^-1 domain (0,1), as x->1-, f^-1(x)->+inf

Training 2 Answers

Q 2.1 Answer:

~ 5x/2

-> Binomial expand -> subtract -> main term 5x/2

Training 2 Answers

Q 2.2 Answer:

-1/4

-> Expand ln(1+x) to x^4 -> -x^4/4 -> -1/4

Training 2 Answers

Q 2.3 Answer:

DNE

-> Lowest order x^3, denominator x^5 -> orders don't match

Training 2 Answers

Q 2.4 Answer:

5/81

-> Trinomial expand -> first two terms cancel -> remaining 5x^3/81

Training 2 Answers

Q 2.5 Answer:

0

-> ln(1+1/n)=1/n-1/(2n^2) -> n*(-1/(2n^2))->0

Training 2 Answers

Q 2.6 Answer:

+inf

-> (1+1/n)^n+1-e ~ e/(2n) -> n^2*e/(2n)=en/2->+inf

Training 2 Answers

Q 2.7 Answer:

2e^2

-> Expand (1+2/n)^n = e^2(1-2/n+2/n^2) -> n*(2e^2/n)->2e^2

Training 2 Answers

Q 2.8 Answer:

1

-> n^1/n=e^ln(n)/n=1+ln(n)/n -> n*a_n ~ ln(n) -> ratio 1

Training 2 Answers

Q 2.9 Answer:

3628800

-> f(x)=sum(-1)^n x^2n+2 -> x^10 coefficient 1 -> 10!=3628800

Training 2 Answers

Q 2.10 Answer:

delta<=0.084, limit=0

-> Lagrange remainder <= delta^3/6; integral gives delta/120 -> 0

Training 3 Answers

Q 3.1 Answer:

Inverse does not exist

-> f(0-)=1, f(0+)=0 jump -> not strictly monotonic

Training 3 Answers

Q 3.2 Answer:

No discontinuity

-> f(1-)=f(1+)=f(1)=3 continuous -> f^-1 continuous

Training 3 Answers

Q 3.3 Answer:

Inverse does not exist

-> Three segments ranges overlap: [1,4],[-1,1],[1,2]

Training 3 Answers

Q 3.4 Answer:

x=5 and x=8 jump

-> f has jump at x=2 (5,8) -> f^-1 has jumps at x=5,8

Training 3 Answers

Q 3.5 Answer:

a=2 cont; a!=2 removable; no 2nd class

-> lim sin(2x)/x=2 exists

Training 3 Answers

Q 3.6 Answer:

Both =1; a=1 cont; jump impossible

-> Left and right limits equal

Training 3 Answers

Q 3.7 Answer:

Never continuous

-> Subsequence limits differ -> oscillatory (2nd class)

Training 3 Answers

Q 3.8 Answer:

g(0)!=0: continuous; g(0)=0: removable

-> Key is whether f is continuous at u=g(0)

Training 3 Answers

Q 3.9 Answer:

No discontinuity

-> g(x)=x^2>=0 -> f(g(x))=x^2+1

Training 3 Answers

Q 3.10 Answer:

f(x)=f(1)*x

-> Cauchy+continuity -> f(0)=0 -> continuous -> rationals -> reals -> f(x)=cx

Training 4 Answers

Q 4.1 Answer:

Continuous, diff, F'(0)=0

-> F(x)=(|x|)^2=x^2, corner smoothed by u^2

Training 4 Answers

Q 4.2 Answer:

Not differentiable

-> F(x)=|x|, left/right derivatives +/-1 unequal

Training 4 Answers

Q 4.3 Answer:

Differentiable, F'(0)=0

-> |dx|^3/dx = |dx|^2 -> 0

Training 4 Answers

Q 4.4 Answer:

Continuous but not diff

-> F(x)=||x||=|x|, double abs doesn't smooth corner

Training 4 Answers

Q 4.5 Answer:

Not differentiable

-> F'(0+)=2, F'(0-)->+-inf

Training 4 Answers

Q 4.6 Answer:

Continuous, diff, F'(0)=0

-> g(x)=x^2>=0 -> F(x)=x^2+1

Training 4 Answers

Q 4.7 Answer:

4

-> 2nd chain: =4x^2 f''(g(x))+2f'(g(x)) -> 2f'(0)=4

Training 4 Answers

Q 4.8 Answer:

0

-> 4-layer chain: =6x^2 sin(x^3)cos(x^3)e^sin^2(x^3) -> 0

Training 4 Answers

Q 4.9 Answer:

Continuous at x=0

-> Chain continuity: g cont -> lim g(x)=1, f cont at u=1

Training 4 Answers

Q 4.10 Answer:

Cannot conclude

-> Counterexample: f discontinuous but f o g continuous

Training 4 Answers

Q 4.11 Answer:

f'(0)*g'(0)

-> Chain rule: F'(0)=f'(g(0))*g'(0)=f'(0)*g'(0)

Training 4 Answers

Q 4.12 Answer:

Continuous, diff, F'(0)=0

-> g'(0)=lim x*sin(1/x)=0 -> F'(0)=f'(0)*0=0

Training 5 Answers

Q 5.1 Answer:

(1)0 (2)2

-> f'(x)<1 decreasing bounded -> 1/x_n+1-1/x_n->1/2 -> nx_n->2

Training 5 Answers

Q 5.2 Answer:

(1)0 (2)1/2

-> Construct f(x)=sin(x)+x -> 2x_n+1=x_n+O(x_n^3)

Training 5 Answers

Q 5.3 Answer:

(1)sqrt(a) (2)1/(2sqrt(a))

-> AM-GM -> e_n+1=e_n^2/(2x_n) -> 1/(2sqrt(a))

Training 5 Answers

Q 5.4 Answer:

(1)0 (2)sqrt(3)

-> 1/x_n+1^2-1/x_n^2->1/3 -> nx_n^2->3 -> sqrt(n)*x_n->sqrt(3)

Training 5 Answers

Q 5.5 Answer:

(1)+inf (2)1

-> y_n=x_n^2/n -> y_n+1=(n+x_n)/(n+1)->1

Ultimate Comprehensive Answers

Q 1 Answer:

A

-> a=0: f'(0)=1 exists; a!=0: a/x diverges

Ultimate Comprehensive Answers

Q 2 Answer:

A

-> Numerator O(x^9), denominator x^7 -> limit O

Ultimate Comprehensive Answers

Q 3 Answer:

C

-> |x|sin(x)/x = |x|*sin(x)/x -> 0

Q 4 Answer:

D

-> (ln(n))^2/2 -> +inf

Ultimate Comprehensive Answers

Q 5 Answer:

3

-> (1-x^2/2)(1-x^2)(1-3x^2/2)=1-3x^2

Ultimate Comprehensive Answers

Q 6 Answer:

2nd class infinite

-> lim 1/|x|^1/2=+inf

Ultimate Comprehensive Answers

Q 7 Answer:

4(sqrt(2)+1)/15

-> Riemann sum -> integral_0^1 x*sqrt(1+x) dx

Ultimate Comprehensive Answers

Q 8 Answer:

(1)exists (2)a~1.164 (3)sqrt(2)

-> |f'(a)|<1 contraction mapping; 1-cos(x_n)~x_n^2/2