

Calculus BC 2019 Free Respond Questions in Depth Analysis

Lesson 348 | Calculus BC | Displacement and distance • Separable differential equations and slope fields • Power series and intervals of convergence

<https://www.youtube.com/watch?v=7L8TmAOFPP4>

Related review: exact coverage needs teacher confirmation.

Name: _____ Date: _____ Show your reasoning.

01

A particle has $v(t)=4(t-13)$ on $0 \leq t \leq 20$. Find displacement and total distance.

02

Solve $dy/dx=11y$ with $y(0)=13$. Give the initial slope and explain the sign of the solution.

03

Find the radius and interval of convergence of $\sum$ from $m=1$ to ∞ of $(x-6)^m/(14^m m)$. Check both endpoints.

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04

A particle has $v(t)=7(t-10)$ on $0 \leq t \leq 12$. Find displacement and total distance.

05

Solve $dy/dx=9y$ with $y(0)=4$. Give the initial slope and explain the sign of the solution.

06

Find the radius and interval of convergence of $\sum$ from $m=1$ to ∞ of $(x-4)^m/(8^m m)$. Check both endpoints.

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01

A particle has $v(t)=4(t-13)$ on $0 \leq t \leq 20$. Find displacement and total distance.

Velocity changes sign at $t=13$. Displacement = $4[t^2/2-13t]_0^{20}=-240$. Distance adds the magnitudes of the two triangular areas: 436.

02

Solve $dy/dx=11y$ with $y(0)=13$. Give the initial slope and explain the sign of the solution.

Separate $dy/y=11dx$. Integrate $\ln|y|=11x+C$; use initial condition: $y=13e^{(11x)}$. Initial slope=143. Exponential and 13 are positive, so $y>0$ for all x .

03

Find the radius and interval of convergence of $\sum$ from $m=1$ to ∞ of $(x-6)^m/(14^m m)$. Check both endpoints.

Ratio limit $|x-6|/14$; convergence inside $|x-6|<14$. Radius 14. At $x=8$, harmonic series diverges; at $x=-20$, alternating harmonic series converges. Interval $[-20,8)$.

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04

A particle has $v(t)=7(t-10)$ on $0 \leq t \leq 12$. Find displacement and total distance.

Velocity changes sign at $t=10$. Displacement = $7[t^2/2-10t]_0^{12}=-336$. Distance adds the magnitudes of the two triangular areas: 364.

05

Solve $dy/dx=9y$ with $y(0)=4$. Give the initial slope and explain the sign of the solution.

Separate $dy/y=9dx$. Integrate $\ln|y|=9x+C$; use initial condition: $y=4e^{(9x)}$. Initial slope=36. Exponential and 4 are positive, so $y>0$ for all x .

06

Find the radius and interval of convergence of $\sum$ from $m=1$ to ∞ of $(x-4)^m/(8^m m)$. Check both endpoints.

Ratio limit $|x-4|/8$; convergence inside $|x-4|<8$. Radius 8. At $x=12$, harmonic series diverges; at $x=-4$, alternating harmonic series converges. Interval $[-4,12)$.