

Watch. Practice. Understand. | Lesson 318

Calculus 7.3 or Calculus II Integration with Trigonometric Substitution

Watch the matching video: <https://www.youtube.com/watch?v=rOBGHI2EE7s>

Practice focus: Trigonometric substitution

Original extra practice matched to the listed lesson topic.

Name: _____ Date: _____ Show your reasoning and check units.

01 Choose a substitution for $\sqrt{9-x^2}$, with $|x|<3$, and simplify the radical.

02 Evaluate the integral of $1/\sqrt{9-x^2}$ dx.

03 Choose a substitution for $\sqrt{x^2+16}$.

04 Choose a substitution for $\sqrt{x^2-25}$ when $x>5$.

Worked answers | Lesson 318

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Practice focus: Trigonometric substitution

Original extra practice matched to the listed lesson topic.

01 Choose a substitution for $\sqrt{9-x^2}$, with $|x|<3$, and simplify the radical.

Use $x=3\sin \theta$ with $-\pi/2<\theta<\pi/2$; radical becomes $3\cos \theta$.

02 Evaluate the integral of $1/\sqrt{9-x^2}$ dx.

$x=3\sin \theta$ reduces integrand to $d\theta$. Result $\arcsin(x/3)+C$.

03 Choose a substitution for $\sqrt{x^2+16}$.

Use $x=4\tan \theta$ on $(-\pi/2,\pi/2)$, giving radical $4\sec \theta$ and $dx=4\sec^2 \theta d\theta$.

04 Choose a substitution for $\sqrt{x^2-25}$ when $x>5$.

Use $x=5\sec \theta$ with $0<\theta<\pi/2$. Radical becomes $5\tan \theta$ and $dx=5\sec \theta \tan \theta d\theta$.