

Calculus 7.3 or Calculus II Integration with Trigonometric Substitution

Lesson 318 | Calculus BC | Trigonometric substitution

<https://www.youtube.com/watch?v=rOBGHI2EE7s>

Original practice aligned to the saved video title.

Name: _____ Date: _____ Show your reasoning.

01

Evaluate $\int \frac{9}{\sqrt{16-x^2}} dx$ for $|x| < 4$, using trigonometric substitution.

02

Evaluate $\int \frac{14}{\sqrt{100-x^2}} dx$ for $|x| < 10$, using trigonometric substitution.

03

Evaluate $\int \frac{2}{\sqrt{100-x^2}} dx$ for $|x| < 10$, using trigonometric substitution.

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04Evaluate $\int 8/\sqrt{36-x^2} \, dx$ for $|x| < 6$, using trigonometric substitution.**05**Evaluate $\int 3/\sqrt{16-x^2} \, dx$ for $|x| < 4$, using trigonometric substitution.**06**Evaluate $\int 6/\sqrt{64-x^2} \, dx$ for $|x| < 8$, using trigonometric substitution.

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01

Evaluate $\int 9/\sqrt{16-x^2} dx$ for $|x|<4$, using trigonometric substitution.

Let $x=4\sin \theta$, $-\pi/2<\theta<\pi/2$. Then $dx=4\cos \theta d\theta$ and $\sqrt{16-x^2}=4\cos \theta$.
Integral= $9\theta+C=9\arcsin(x/4)+C$.

02

Evaluate $\int 14/\sqrt{100-x^2} dx$ for $|x|<10$, using trigonometric substitution.

Let $x=10\sin \theta$, $-\pi/2<\theta<\pi/2$. Then $dx=10\cos \theta d\theta$ and $\sqrt{100-x^2}=10\cos \theta$.
Integral= $14\theta+C=14\arcsin(x/10)+C$.

03

Evaluate $\int 2/\sqrt{100-x^2} dx$ for $|x|<10$, using trigonometric substitution.

Let $x=10\sin \theta$, $-\pi/2<\theta<\pi/2$. Then $dx=10\cos \theta d\theta$ and $\sqrt{100-x^2}=10\cos \theta$.
Integral= $2\theta+C=2\arcsin(x/10)+C$.

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04

Evaluate $\int 8/\sqrt{36-x^2} dx$ for $|x|<6$, using trigonometric substitution.

Let $x=6\sin \theta$, $-\pi/2<\theta<\pi/2$. Then $dx=6\cos \theta d\theta$ and $\sqrt{36-x^2}=6\cos \theta$.
Integral= $8\theta+C=8\arcsin(x/6)+C$.

05

Evaluate $\int 3/\sqrt{16-x^2} dx$ for $|x|<4$, using trigonometric substitution.

Let $x=4\sin \theta$, $-\pi/2<\theta<\pi/2$. Then $dx=4\cos \theta d\theta$ and $\sqrt{16-x^2}=4\cos \theta$.
Integral= $3\theta+C=3\arcsin(x/4)+C$.

06

Evaluate $\int 6/\sqrt{64-x^2} dx$ for $|x|<8$, using trigonometric substitution.

Let $x=8\sin \theta$, $-\pi/2<\theta<\pi/2$. Then $dx=8\cos \theta d\theta$ and $\sqrt{64-x^2}=8\cos \theta$.
Integral= $6\theta+C=6\arcsin(x/8)+C$.