53. $y = \frac{1}{2}\left(\frac{1}{2}\ln\frac{x+1}{x-1} + \arctan x\right)$

$\frac{1}{4}\ln(x+1) - \frac{1}{4}\ln(x-1) + \frac{1}{2}\arctan x$

$\frac{1}{4}\cdot\frac{1}{x+1} - \frac{1}{4}\cdot\frac{1}{x-1} + \frac{1}{2}\cdot\frac{1}{x^2+1}$

72. $\arcsin x - 2x$

$$\frac{1}{\sqrt{1-x^2}} - 2 = 0$$

5.7A Inverse Trig Integrals

WCID? I can take inverse trig integrals

A. $\frac{d}{dx}\arcsin(x) = \frac{1}{\sqrt{1-x^2}}$

1. Integrals $\int \frac{\quad}{\sqrt{\quad}}$

* Inverse trig

2. Formulas

a. $\int \frac{du}{\sqrt{a^2-u^2}} = \arcsin\frac{u}{a} + C$

b. $\int \frac{du}{a^2+u^2} = \frac{1}{a}\arctan\frac{u}{a} + C$

c. $\int \frac{du}{u\sqrt{u^2-a^2}} = \frac{1}{a}\operatorname{arcsec}\frac{|u|}{a} + C$

Ex. $\int \frac{dx}{\sqrt{4-x^2}} = \arcsin\frac{x}{2} + C$

$\downarrow \quad \downarrow$

$2^2 \quad x^2$

Ex. $\int \frac{-dx}{\sqrt{16-9x^2}} = \frac{1}{3}\arccos\frac{3x}{4}+C$

$4^2 \quad (3x)^2$

Ex. $\int \frac{-dx}{x\sqrt{25-81x^2}} = \frac{1}{9}\cdot\frac{1}{25}\operatorname{arccsc}\frac{|9x|}{25}+C$

$25 \quad 9x$

Ex. $\int \frac{dx}{-25-9x^2}$

$\int \frac{dx}{-(25+9x^2)} = \frac{1}{15} \operatorname{arccot} \frac{3x}{5} + C$

$u = 5$, $du = 3dx$

Ex. $\int \frac{dx}{36 + e^{4x}} = \frac{1}{6} \cdot \frac{1}{2} \arctan \frac{e^{2x}}{6} + C$

$6 \quad e^{2x}$

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1-16 (Not 7, 13)

53, 54, 65, 68

1. $\int \frac{5\,dx}{\sqrt{9-x^2}} = 5 \operatorname{arcsin} \frac{x}{3} + C$