MATH 251/GRACEY NAME_____
WORKSHEET/5.7

Derivatives of the inverse trigonometric functions. Let $u = f(x)$.

$$\frac{d}{dx}[\arcsin u] = \frac{u'}{\sqrt{1-u^2}} \qquad \frac{d}{dx}[\operatorname{arc\,sec} u] = \frac{u'}{|u|\sqrt{u^2-1}}$$

$$\frac{d}{dx}[\arccos u] = -\frac{u'}{\sqrt{1-u^2}} \qquad \frac{d}{dx}[\arctan u] = \frac{u'}{1+u^2}$$

$$\frac{d}{dx}[\operatorname{arc\,csc} u] = -\frac{u'}{|u|\sqrt{u^2-1}} \qquad \frac{d}{dx}[\operatorname{arc\,cot} u] = -\frac{u'}{1+u^2}$$

Integrals of the inverse trigonometric functions. Let $u = f(x)$.

$$\int \frac{du}{\sqrt{a^2-u^2}} = \arcsin\frac{u}{a} + C \qquad \int \frac{du}{u\sqrt{u^2-a^2}} = \frac{1}{a}\operatorname{arc\,sec}\frac{|u|}{a} + C$$

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

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1. Find the integral.

a. $\displaystyle\int \frac{2}{\sqrt{3-x^2}}dx$

b. $\displaystyle\int \frac{e^x}{16+e^{2x}}dx$

c. $\int \frac{5}{3x\sqrt{x-4}}dx$

d. $\int_0^{1/\sqrt{2}} \frac{\arccos x}{\sqrt{1-x^2}}$

e. $\int \frac{2x-5}{x^2+2x+2}dx$

f. $\int \frac{x+2}{\sqrt{-x^2-4x}}dx$