

Instructions: Show all work. Use exact answers unless otherwise asked to round.

1. Use the Table of Integrals to integrate. Report the formula used. A substitution may be needed first.

a.  $\int \sqrt{\frac{5-x}{5+x}} dx =$

$$-\int \sqrt{\frac{u}{10-u}} du = 5 \arcsin\left(\frac{10-2u}{10}\right) +$$

$$\sqrt{u(10-u)} + C$$

3.14

$$u = 5-x$$

$$-du = +dx$$

$$x = 5-u$$

$$x+5 = 10-u$$

$$a = 10$$

$$5 \arcsin\left(\frac{10-2(5-x)}{10}\right) + \sqrt{(5-x)(10-(5-x))} + C$$

b.  $\int \frac{\ln x}{x(3+2\ln x)} dx$

$$= 5 \arcsin\left(\frac{x}{5}\right) + \sqrt{25-x^2} + C$$

$$u = \ln x$$

$$du = \frac{1}{x} dx$$

$$\int \frac{u}{3+2u} du$$

2.6

$$a = 2, b = 3$$

$$\frac{u}{2} - \frac{3}{4} \ln|2u+3| + C$$

$$\frac{\ln x}{2} - \frac{3}{4} \ln|2\ln x + 3| + C$$

c.  $\int \frac{e^{3x}}{(1+e^x)^3} dx$

$$u = e^x$$

$$du = e^x$$

$$e^{3x} = (e^x)^2 \cdot e^x$$

2.11

$$a = 1, b = 1$$

$$\int \frac{u^2}{(1+u)^3} du = \frac{1}{1} \left[ \frac{2}{1+u} - \frac{1}{2(1+u)^2} + \ln|1+u| \right] + C$$

$$= \frac{2}{1+e^x} - \frac{1}{2(1+e^x)^2} + \ln|1+e^x| + C$$