

1. Evaluate the following integrals.

$$\begin{aligned}
 & \text{(a) } \int (2 + \frac{1}{\sqrt{t}})(2 - \frac{1}{\sqrt{t}}) dt \quad \text{(b) } \int_0^3 |2 - x| dx \quad \text{(c) } \int_0^{1/2} \frac{1}{\sqrt{1-t^2}} dt \quad \text{(d) } \int_{\ln 2}^{\ln 3} e^{2x} dx \\
 & \text{(e) } \int_0^1 \frac{x^2}{(1+x^3)^2} dx \quad \text{(f) } \int_e^{e^2} \frac{(\ln x)^2}{x} dx \quad \text{(g) } \int_0^{\pi/2} \cos x \sin(\sin x) dx \quad \text{(h) } \int_1^4 \frac{1}{(1+\sqrt{x})^2} \frac{1}{\sqrt{x}} dx \\
 & \text{(i) } \int_0^{\pi/4} \sin^2 x \cos x dx \quad \text{(j) } \int_0^1 \sqrt[3]{t^3+1} \cdot t^5 dt \quad \text{(k) } \int \frac{x+3}{x^2+6x} dx \quad \text{(l) } \int_0^1 x e^x dx \quad \text{(m) } \int_0^1 \ln(1+x^2) dx \\
 & \text{(n) } \int_0^{\pi/2} e^x \cos x dx \quad \text{(o) } \int x \sec^2 x dx \quad \text{(p) } \int e^{\sqrt{x}} dx \quad \text{(q) } \int_1^2 \sqrt{u^2-1} du \quad \text{(r) } \int \frac{\cos x}{4+\sin^2 x} dx \\
 & \text{(s) } \int \frac{1}{x^2-4} dx \quad \text{(t) } \int \frac{3x+2}{x-1} dx \quad \text{(u) } \int \frac{7x-23}{x^2-7x+12} dx \quad \text{(v) } \int \frac{1}{x^2+2x+2} dx
 \end{aligned}$$

2. Use the table of integrals to evaluate each of the following.

$$\text{(a) } \int e^{3x} \cos 2x dx \quad \text{(b) } \int \sqrt{4x-25x^2} dx \quad \text{(c) } \int \cos^4(2t) dt \quad \text{(d) } \int \sqrt{9+4u^2} du \quad \text{(e) } \int \sqrt{4u^2-9} du$$

Answer key to Review for Final 1

$$\begin{aligned}
 & 1. \text{ (a) } 4t - \ln|t| + c \quad \text{(b) } 5/2 \quad \text{(c) } \pi/6 \quad \text{(d) } 5/2 \quad \text{(e) } 1/6 \quad \text{(f) } 7/3 \quad \text{(g) } 1 - \cos 1 \quad \text{(h) } 1/3 \quad \text{(i) } \sqrt{2}/12 \\
 & \text{(j) } \frac{\sqrt[3]{2}}{14} + \frac{3}{28} \quad \text{(k) } \frac{1}{2} \ln|x^2+6x| + c \quad \text{(l) } 1 \quad \text{(m) } \pi/2 - 2 + \ln 2 \quad \text{(n) } \frac{e^{\pi/2} - 1}{2} \quad \text{(o) } \ln|\cos x| + x \tan x + c \\
 & \text{(p) } 2e^{\sqrt{x}}(\sqrt{x}-1) + c \quad \text{(q) } \sqrt{3} - \frac{1}{2} \ln(2+\sqrt{3}) \quad \text{(r) } \frac{1}{2} \tan^{-1}\left(\frac{\sin x}{2}\right) + c \quad \text{(s) } \frac{1}{4} \ln\left|\frac{x-2}{x+2}\right| + c \\
 & \text{(t) } 5 \ln|x-1| + 3x + c \quad \text{(u) } \ln((x-3)^2 |x-4|^5) + c \quad \text{(v) } \tan^{-1}(x+1) + c \\
 & 2. \text{ (a) } e^{3x} \left(\frac{3 \cos 2x}{13} + \frac{2 \sin 2x}{13} \right) + c \quad \text{(b) } \left(\frac{x}{2} - \frac{1}{25} \right) \sqrt{4x-25x^2} + \frac{2}{125} \sin^{-1}\left(\frac{-2+25x}{2} \right) + c \\
 & \text{(c) } \frac{1}{8} \cos^3 2t \sin 2t + \frac{3}{8} t + \frac{3}{32} \sin(4t) + c \quad \text{(d) } u \sqrt{9/4+u^2} + 9/4 \ln|u + \sqrt{9/4+u^2}| + c \\
 & \text{(e) } u \sqrt{u^2-9/4} - 9/4 \ln|u + \sqrt{9/4+u^2}| + c
 \end{aligned}$$