

Problem 1: Simplify

- (a) $\ln x^3 + \ln x^4 =$
- (b) $e^{(\ln x)/2} =$
- (c) $e^{\ln 7 - \ln 8} =$
- (d) $e^0 =$
- (e) $\cos^2 z - 1 =$
- (f) $\sin(-x) =$
- (g) $\cos(-x) =$
- (h) $\sin 2x =$
- (i) $\tan(\pi/4) =$
- (j) $\tan(-x) =$
- (k) $\arctan 1 =$
- (l) $e^{-\ln x} =$
- (m) $e^{-2 \ln |x|} =$
- (n) $e^{-\pi \ln x^3 - 4 \ln x} =$

Problem 2: Solve for x where possible:

- (a) $\ln(2x + 2) = 3t$
- (b) $x^2 + 4x + 3 = 0$
- (c) $x^3 + 2x^2 + x = 0$
- (d) $\arctan x = 1$
- (e) $\arctan x = \sqrt{2}/2$

Problem 3: Find the derivatives:

- (a) $\frac{d}{dt}(e^{-3t}) =$
- (b) $\frac{d}{dt}(e^{\pi t}) =$
- (c) $\frac{d}{dt} \frac{\pi}{t} =$
- (d) $\frac{d}{dx} \sin(5x) =$
- (e) $\frac{d}{dx} \tan x =$
- (f) $\frac{d}{dt}(t \cos 3t) =$
- (g) $\frac{d}{dx}(\ln 2t) =$
- (h) $\frac{d}{dx} [(2x + 3)^{10}] =$
- (i) $\frac{d}{dx}(9x^6 - \frac{1}{x^2}) =$
- (j) $\frac{d}{dx}(\frac{1}{\sqrt{2x+1}}) =$
- (k) $\frac{d}{dt}(3t^4 + 1)^{5/2} =$
- (l) $\frac{d}{dy}(\frac{1}{\sqrt[3]{y+1}}) =$
- (m) $\frac{d}{dx}(2x + 1)^{1/4} =$

Problem 4: Evaluate limits:

- (a) $\lim_{t \rightarrow \infty} e^{-t} =$
- (b) $\lim_{x \rightarrow \infty} e^{2-x} =$
- (c) $\lim_{t \rightarrow \infty} e^{1/t} =$
- (d) $\lim_{t \rightarrow \infty} e^{-t} =$
- (e) $\lim_{t \rightarrow 0} e^{-t} =$
- (f) $\lim_{t \rightarrow 0} (te^{-t}) =$
- (g) $\lim_{t \rightarrow \infty} \sin t =$
- (h) $\lim_{t \rightarrow 0} \frac{\sin t}{t} =$
- (i) $\lim_{t \rightarrow 0} \frac{\cos t}{t} =$
- (j) $\lim_{t \rightarrow 0} \tan t =$
- (k) $\lim_{t \rightarrow \pi/2} \arctan t =$
- (l) $\lim_{t \rightarrow -\pi/2} \arctan t =$
- (m) $\lim_{x \rightarrow 0} \frac{x}{3x^2+1} =$
- (n) $\lim_{x \rightarrow \infty} \frac{x}{3x^2+1} =$
- (o) $\lim_{x \rightarrow \infty} \frac{x+1}{3x+1} =$
- (p) $\lim_{x \rightarrow 0} \frac{x+1}{x-1} =$
- (q) $\lim_{x \rightarrow 1} \frac{x}{3x^2+1} =$
- (r) $\lim_{t \rightarrow \infty} \frac{3x^2+1}{4x^3+x} =$

Problem 5: Evaluate integrals:

- (a) $\int \frac{dx}{x^3} =$
- (b) $\int \frac{dt}{3t+2} =$
- (c) $\int \frac{x dx}{x^2+1} =$
- (d) $\int \frac{(x^2+1) dx}{x} =$
- (e) $\int \frac{dx}{x^2+1} =$
- (f) $\int \frac{x dx}{\sqrt{x^2+1}} =$
- (g) $\int e^{-3t} dt =$
- (h) $\int t e^{-t} dt =$
- (i) $\int (t+1) e^{-t} dt =$
- (j) $\int_0^{\pi/4} \cos(2t) \sin(2t) dt =$
- (k) $\int_0^{\pi/4} \cos t e^t dt =$
- (l) $\int_0^{\pi/4} \tan x dx =$
- (m) $\int \cos^2 t dt =$