Quiz 7.1 - 7.2

Find a general solution to a differential equation.

7.1 # 1-4

(2) $\frac{dy}{dx} = \sec x \tan x - e^y$

$y = \sec x - e^x + C$

Solve an initial value problem.

7.1 # 11-20 ↘ solve for C

(12) $\frac{dy}{dx} = 2e^x - \cos x \qquad (0,3)$

$y = 2e^x - \sin x + C$

$3 = 2e^0 - \sin 0 + C$

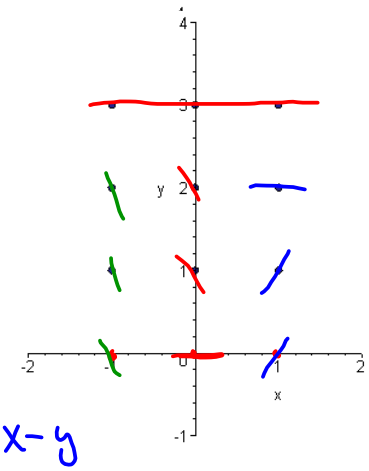
$3 = 2 + C$

$C = 1$

$y = 2e^x - \sin x + 1$

Construct a slope field for a differential equation. Then sketch a graph through a specific point.

7.1 # 29-34



(32) $\frac{dy}{dx} = 2x - y$

	m
$(-1,0)$	-2
$(-1,1)$	-3
$(-1,2)$	-4
$(0,0) = 0$	
$(0,1)$	-1
$(0,2)$	-2

$2x - y$

$(1,0)$	2
$(1,1)$	1
$(1,2)$	0

Evaluate an indefinite integral (no substitution necessary)

7.2 # 1-5

(1) $\int (\cos x - 3x^2)\,dx$

$\sin x - x^3 + C$

(4) $\int \frac{dt}{t^2+1}$ $\tan^{-1} t + C$

Use U substitution to find an indefinite integral.

7.2 # 25 - 46

$(\ln x)^6$

(33) $\int \frac{\ln^6 x}{x}\,dx$ $\quad u = \ln x$

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

$\int u^6\,du$

$\frac{1}{7}u^7 + C = \boxed{\frac{1}{7}(\ln x)^7 + C}$

$-\frac{1}{3}\int -3\frac{\cos\left(\frac{3}{x}\right)}{x^2}\,dx$

$u = \left(\frac{3}{x}\right) \quad 3x^{-1}$

$du = -3x^{-2}$

$= -\frac{3}{x^2}$

$-\frac{1}{3}\int \cos u\,du$

$-\frac{1}{3}\sin u + C$

$-\frac{1}{3}\sin\left(\frac{3}{x}\right) + C$

Evaluate an indefinite integral using a trig identity.

7.2 # 29, # 47

(29) $\int \tan(4x+2)\,dx$

$-\frac{1}{4}\int \frac{-4\sin(4x+2)}{\cos(4x+2)}\,dx$

$u = \cos(4x+2)$

$du = -4\sin(4x+2)$

$-\frac{1}{4}\int \frac{1}{u}\,du$

$-\frac{1}{4}\ln|u| + C$

$-\frac{1}{4}\ln|\cos(4x+2)| + C$

$\sin^3 2x = \sin 2x \sin^2 2x$

(47) $\int \sin^3 2x\,dx$ $\sin^2 2x = 1-\cos^2 2x$

$\int \sin 2x(1-\cos^2 2x)\,dx$

$\int (\sin 2x - \cos^2 2x \sin 2x)\,dx$

$\int \sin 2x\,dx$ $-\frac{1}{2}\int -2\cos^2 2x \sin 2x\,dx$

$u = \cos 2x$

$du = -2\sin 2x$

$-\frac{1}{2}\cos 2x$ $+\frac{1}{2}\int u^2\,du$

$+\frac{1}{2}\left(\frac{1}{3}u^3\right) + C$

$-\frac{1}{2}\cos 2x + \frac{1}{6}\cos^3 2x + C$

Evaluate definite integrals using U substitution.

7.2 # 53-60

(55) $\int_{-\frac{\pi}{4}}^{0} \tan x \sec^2 x \, dx$

$u = \tan x$

$du = \sec^2 x \, dx$

$u(-\frac{\pi}{4}) =$

$u(0) = 0$

$\int_{-1}^{0} u \, du$

$\frac{1}{2}u^2 \Big|_{-1}^{0}$

$\frac{1}{2}\left[0^2 - (-1)^2\right]$

$\frac{1}{2}[-1] = \boxed{-\frac{1}{2}}$

(60) $\int_{-\frac{1}{2}}^{\frac{\pi}{6}} \cos^{-3}(2\theta)\sin(2\theta)\, d\theta$

$u = \cos(2\theta)$

$du = -2\sin 2\theta$

$u(0) = \cos(0)$

$u(\frac{\pi}{6}) = \cos(\frac{\pi}{3}) = \frac{1}{2}$

$\frac{1}{2}\int_{1}^{\frac{1}{2}} u^{-3}\, du$

$-\frac{1}{2}\left[-\frac{1}{2}u^{-2}\right]_{1}^{\frac{1}{2}}$

$+\frac{1}{4}\left[\left(\frac{1}{2}\right)^{-2} - (1)^{-2}\right]$

$+\frac{1}{4}[4-1] = \boxed{\frac{3}{4}}$