GOOD LUCK ON YOUR FINALS !

1. *Polynomials and Radicals*

(a) Derivatives: Compute $f'(x)$ of the following

i. $f(x) = 6x^2 - 12x + 1$

$f'(x) = 12x - 12 = 12(x-1)$

ii. $f(x) = 7x^{-2} + 12x^{-3} + 11$

$f'(x) = -14x^{-3} - 36x^{-4} = -2\left(\frac{7}{x^3} + \frac{18}{x^4}\right)$

iii. $f(x) = 8x^{1/2} - 12x^{-3/2} + 10$

$f'(x) = 4x^{-1/2} + 18x^{-5/2} = 2\left(\frac{2}{x^{1/2}} + \frac{9}{x^{5/2}}\right)$

iv. $f(x) = \underbrace{6\sqrt{x}}_{=6x^{1/2}} + 12x^{-3/2} - 12$

$f'(x) = 3x^{-1/2} - 18x^{-5/2} = 3\left(\frac{1}{x^{1/2}} - \frac{6}{x^{5/2}}\right)$

v. $f(x) = (x^3 - 12x)(1 + 2x + 3x^2)$

$f'(x) = (3x^2 - 12)(1 + 2x + 3x^2) + (x^3 - 12x)(2 + 6x)$

vi.

$$f(x) = \frac{(2x^2 - 12x)}{(1 + 2x)}$$

$$f'(x) = \frac{\overbrace{(1+2x)(4x-12)}^{4x-12+8x^2-24x} - \overbrace{(2x^2-12x)(2)}^{-4x^2+24x}}{(1+2x)^2} = \frac{4x^2 + 4x - 12}{(1+2x)^2}$$

i. $f(x) = (3x+1)^4$

$f'(x) = 4(3x+1)^3 \cdot 3 = 12(3x+1)^3$

ii. $f(x) = (1-2x)^{-4}$

$f'(x) = -4(1-2x)^{-5} \cdot (-2)$

$= 8(1-2x)^{-5}$

(a) Integrals: Compute $\int f(x)dx$

i. $f(x) = 6x^2 + 12x + 1$ Compute $\int_1^3 f(x)dx$

$$\int f(x) = \frac{6x^3}{3} + \frac{12x^2}{2} + x \Big|_1^3$$

$$= 2x^3 + 6x^2 + x \Big|_1^3$$

$$= \overbrace{2 \cdot 27}^{54} + 54 + 3 - (2 + 6 + 1)$$

$$= 102$$

ii. $f(x) = 7x^{-2} + 12x^{-3} + 11$

$$\int f(x) = \frac{7x^{-1}}{-1} + \frac{12x^{-2}}{-2} + 11x + C$$

$$= \frac{-7}{x} - \frac{6}{x^2} + 11x + C$$

iii. $f(x) = 8x^{1/2} - 12x^{-3/2} + 10$

$$\int f(x)\,dx = \frac{2}{3} \cdot 8x^{3/2} + \frac{2}{1} \cdot 12x^{-1/2} + 10x + C$$

$$= \frac{16}{3}x^{3/2} + 24x^{-1/2} + 10x + C$$

i. $f(x) = (2x+1)^4$

$u = 2x+1$

$\frac{du}{dx} = 2 \Rightarrow du = 2\,dx$

$\Rightarrow \frac{du}{2} = dx$

$$\int (2x+1)^4\,dx = \int u^4 \cdot \frac{du}{2} = \frac{1}{2}\int u^4\,du = \frac{1}{2}\frac{u^5}{5} + C$$

$$= \frac{1}{10}(2x+1)^5 + C$$

ii. $f(x) = \sqrt{3x+1}$

$$\int_1^3 (3x+1)^{1/2}\,dx = \int u^{1/2} \cdot \frac{1}{3}\,du = \frac{1}{3}\int u^{1/2}\,du = \frac{1}{3}\frac{u^{3/2}}{\left(\frac{3}{2}\right)}$$

$u = 3x+1$

$\frac{du}{dx} = 3 \Rightarrow du = 3\,dx$

$\frac{1}{3}\,du = dx$

$$= \frac{2}{9}(3x+1)^{3/2}\Big|_1^3$$

$$\boxed{= \frac{2}{9}\left[(10)^{\frac{3}{2}} - (4)^{\frac{3}{2}}\right]}$$

iii. $f(x) = x(3x^2+1)$

$u = 3x^2+1$

$\frac{du}{dx} = 6x \Rightarrow du = 6x\,dx \Rightarrow \frac{du}{6} = x\,dx$

$$\int x(3x^2+1)\,dx = \int (3x^2+1)\,x\,dx = \int u \cdot \frac{du}{6} = \frac{1}{6}\int u\,du$$

$$= \frac{1}{6}\frac{u^2}{2} + C$$

$$= \frac{(3x^2+1)^2}{12} + C$$

or distribute 1st

$$\int 3x^3 + x\,dx = \frac{3x^4}{4} + \frac{x^2}{2} + C = \frac{3x^4+2x^2}{4} + C$$

How can both of these be right?

$$\frac{(3x^2+1)^2}{12} + C = \frac{9x^4+6x^2+1}{12} + C = \frac{3x^4+2x^2}{4} + \underbrace{\frac{1}{12} + C}_{\text{constant}}$$

Two anti-derivatives are equal if they differ only by a constant.

(a) Applications

i. Find the speed of a pebble the instant it hits the ground if it is dropped from 256 feet high.

$v(t) = \int -32\,dt = -32t + c$, & $c = 0$ (since dropped)

$s(t) = \int -32t\,dt = -16t^2 + c$

& $s(0) = 256 \Rightarrow c = 0$ so $s(t) = -16t^2 + 256$

Pebble hits ground: $s(t) = 0 = -16t^2 + 256$

$\Rightarrow t^2 = \frac{256}{16} = \frac{2^8}{2^4} = 2^4 = 16$

so $t = 4$ seconds

Velocity upon impact:

$v(4) = -32(4) = -128$ ft/sec

ii. Find the velocity at $t = 2$ of an object whose position is $s(t) = x(3x+1)^2$ feet high at time t (in seconds).

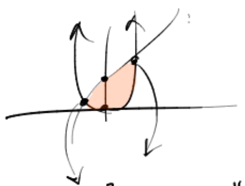
$v(t) = s'(t) = 1\cdot(3x+1)^2 + x(2(3x+1)\cdot 3)$

$= (3x+1)^2 + 6x(3x+1) = (3x+1)((3x+1) + 6x)$

$= (3x+1)(9x+1)$

$v(2) = (3\cdot 2+1)(9\cdot 2+1) = (7)(19) = \boxed{113 \frac{ft}{sec}}$

Find the area bound by $y = x^3 + 2$ & $y = x^4$.



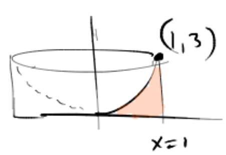
$x^3 + 2 = x^4$

$x^4 - x^3 + 2 = 0$ tough to solve by hand look at graph instead

$\Rightarrow$ $x = -1$ & $x = 1.54$

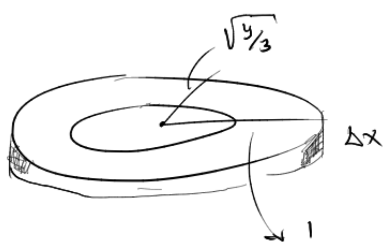
$$A = \int_{-1}^{1.54} x^3 + 2 - x^4 \, dx = \frac{x^4}{4} + 2x - \frac{x^5}{5} \Bigg|_{-1}^{1.54} = \frac{(1.54)^4}{4} + 2(1.54) - \frac{(1.54)^5}{5} - \left(\frac{1}{4} - 2 + \frac{1}{5}\right) \approx 4.03$$

(iv) Find the volume: $y = 3x^2$, $y = 0$, $x = 0$, $x = 1$, about y-axis



y-axis $\Rightarrow$ $\frac{y}{3} = x^2$ & bounds $y = 3 \cdot 0^2 = 0$, $y = 3 \cdot 1^2 = 3$

so $\sqrt{\frac{y}{3}} = x$ will be inside (small radius

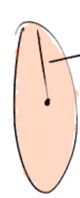


$$A = \pi(1)^2 - \pi\left(\sqrt{y/3}\right)^2$$

$$V = \int_0^3 \pi\,(1 - y/3)\,dy = \pi\left(y - \frac{y^2}{6}\right)\Bigg|_0^3 = \pi\left(3 - \frac{9}{6}\right)$$

$$= \boxed{\frac{9\pi}{6}}$$

(v) Now the x-axis



so $A = \pi(3x^2)^2 = 9\pi x^4$

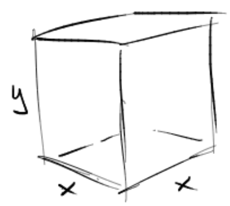
$$\int_0^1 9\pi x^4 \, dx = \frac{9\pi^5}{5}\Bigg|_0^1 = \boxed{\frac{9\pi}{5}}$$

(vi) Find the average velocity. $v(t) = \cos(2t)$, $t \in [0, 2\pi]$

$$= \frac{1}{2\pi - 0}\int_0^{2\pi} \cos(2t) = \frac{1}{2}\frac{1}{2\pi}\left(-\sin(2t)\right)\Big|_0^{2\pi} = 0.$$

The projectile is oscillating forward (+ velocity) and back (− velocity) equally, giving an average velocity of zero.

(vii)



1000 cm^2 of material

Constraint:

1 Bottom: x^2
4 sides: xy

$$x^2 + 4xy = 1000$$
$$y = \frac{1000 - x^2}{4x}$$

$$A = x^2 y = x^2\left(\frac{1000 - x^2}{4x}\right)$$

$$= \frac{1000x - x^3}{4} = 250x - .25x^3$$

$$A' = 250 - .75x^2 = 0$$

Note: $A'' = -1.5x$

& $A''(18.25) < 0$

$\Rightarrow$ concave down

$\Rightarrow$ volume is a max.

$$250 = .75x^2$$

$$\frac{250}{\frac{3}{4}} = x^2$$

$$\frac{4 \cdot 250}{3} = x^2$$

$25 \cdot 10$

$$\frac{2 \cdot 5\sqrt{10}}{\sqrt{3}} = x$$

$$10 \cdot \sqrt{\frac{10}{3}} = x$$

$$\boxed{18.25 \approx x}$$

$$\frac{1000 - (18.25)^2}{4(18.25)} = \boxed{9.13 = y}$$

3. *Exponentials*

(a) Derivatives: Compute $f'(x)$ of the following

i. $f(x) = e^{2x+1}$ Compute $\int_1^3 f(x)dx$

$f'(x) = 2e^{2x+1} \Big|_1^3 = 2\left[e^7 - e^3\right] \approx 2153.1$

ii. $f(x) = e^{-3x^2+x}$

$f'(x) = e^{-3x^2+x}(-6x+1)$

iii. $f(x) = 2e^{\cos(x)}$

$f'(x) = 2e^{\cos(x)} \cdot (-\sin(x)) = -2\sin(x)e^{\cos(x)}$

iv. $f(x) = xe^x$

$f'(x) = e^x + xe^x = e^x(1+x)$

v. $f(x) = 2xe^{3x}$

$f'(x) = 2e^{3x} + 3 \cdot 2xe^{3x} = 2e^{3x}(1+3x)$

$+C$

vi.

$$f(x) = \frac{2x+1}{e^{3x}}$$

$f'(x) = \dfrac{2e^{3x} - (2x+1)e^{3x} \cdot \frac{1}{3}}{e^{6x}} = \dfrac{e^{3x}\left(2 - \frac{(2x+1)}{3}\right)}{e^{6x}}$

$= \dfrac{6-(2x+1)}{e^{3x}} = \dfrac{5-2x}{e^{3x}}$

(a) Integrals

$u = 2x$

$\frac{du}{dx} = 2 \quad du = 2dx \quad \frac{du}{2} = dx$

i. $f(x) = e^{2x}$

$$\int e^{2x}dx = \int e^u \frac{du}{2} = \frac{1}{2}\int e^u du = \frac{1}{2}e^u + c$$

$$= \frac{1}{2}e^{2x} + c$$

ii. $f(x) = e^{-3x}$

$u = -3x$

$\frac{du}{dx} = -3$

$\Rightarrow du = -3dx$

$-\frac{1}{3}du = dx$

$$\int e^{-3x}dx = \int e^u\left(\frac{-1}{3}du\right) = \frac{-1}{3}\int e^u du = \frac{-1}{3}e^{-3x} + c$$

i. $f(x) = e^{2x+1}$

$u = 2x + 1$

$\frac{du}{dx} = 2$

$\Rightarrow du = 2dx$

$\frac{1}{2}du = dx$

$$\int e^{2x+1}dx = \int e^u\left(\frac{1}{2}du\right) = \frac{1}{2}\int e^u du = \frac{1}{2}e^{(2x+1)} + c$$

ii. $f(x) = xe^{2x^2+1}$

$u = 2x^2 + 1$

$\frac{du}{dx} = 4x$

$\Rightarrow du = 4x\,dx \Rightarrow \frac{du}{4} = x\,dx$

$$\int xe^{2x^2+1}dx = \int e^{2x^2+1}x\,dx = \int e^u \cdot \frac{du}{4} = \frac{1}{4}\int e^u du = \frac{1}{4}e^{(2x^2+1)} + c$$

iii. $f(x) = \cos(x)e^{\sin(x)}$

$u = \sin x$

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

$\Rightarrow du = \cos x\, dx$

$$\int \cos x \cdot e^{\sin x}dx = \int e^{\sin x}\underbrace{\cos x\, dx}_{du} = \int e^u du$$

$$= e^u + c$$

$$= e^{\sin x} + c$$

iv. $f(x) = \sin(x)e^{2\cos(x)+1}$

$u = 2\cos x + 1$

$\frac{du}{dx} = -2\sin x$

$du = -2\sin x\, dx$

$\Rightarrow -\frac{1}{2}du = \sin x\, dx$

$$\int e^{2\cos x + 1} \cdot \underbrace{\sin x\, dx}_{-\frac{1}{2}du} = \int e^u \cdot -\frac{1}{2}du$$

$$= -\frac{1}{2}\int e^u du = -\frac{1}{2}e^u + c$$

$$= -\frac{1}{2}e^{2\cos(x)+1} + c$$

$u = x \quad dv = e^x$

$\frac{du}{dx} = 1 \quad v = e^x$

i. $f(x) = xe^x$

$\int xe^x = xe^x - \int e^x dx = xe^x - e^x + C$

$= e^x(x-1) + C$

ii. $f(x) = -xe^{2x}$

$u = -x \quad dv = e^{2x}$

$\frac{du}{dx} = -1 \quad v = \frac{1}{2}e^{2x}$

$-\frac{x}{2}e^{2x} + \frac{1}{2}\int e^{2x} dx$

$-\frac{x}{2}e^{2x} + \frac{1}{4}e^{2x} + C$

$-\frac{e^{2x}}{2}\left(x - \frac{1}{2}\right) + C$

iii. $f(x) = 5xe^{-2x}$

$u = 5x \quad dv = e^{-2x}$

$\frac{du}{dx} = 5 \quad v = -\frac{1}{2}e^{-2x}$

$du = 5dx$

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

$-\frac{5x}{2}e^{-2x} + \frac{5}{2}\cdot\frac{-1}{2}e^{-2x} + C$

$-\frac{5}{2}e^{-2x}\left(x + \frac{1}{2}\right) + C$

(a) Applications

i. Find the velocity at $t = 5$ of an object moving according to $s(t) = x(e^{-x})$

$$s'(t) = v(t) = 1 \cdot e^{-x} - xe^{-x} = e^{-x}(1-x)$$

$$v(5) = e^{-5}(1-5) = \frac{-4}{e^5} \approx -0.03$$

Ignore Gravity!

ii. Find the height at $t = 10$ of a bottle rocket whose velocity is $v(t) = x(e^{-x})$, where $t = 0$ corresponds to the moment of liftoff.

$$s(t) = \int xe^{-x}\,dx = -xe^{-x} + \int e^{-x}\,dx = -xe^{-x} - e^{-x} + C$$

$$\left.\begin{matrix} u = x & dv = e^{-x} \\ \frac{du}{dx} = 1 & v = -e^{-x} \end{matrix}\right\}$$

$\&$ $s(0) = 0 \Rightarrow \underbrace{-0e^{-0}}_{0} - e^{-0} + C = 0$

$0 - 1 + C = 0$

$\Rightarrow C = 1$

$$s(t) = 1 - e^{-x}(x+1)$$

$$s(10) = 1 - e^{-10}(10+1) = 1 - \frac{11}{e^{10}} = .999$$

iii. Kyle, who likes guns, fires a bullet straight up into the air. How high does the bullet go? Ignore air resistence, assume the initial velocity of the bullet is 400 feet per second, and assume gravity is $-32\frac{feet}{sec}$.

$$a(t) = -32$$

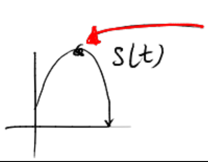
$$v(t) = -32t + C \quad \& \quad v(0) = 400 \Rightarrow C = 400$$

$$v(t) = -32t + 400$$

$$s(t) = -16t^2 + 400t + C, \quad \text{assume } s(0) = 6 \ (\text{6 feet tall})$$

Kyle's

$$s(t) = -16t^2 + 400t + 6$$



$$s'(t) = -32t + 400 = 0$$

$$t = \frac{400}{32} = \frac{100}{8} = \frac{50}{4} = \frac{25}{2} = 12.25 \text{ s.} \Rightarrow s(12.25) = 2505 \text{ feet.}$$

4. *Logarithmic Functions*

(a) Derivatives: Compute $f'(x)$ of the following

i. $f(x) = \ln(cos(x))$

$f'(x) = \frac{-\sin x}{\cos x} = -\tan x$

ii. $f(x) = \ln(2x)$

$f'(x) = \frac{2}{2x} = \frac{1}{x}$

iii. $f(x) = x \ln(x)$

$f'(x) = \ln x + \frac{x}{x} = 1 + \ln x$

iv. $f(x) = 2x \ln(3x)$

$f'(x) = 2\ln(3x) + 2x \cdot \frac{3}{3x} = 2\ln 3x + 2$

v.

$$f(x) = \frac{\ln x}{3x}$$

$f'(x) = \frac{3x\left(\frac{1}{x}\right) - 3\ln x}{9x^2} = \frac{3(1-\ln x)}{9x^2} = \frac{1-\ln x}{3x^2}$

vi.

$$f(x) = \frac{2x}{\ln x + 1}$$

$f'(x) = \frac{2(\ln x + 1) - 2x(1/x)}{(\ln x + 1)^2} = \frac{2\ln x}{(\ln x + 1)^2}$

(a) Integrals

i.

$$f(x) = \frac{1}{x}$$

$$\int \frac{1}{x}\,dx = \ln(x) + C$$

ii.

$$f(x) = \frac{\sin(x)}{\cos(x)}$$

$u = \cos x$

$\frac{du}{dx} = -\sin x$

$-du = \sin x\,dx$

$$\int \frac{\sin x}{\cos x}\,dx = \int -\frac{du}{u}$$

$$= -\ln u + C$$

$$= -\ln(\cos x) + C$$

iii.

$$f(x) = \frac{x^2}{x^3+1}$$

$u = x^3 + 1$

$\frac{du}{dx} = 3x^2$

$du = 3x^2\,dx$

$\frac{1}{3}du = x^2\,dx$

$$\int \frac{x^2}{x^3+1}\,dx = \int \frac{\frac{1}{3}du}{u} = \frac{1}{3}\int \frac{du}{u} = \frac{1}{3}\ln u + C$$

$$= \frac{1}{3}\ln(x^3+1) + C$$

(a) Applications

i. Suppose the height of an object is given by $f(x) = \ln(x)$. Which is greater, the speed of the object at $t = 10$ or $t = 100$? Is the object going up or down? Is the object accelerating or deccelerating at these times?

$v(x) = \frac{1}{x}$ so $v(10) = \frac{1}{10} > v(100) = \frac{1}{100}$

$t = 10 \Rightarrow$ greater speed, it's positive, so going <u>up</u>

$a(x) = \frac{-1}{x^2}$, negative, decelerating always.

5. *Trigonometric Functions*

(a) Derivatives: Compute $f'(x)$ of the following

i. $f(x) = \cos 2x$

$f'(x) = -2\sin 2x$

ii. $f(x) = \tan x = \frac{\sin x}{\cos x}$

$f'(x) = \frac{\cos^2 x + \sin^2 x}{\cos^2 x} = \frac{1}{\cos^2 x} = \sec^2 x$

iii. $f(x) = \sin(3x)e^{2x}$

$f'(x) = 3\cos(3x)e^{2x} + 2\sin(3x)e^{2x}$

iv.

$$f(x) = \frac{1}{\sin x}$$

$f'(x) = \frac{-\cos x}{\sin^2 x}$

v. $f(x) = \cos 2x^3 + x$

$f'(x) = -\sin(2x^3)\cdot(6x^2) + 1$

vi. $f(x) = \sin e^{2x}$

$f'(x) = \cos(e^{2x})\cdot e^{2x}\cdot 2$

vii. $f(x) = (1 + \sin 2x)^3$

$f'(x) = 6(1 + \sin 2x)^2(\cos(2x))$

viii. $f(x) = x\cos x$

$f'(x) = \cos x - x\sin x$

(a) Integrals

i. $f(x) = \sin 2x$

$$\int \sin 2x \, dx = \int \sin u \cdot \tfrac{1}{2} du = \tfrac{1}{2} \int \sin u \, du$$

$u = 2x$

$\frac{du}{dx} = 2$

$du = 2dx$

$\frac{1}{2} du = dx$

$$= -\tfrac{1}{2} \cos u + C$$

$$= -\tfrac{1}{2} \cos(2x) + C$$

ii. $f(x) = \cos(-2x)$

$u = -2x$

$\frac{du}{dx} = -2$

$du = -2dx$

$-\frac{1}{2} du = dx$

$$\int \cos(-2x) \, dx = \int \cos(u) \left(-\tfrac{1}{2} du\right)$$

$$= -\tfrac{1}{2} \int \cos u \, du$$

$$= -\tfrac{1}{2} \sin u + C$$

$$= -\tfrac{1}{2} \sin(-2x) + C$$

i. $f(x) = x\cos(-2x^2)$

$u = -2x^2$

$\frac{du}{dx} = -4x$

$du = -4x\, dx$

$-\frac{1}{4} du = x\, dx$

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

$= \int \cos(u) \left(-\frac{1}{4} du\right)$

$= -\frac{1}{4} \int \cos u \, du = -\frac{1}{4} \sin u + C$

$= -\frac{1}{4} \sin(-2x^2) + C$

ii. $f(x) = x^2 \sin(-2x^3)$

$u = -2x^3$

$\frac{du}{dx} = -6x^2$

$du = -6x^2 dx$

$-\frac{1}{6} du = x^2 dx$

$\int \sin(\underbrace{-2x^3}_{u}) \underbrace{x^2 dx}_{-\frac{1}{6}du} = \int \sin(u) \left(-\frac{1}{6} du\right)$

$= -\frac{1}{6} \int \sin u \, du$

$= +\frac{1}{6} \cos u + C$

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

iii. $f(x) = \sin(x)(1 + \cos x)^3$

$u = 1 + \cos x$

$\frac{du}{dx} = -\sin x$

$du = -\sin x \, dx$

$-du = \sin x \, dx$

$\int (1 + \cos x)^3 \sin x \, dx$

$\int u^3 (-du) = -\int u^3 du$

$= -\frac{u^4}{4} + C$

$= -\frac{(1 + \cos x)^4}{4} + C$

i. $f(x) = x\sin((x))$

$$\int x\sin(x)\,dx = -x\cos(x) + \int \cos x\,dx$$

$$= -x\cos x + \sin x + C$$

$u = x \quad dv = \sin x\,dx$

$\frac{du}{dx} = 1 \quad v = -\cos x$

$du = dx$

ii. $f(x) = 2x^2\cos((3x))$

$u = 2x^2 \quad dv = \cos(3x)$

$du = 4x \quad v = \frac{1}{3}\sin 3x$

$u = x \quad dv = \sin 3x$

$du = 1 \quad v = -\frac{1}{3}\cos 3x$

$$\frac{2x^2}{3}\sin 3x + \frac{4}{3}\int x \cdot \sin 3x\,dx$$

$$+ \frac{4}{3}\left(-\frac{x}{3}\cos 3x + \frac{1}{3}\int \cos 3x\,dx\right)$$

$$+ \frac{4}{3}\left(-\frac{x}{3}\cos 3x + \frac{1}{3}\cdot\frac{1}{3}\sin 3x\right)$$

$$\frac{2x^2}{3}\sin 3x - \frac{4x}{9}\cos 3x + \frac{4}{27}\sin 3x$$

$$\frac{2}{3}\left[\sin 3x\left(x^2 + \frac{2}{9}\right) - \frac{4}{3}x\cos 3x\right] + C$$

(a) Applications

i. Find the velocity at time $t = 3$ of an object whose position is

$s(t) = 2\cos(1.3x - 2)$

$s'(t) = -2\sin(1.3x-2)(1.3)$

$s'(3) = -2\sin(1.3(3) - 2)(1.3) = -2.46$

ii. Find the acceleration at time $t = 10$ of an object whose position is given by

$$s(t) = 2\cos(1.3x - 2)$$

$v(t) = -2\sin(1.3x - 2)\cdot(1.3) = -2.6\sin(1.3x - 2)$

$a(t) = -2.6\cos(1.3x - 2)(1.3)$

$= -3.38\cos(1.3x - 2)$

$a(10) = -3.38\cos(13 - 2) = -3.38\cos(11)$

$= -0.015$