

رابعي ← لجميع الحدود
ثم الفرز

$$1) \frac{dy}{dx} = 1 - y + x^2 - yx^2$$

$$\frac{dy}{dx} = 1 - y + (1 - y)(x^2)$$

$$\frac{dy}{dx} = (1 - y)(1 + x^2)$$

$$\frac{1}{1 - y} dy = (1 + x^2) dx$$

$$\int \frac{1}{1 - y} dy = \int (1 + x^2) dx$$

$$-\ln|1 - y| = x + \frac{x^3}{3} + C \rightarrow |1 - y| = e^{-x - \frac{x^3}{3}} \times C$$

$$2) (x^2 + 4x) \frac{dy}{dx} = e^{-3y} (x + 1)(x^2 - 16)$$

$$e^{3y} dy = \frac{(x + 1)(x - 4)(x + 4)}{x(x + 4)} dx$$

$$e^{3y} dy = \frac{x^2 + x - 4x - 4}{x} dx$$

$$\int e^{3y} dy = \int \left(\frac{x^2 - 3x - 4}{x} \right) dx$$

$$\frac{e^{3y}}{3} = \frac{x^2}{2} - 3x - 4 \ln|x| + C$$

$$3y = \ln\left(\frac{3x^2}{2} - 9x - 12 \ln|x| + C\right)$$

$$y = \frac{1}{3} \ln\left(\frac{3}{2}x^2 - 9x - 12 \ln|x| + C\right)$$

$$3) \frac{dy}{dx} = x \cdot y, \quad y > 0$$

$$\frac{1}{y} dy = x dx$$

$$\int \frac{1}{y} dy = \int x dx$$

$$\ln|y| = \frac{x^2}{2} + C$$

$$|y| = e^{\frac{x^2}{2} + C} = C e^{\frac{x^2}{2}}$$

$$4) \frac{dy}{dx} = \frac{y}{\cos^2 x}$$

$$\frac{1}{y} dy = \sec^2 x dx$$

$$\int \frac{1}{y} dy = \int \sec^2 x dx$$

$$\ln|y| = \tan x + C \rightarrow |y| = e^{\tan x + C} = e^{\tan x} * C$$

$$\frac{dy}{dx} = 5 \sec^2 x - \frac{3}{2} \sqrt{x}$$

$$dy = (5 \sec^2 x - \frac{3}{2} \sqrt{x}) dx$$

$$y = 7, x = 0$$

$$\int dy = \int (5 \sec^2 x - \frac{3}{2} x^{\frac{1}{2}}) dx$$

$$y = 5 \tan x - \frac{3(2)}{2} \frac{\sqrt{x^3}}{3} + C$$

$$y = 5 \tan x - \sqrt{x^3} + C$$

$$7 = 0 - 0 + C \rightarrow \boxed{C=7} \quad y = 5 \tan x - \sqrt{x^3} + 7$$

$$1) \frac{dy}{dx} = 2xy, (0, 1)$$

$$\frac{dy}{y} = 2x dx$$

$$\int \frac{1}{y} dy = \int 2x dx$$

$$\ln|y| = x^2 + C$$

$$|y| = e^{x^2 + C}$$

$$|y| = e^{x^2} \cdot C \rightarrow (0, 1)$$

$$x=0, y=1$$

$$1 = 1 \cdot C \rightarrow C=1$$

$$|y| = e^{x^2} \quad \text{وحيث}$$

* حل واجب (1) صفحة (53)

2) $\frac{dy}{dx} = \frac{2 \sin^2 x}{y}$, $y(0) = 1 \rightarrow x = 0, y = 1$

$y dy = (1 - \cos 2x) dx$

$\int y dy = \int (1 - \cos 2x) dx$

$\frac{y^2}{2} = x - \frac{\sin 2x}{2} + C$

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

$1 = C$

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

$y = \pm \sqrt{2x - \sin 2x + 1}$

السالب ترفض لأنها لا تحقق الشرط المعطى

$y = \sqrt{2x - \sin 2x + 1}$

3) $\frac{dy}{dx} = \frac{\cos x e^{\sin x}}{e^y}$, $y(\pi) = 0$

$e^y dy = \cos x e^{\sin x} dx$

$\int e^y dy = \int \cos x e^{\sin x} dx$

$\int e^y dy = \int e^u du \rightarrow \begin{matrix} \text{تعويض} \\ u = \sin x \\ \frac{du}{\cos x} = dx \end{matrix}$

$e^y = e^u + C$
 $y = \ln(e^u + C) = \ln(e^{\sin x} + C)$

$x = \pi, y = 0$

$0 = \ln(1 + C)$

$1 + C = 1 \rightarrow C = 0$

$y = \ln(e^{\sin x})$

4) $\frac{dy}{dx} = \frac{1}{xy}$, $y(e) = 1$

$y dy = \frac{1}{x} dx$

$\int y dy = \int \frac{1}{x} dx$

$\frac{y^2}{2} = \ln|x| + C$

$y^2 = 2 \ln|x| + C$

$x = e, y = 1$

$1 = 2 \ln e + C$

$C = -1$

$y^2 = 2 \ln|x| - 1$

$y = \pm \sqrt{2 \ln|x| - 1}$

والسالب ترفض لأنها لا تحقق الشرط المعطى

$y = \sqrt{2 \ln|x| - 1}$

* حل واجب (2) صفحة (53)

$$y = 4e^x + 5e^{3x} \rightarrow y'' - 4y' + 3y = 0$$

$$y' = 4e^x + 15e^{3x}$$

$$y'' = 4e^x + 45e^{3x} \xrightarrow{\text{التحويل}} 4e^x + 45e^{3x} - 16e^x - 60e^{3x} + 12e^x + 15e^{3x} = 0$$

المعادلة المحققة $0 = 0$

* حل واجب (1) صفحة (55)

$$\frac{dV}{dt} = \frac{1}{\sqrt{2t+1}}$$

$$dV = (2t+1)^{-1/2} dt$$

$$\int dV = \int (2t+1)^{-1/2} dt$$

$$V = (2t+1)^{1/2} + C$$

$$V = \sqrt{2t+1} + C$$

$$100 = \sqrt{1} + C \rightarrow C = 99$$

$$V = \sqrt{2t+1} + 99$$

$$V|_{t=24} = \sqrt{49} + 99 = 7 + 99 = 106$$

$$t=24$$

$$V_2 - V_1 = 106 - 100$$

$$= 6 \text{ cm}^3$$

الإجابة النهائية ←

* انتبه للمطلوب ← مقدار الزيادة

* حل واجب (2) صفحة (55)

$$\frac{dk}{dt} = 0.025k$$

$$\frac{1}{k} dk = dt (0.025)$$

$$\int \frac{1}{k} dk = \int 0.025 dt$$

$$\ln|k| = 0.025t + C$$

$$|k| = e^{0.025t + C}$$

$$k = e^{0.025t + C}$$

$$k = a e^{0.025t}$$

$$\downarrow C$$

$$a = e^C$$

$$200000 = a e^0$$

$$a = 200000$$

$$k|_{t=20} = 200000 e^{0.5}$$

$$t=20$$

$$= 329744$$

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* حل واجب صفحة (56)

$$\frac{dV}{dt} = (5t - 100)$$

$$dV = (5t - 100) dt$$

$$\int dV = \int (5t - 100) dt$$

$$V = \frac{5}{2} t^2 - 100t + C$$

$$V = 250 \quad , \quad t = 10$$

$$250 = 250 - 1000 + C$$

$$C = 1000$$

$$V(t) = \frac{5}{2} t^2 - 100t + 1000$$

a) $t = 0 \quad V(0) = 1000 \text{ cm}^3$

b) $V(t) = 0 \quad 0 = \frac{5}{2} t^2 - 100t + 1000$

$$0 = t^2 - 40t + 400$$

$$t = 20 \text{ min} \quad \leftarrow \quad 0 = (t - 20)(t - 20)$$

* حل واجب صفحة (57)

$$1) \frac{dy}{dx} = \frac{e^{x-y}}{e^x+1} = \frac{e^x \div e^y}{e^x+1} = \frac{e^x}{e^x+1} * \frac{1}{e^y}$$

$$e^y dy = \frac{e^x}{e^x+1} dx$$

$$\int e^y dy = \int \frac{e^x}{e^x+1} dx$$

$$e^y = \ln|e^x+1| + C$$

$$y = \ln(\ln|e^x+1| + C)$$

$$y = 1 \quad , \quad x = 0$$

$$e = \ln 2 + C$$

$$C = \boxed{e - \ln 2}$$

$$y = \ln(\ln|e^x+1| + e - \ln 2)$$

$$y = \ln\left[\ln\left(\frac{e^x+1}{2}\right) + e\right]$$

* حل واجب ورقة (57)

$$2) \frac{dy}{dx} = \frac{\sin^4 x}{\cos^2 x} = \tan^2 x \sin^2 x$$

$$\int dy = \int \sin^2 x \tan^2 x dx$$

$$y = \int \sin^2 x (\sec^2 x - 1) dx$$

$$y = \int (\tan^2 x - \sin^2 x) dx$$

$$y = \int (\sec^2 x - 1) dx - \frac{1}{2} \int (1 - \cos 2x) dx$$

$$y = \tan x - x - \frac{1}{2} \left(x - \frac{\sin 2x}{2} \right) + C$$

$$y = \tan x - \frac{3}{2}x + \frac{\sin 2x}{4} + C$$

$$x=0 \quad y=1$$

$$1 = 0 - 0 + 0 + C \rightarrow \boxed{C=1} \rightarrow y = \tan x - \frac{3}{2}x + \frac{\sin 2x}{4} + 1$$

* حل واجب ورقة (59)

$$\frac{ds}{dt} = 3 \cos t$$

$$\int ds = \int 3 \cos t dt$$

$$s(t) = 3 \sin t + C$$

$$t=0, s=0$$

$$0 = 0 + C \rightarrow C=0$$

$$s(t) = 3 \sin t$$

$$a) s\left(\frac{\pi}{6}\right) = 3 \sin \frac{\pi}{6} = \frac{3}{2}$$

$$b) \int_0^{2\pi} 3 \cos t \, dt = \text{الإجابة}$$

$$= 3 \sin t \Big|_0^{2\pi} = 0 \text{ m}$$

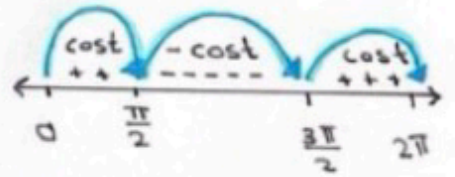
$$c) \int_0^{2\pi} |3 \cos t| \, dt = \text{المسافة الكلية المقطوعة}$$

$$= \int_0^{\frac{\pi}{2}} 3 \cos t \, dt + \int_{\frac{\pi}{2}}^{\frac{3\pi}{2}} -3 \cos t \, dt + \int_{\frac{3\pi}{2}}^{2\pi} 3 \cos t \, dt$$

$$= 3 \sin t \Big|_0^{\frac{\pi}{2}} + -3 \sin t \Big|_{\frac{\pi}{2}}^{\frac{3\pi}{2}} + 3 \sin t \Big|_{\frac{3\pi}{2}}^{2\pi}$$

$$= 3(1-0) - 3(-1-1) + 3(0-(-1))$$

$$= 3 + 6 + 3 = 12 \text{ m}$$



$$\frac{dv}{dt} = \sqrt{v}$$

$$\int v^{-\frac{1}{2}} dv = \int dt$$

$$2\sqrt{v} = t + C \rightarrow t=0, v=9$$

$$6 = C \rightarrow 2\sqrt{v} = t + 6$$

$$4v = t^2 + 12t + 36$$

$$v = \frac{t^2}{4} + 3t + 9$$

$$\frac{ds}{dt} = \frac{t^2}{4} + 3t + 9$$

$$\int ds = \int \left(\frac{t^2}{4} + 3t + 9 \right) dt$$

$$s(t) = \frac{t^3}{12} + \frac{3}{2}t^2 + 9t + C_1 \rightarrow s=80, t=4$$

$$80 = \frac{64}{12} + 24 + 36 + C_1 \rightarrow C_1 = \frac{44}{3}$$

$$s(2) = \frac{8}{12} + \frac{3}{2}(4) + 18 + \frac{44}{3}$$

$$= \frac{72 + 44 + 2}{3} = \frac{118}{3} \text{ m}$$

* حل الواجب

:- (62) صفحة