Q1 - 2024 (04 Apr Shift 1) mathongo ///. mathongo ///. mathongo ///. mathongo

If the solution y=y(x) of the differential equation $\left(x^4+2x^3+3x^2+2x+2\right)\mathrm{d}y-\left(2x^2+2x+3\right)\mathrm{d}x=0$

satisfies $y(-1)=-\frac{\pi}{4}$, then y(0) is equal to : mathongo /// mathongo /// mathongo /// mathongo /// mathongo $(1) \frac{\pi}{2}$

(2) $\frac{n\pi}{2}$ athongo ///. mathongo ///. mathongo ///. mathongo ///. mathongo

(3) 0 mathongo ///. mathongo ///. mathongo ///. mathongo ///. mathongo

 $(4) \frac{\pi}{4}$

Q2 - 2024 (04 Apr Shift 1) mathongo /// mathongo /// mathongo /// mathongo /// mathongo /// mathongo

Q3 - 2024 (04 Apr Shift 2)

Let y=y(x) be the solution of the differential equation $\left(x^2+4\right)^2dy+\left(2x^3y+8xy-2\right)dx=0$. If

y(0)=0, then y(2) is equal to g(2)=0, then g(2)=0, then

 $\frac{1}{32}$ nathongo ///. mathongo ///. mathongo ///. mathongo ///. mathongo (2) 2π

 $\frac{\pi}{8}$ mathongo ///. mathongo ///. mathongo ///. mathongo ///. mathongo

 $\frac{4}{16}$ mathongo ///. mathongo ///. mathongo ///. mathongo ///. mathongo

Q4 - 2024 (04 Apr Shift 2) mathongo ///. mathongo ///. mathongo ///. mathongo

Let y = y(x) be the solution of the differential equation $(x + y + 2)^2 dx = dy$, y(0) = -2. Let the maximum and minimum values of the function y=y(x) in $\left[0,\frac{\pi}{3}\right]$ be α and β , respectively. If

 $(3lpha+\pi)^2+eta^2=\gamma+\delta\sqrt{3}, \gamma, \delta\in\mathbb{Z}, ext{ then } \gamma+\delta ext{ equals }$

Q5 - 2024 (05 Apr Shift 1)

If y=y(x) is the solution of the differential equation $\frac{\mathrm{d}y}{\mathrm{d}x}+2y=\sin(2x),y(0)=\frac{3}{4}$, then $y\left(\frac{\pi}{8}\right)$ is equal to:

- $\binom{n}{1}e^{\pi/8}$ thongo ///. mathongo ///. mathongo ///. mathongo ///. mathongo
- (2) $e^{\pi/4}$ mathongo ///. mathongo ///. mathongo ///. mathongo ///. mathongo (3) $e^{-\pi/4}$

Q6 - 2024 (05 Apr Shift 2)

The differential equation of the family of circles passing through the origin and having centre at the line y = x

- is.) mathongo ///. mathongo ///. mathongo ///. mathongo ///. mathongo
- (1) $(x^2 y^2 + 2xy) dx = (x^2 y^2 2xy) dy$
- (2) $(x^2 + y^2 + 2xy) dx = (x^2 + y^2 2xy) dy$
- (3) $(x^2+y^2-2xy) dx = (x^2+y^2+2xy) dy$ ongo /// mathongo /// mathongo ///
- (4) $(x^2-y^2+2xy) dx = (x^2-y^2+2xy) dy$ mathongo /// mathongo /// mathongo /// mathongo
- Q7 2024 (05 Apr Shift 2) nathongo ///. mathongo ///. mathongo ///. mathongo ///. mathongo

Let y = y(x) be the solution of the differential equation mathons with mathons w

$$rac{\mathrm{d}y}{\mathrm{d}x}+rac{2x}{(1+x^2)^2}y=x\mathrm{e}^{\frac{1}{(1+x^2)}};y(0)=0.$$

Then the area enclosed by the curve $f(x)=y(x)\mathrm{e}^{\frac{1}{(1+x^2)}}$ and the line $y-x=4$ is _______

Q8 - 2024 (06 Apr Shift 1) mathongo ///. mathongo ///. mathongo ///. mathongo ///. mathongo

Let y=y(x) be the solution of the differential equation $(1+x^2)\frac{dy}{dx}+y=e^{\tan^{-1}x}$, y(1)=0. Then y(0) is mathongo /// mathongo /// mathongo /// mathongo

- (1) $\frac{1}{2} (e^{\pi/2} 1)$
- $(2) \frac{1}{2} (1 + e^{\pi/2})$ /// mathongo /// mathongo /// mathongo /// mathongo
- (3) $\frac{1}{4}(1-e^{\pi/2})$ mathongo ///. mathongo ///. mathongo ///. mathongo ///. mathongo
- $(4) \frac{1}{4} (e^{\pi/2} 1)$
- Q9 2024 (06 Apr Shift 1) //. mathongo ///. mathongo ///. mathongo ///. mathongo
- #MathBoleTohMathonGo

Let y=y(x) be the solution of the differential equation $(2x\log_e x)\,rac{dy}{dx}+2y=rac{3}{x}\log_e x, x>0$ and

- $y\left(e^{-1}\right)=0$. Then, y(e) is equal to
- $\frac{1}{1/2}$ mathongo $\frac{1}{1/2}$ mathongo $\frac{1}{1/2}$ mathongo $\frac{1}{1/2}$ mathongo $\frac{1}{1/2}$ mathongo $\frac{1}{1/2}$ mathongo $\frac{1}{1/2}$ mathongo
- (3) $+\frac{2}{3e}$ ithongo ///. mathongo ///. mathongo ///. mathongo ///. mathongo
- //. mathongo ///. mathongo ///. mathongo ///. mathongo ///. mathongo
- Q10 2024 (06 Apr Shift 2) athongo ///. mathongo ///. mathongo ///. mathongo ///. mathongo Suppose the solution of the differential equation $\frac{dy}{dx} = \frac{(2+\alpha)x - \beta y + 2}{\beta x - 2\alpha y - (\beta \gamma - 4\alpha)}$ represents a circle passing through

origin. Then the radius of this circle is:

- mathongo /// mathongo /// mathongo /// mathongo /// mathongo /// mathongo
- (2) $\sqrt{17}$ thongo ///. mathongo ///. mathongo ///. mathongo ///. mathongo
- $(3) \frac{1}{2}$ $\frac{1}{4}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ mathongo $\frac{1}{2}$ mathongo $\frac{1}{2}$ mathongo $\frac{1}{2}$ mathongo $\frac{1}{2}$ mathongo

Q11 - 2024 (06 Apr Shift 2)

If the solution y(x) of the given differential equation $(e^y+1)\cos x \ \mathrm{d} x + e^y \sin x \ \mathrm{d} y = 0$ passes through the point $\left(\frac{\pi}{2},0\right)$, then the value of $e^{y\left(\frac{\pi}{6}\right)}$ is equal to <u>ongo</u> <u>w</u> mathongo <u>w</u> mathongo

Q12 - 2024 (08 Apr Shift 1)

Let y=y(x) be the solution of the differential equation $\frac{y}{x}$ mathons $\frac{y}{x}$ mathons $\frac{y}{x}$

$$\left(1+y^2
ight)e^{ an x}dx+\cos^2 x\left(1+e^{2 an x}
ight)dy=0, y(0)=1.$$
 Then $y\left(rac{\pi}{4}
ight)$ is equal to

- (3) $\frac{1}{e}$ nathongo ///. mathongo ///. mathongo ///. mathongo ///. mathongo
- (4) $\frac{1}{e^2}$ mathongo ///. mathongo ///. mathongo ///. mathongo ///. mathongo

Q13 - 2024 (08 Apr Shift 2) athongo ///. mathongo ///. mathongo ///. mathongo

Let y=y(x) be the solution curve of the differential equation $\sec y \frac{\mathrm{d}y}{\mathrm{d}x} + 2x \sin y = x^3 \cos y, y(1) = 0$. Then

 $y(\sqrt{3})$ is equal to :

(1) $\frac{\pi}{2}$

(2) $\frac{\pi}{6}$ nathongo ///. mathongo ///. mathongo ///. mathongo ///. mathongo

 $\frac{\pi}{12}$ mathongo ///. mathongo ///. mathongo ///. mathongo ///. mathongo $(4) \frac{\pi}{4}$

Q14 - 2024 (08 Apr Shift 2)

mathongo ///. mathongo ///. mathongo ///. mathongo Let $\alpha |x| = |y| \mathrm{e}^{xy-\beta}, \alpha, \beta \in \mathbf{N}$ be the solution of the differential equation

 $x \, \mathrm{d}y - y \, \mathrm{d}x + xy(x \, \mathrm{d}y + y \, \mathrm{d}x) = 0, y(1) = 2$. Then $\alpha + \beta$ is equal to ______ mathons o

Q15 - 2024 (09 Apr Shift 1)

The solution curve, of the differential equation $2y\frac{dy}{dx} + 3 = 5\frac{dy}{dx}$, passing through the point (0,1) is a conic,

whose vertex lies on the line: /// mathongo /// mathongo /// mathongo /// mathongo

 $(1) \ 2x + 3y = 9$ ngo ///. mathongo ///. mathongo ///. mathongo ///. mathongo (2) 2x + 3y = -9

(3) 2x+3y = j-6 ///. mathongo ///. mathongo ///. mathongo ///. mathongo

(4) 2x + 3y = 6 /// mathongo /// mathongo /// mathongo /// mathongo /// mathongo

Q16 - 2024 (09 Apr Shift 1) athongo ///. mathongo ///. mathongo ///. mathongo ///. mathongo

The solution of the differential equation $(x^2 + y^2) dx - 5xy dy = 0$, y(1) = 0, is:

(1) $|x^2 - 2y^2|^6 = x$

(3) $|x_1^2 + 4y_1^2|^5 = x^2$ mathongo /// mathongo /// mathongo /// mathongo

 $(4) \left| x^2 - 2y^2 \right|^5 = x^2$ / mathongo ///. mathongo ///. mathongo ///. mathongo ///. mathongo

#MathBoleTohMathonGo

Questions MathonGo Q17 - 2024 (09 Apr Shift 2) athongo ///. mathongo ///. mathongo ///. mathongo For a differentiable function $f:\mathbb{R} o\mathbb{R}$, suppose f'(x)=3f(x)+lpha, where $lpha\in\mathbb{R}$, f(0)=1 and $\lim_{x \to -\infty} f(x) = 7$. Then $9f(-\log_e 3)$ is equal to_ ///. mathongo #MathBoleTohMathonGo

| Questions | | | | | | | MathonGo |
|-----------------------|---------------|----------------------|------------------------|-----------|---------------------|-------------------|----------|
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| Answer Ke | y ///. | | | | | | |
| Q1 (4) athongo | | | | | | | |
| Q5 (3) athongo | | matl Q6 (1) | | Q7 | (18) thongo | ma Q8 (2) | |
| Q9 (1) athongo | | matlQ10 (4) | | Q1 | 1 (3) thongo | ma Q12 (3) | |
| Q13 (4) thongo | | matl Q14 _(4) | | Q1 | 5 (1) thongo | ma Q16 (3) | |
| Q17 (61) hongo | | | | | | | |
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| | | | mathongo #MathBoleT | ohMa | mathongo athonGo | | |

$$\int dy = \int \frac{(2x^2+2x+3)}{x^4+2x^3+3x^2+2x+2} dx$$
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$$y = \int \frac{(2x^2 + 2x + 3)}{(x^2 + 1)(x^2 + 2x + 2)} dx$$
 /// mathongo /// mathongo /// mathongo

$$y = \int \frac{dx}{x^2 + 2x + 2} + \int \frac{dx}{x^2 + 1}$$
 /// mathongo /// mathongo /// mathongo

$$y= an^{-1}(x+1)+ an^{-1}x+C$$
 /// mathongo /// mathongo /// mathongo /// mathongo /// mathongo /// mathongo

$$\frac{-\pi}{4} = 0 - \frac{\pi}{4} + C \Rightarrow C = 0 - \frac{\pi}{4} + C \Rightarrow C = 0 - \frac{\pi}{4} = 0 - \frac{\pi}{4} + C \Rightarrow C = 0 - \frac{\pi}{4} = 0 - \frac{\pi$$

$$\Rightarrow y = an^{-1}(x+1) + an^{-1}x$$
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$$\frac{Q2}{w}$$
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$$ye^{-x} = -e^{-x} - 2\left(e^{-x}\sin xe^{-x}\cos x\right) + C$$
 though //////// mathongo ///////// mathongo

$$y=-1-2(\sin x+\cos x)+ce^x$$

$$y(\pi) = 1 \Rightarrow c = 0$$
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$$Ans_{1}=10$$
 $m_{3}=7$. mathongo ///. mathongo ///. mathongo ///. mathongo ///. mathongo

$$\frac{dy}{dx} + y \left(\frac{2x^3 + 8x}{(x^2 + 4)^2}\right) = \frac{1}{(x^2 + 4)^2}$$
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$$\frac{dy}{dx} + y \left(\frac{\cos_2 x}{\cos_2 x}\right) = \frac{\cos_2 x}{\cos_2 x}$$
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$$\begin{array}{l} \text{IF} = x^2 + 4 \\ \text{mathongo} \\ y \times (x^2 + 4) = \int \frac{2}{(x^2 + 4)^2} \times (x^2 + 4) \\ \text{mathongo} \\ y \left(x^2 + 4\right) = 2 \int \frac{dx}{(x^2 + 4)^2} \end{array} \begin{array}{l} \text{mathongo} \\ \text{matho$$

mathongo
$$(x^2+4)^-$$
 mathongo $(x^2+4)^-$ mathongo

$$y(x^{2}+4)=2\int \frac{x^{2}+2^{2}}{x^{2}+2^{2}}$$

$$y(x^{2}+4)=\frac{2}{2}\tan^{-1}\left(\frac{x}{2}\right)+c$$
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$$0=0+c\equiv c=0$$
 // mathongo /// mathongo /// mathongo /// mathongo /// mathongo /// mathongo

$$y'$$
 at $x = 2$ ongo /// mathongo /// mathongo /// mathongo /// mathongo /// mathongo

$$y(4+4)= an^{-1}(1)$$
 $y(2)=rac{\pi}{32}$ mathongo /// mathongo /// mathongo /// mathongo /// mathongo

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

$$y(0) = -2$$
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$$1''+\frac{dy}{dx}a\underline{t}h\frac{dv}{dx}$$
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from (1)
$$\frac{dv}{dx} = 1 + v^2$$
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$$tan^{-1}(v) = x + C$$
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$$an^{-1}(x+y+2)=x+C$$
 at $x=0y=-2\Rightarrow C=0$ /// mathongo /// mathongo /// mathongo /// mathongo

$$y'=\tan x - 2''$$
 mathongo /// mathongo /// mathongo /// mathongo /// mathongo

$$f(\mathbf{x}) = \tan \mathbf{x} - \mathbf{x} - 2, \mathbf{x} \in \left[0, \frac{\pi}{3}\right]$$
 $f'(x) = \sec^2 x - 1 > 0 \Rightarrow f(x) \uparrow$ mathongo /// mathongo /// mathongo ///

$$f_{\min} = f(0) = -2 = \beta$$
 mathongo matho

$$\frac{1}{100} (3\alpha^2 + \pi)^2 + \beta^2 = \gamma + \delta\sqrt{3}$$
 o /// mathongo /// mathongo /// mathongo

$$\Rightarrow (3\alpha+\pi)^2+\beta^2=(3\sqrt{3}-6)^2+4$$

$$\gamma+\delta\sqrt{3}=67-36\sqrt{3}$$
 mathongo /// mathongo /// mathongo

$$\gamma + \delta\sqrt{3} = 67 - 36\sqrt{3}$$

 $\Rightarrow \gamma = 67 \text{ and } \delta = -36 \Rightarrow \gamma + \delta = 31$

$$\Rightarrow \gamma = 67 \text{ and } \delta = -36 \Rightarrow \gamma + \delta = 31$$
 /// mathongo /// mathongo /// mathongo /// mathongo /// mathongo

$$1.F = e^{\int 2dx} = e^{2x'}$$
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$$y \cdot e^{2x} = \int e^{2x} \sin 2x dx$$
 mathongo mathongo mathongo mathongo mathongo mathongo mathongo

$$y \cdot e^{2x} = \frac{e^{2x}(2\sin 2x - 2\cos 2x)}{\text{mathongo}} + C$$
 mathongo /// mathongo /// mathongo

$$x=0, y=\frac{3}{4}\Rightarrow \frac{3}{4}\cdot 1=\frac{1(0-2)}{\text{mathongo}} + C$$

$$\frac{3}{4}=-\frac{1}{4}+C$$
/// mathongo // m

$$\frac{3}{4} = -\frac{1}{4} + C$$

$$1' = C \text{ athongo } \text{ ///. mathongo } \text{ /$$

$$y = \frac{2\sin 2x - 2\cos 2x}{\text{mathongo}} + 1 \cdot e^{-2x}$$
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$$y = \frac{2\sin 2x - 2\cos 2x}{\text{mathon 8}} + 1 \cdot e^{-2x}$$

$$x = \frac{\pi}{8}, y = \frac{1}{8} \left(2\sin\frac{\pi}{4} - 2\cos\frac{\pi}{4}\right) + e^{-2\left(\frac{\pi}{8}\right)}$$

$$y = 0 + e^{-\frac{\pi}{4}}$$
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$$C \equiv x_0^2 + y_1^2 + gx + gy \equiv 0...(1)$$
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$$g' = m\left(t\frac{2x+2yy'}{1+y'}\right)$$
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$$x^2+y^2-\left(rac{2x+2yy'}{1+y'}
ight)(x+y)=0$$
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///.
$$\operatorname{mof} \frac{2x}{(1+x^2)^2} dx$$
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$$y \cdot e^{\frac{-1}{1+x^2}} = \int x \cdot e^{\frac{1}{1+x^2}} \cdot e^{\frac{-1}{1+x^2}} dx$$
 mathongo /// mathongo /// mathongo

$$y \cdot e^{\frac{-1}{1+x^2}} = \frac{x^2}{1-x^2} + \frac{x^2}{1-x^2}$$
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$$(0,0)\Rightarrow C=0$$

$$y(x) \stackrel{\text{def}}{=} \frac{x^2 \text{def}}{2} e^{\frac{1}{1+x^2}}$$
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$$f(x) \cong \frac{x^2}{2}$$
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$$y = x^2/2$$
///. mathongo ///. mathongo ///. mathongo ///. mathongo ///. mathongo

$$A=\int_{-2}^4 (x+4)-rac{x^2}{2}dx=18$$
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$$oldsymbol{q_8''}$$
 mathongo $oldsymbol{\prime\prime\prime}$ mathongo $oldsymbol{\prime\prime\prime}$ mathongo $oldsymbol{\prime\prime\prime}$ mathongo $oldsymbol{\prime\prime\prime}$ mathongo

$$\frac{dy}{dx} + \frac{y \log e}{1 + x^2} = \frac{e^{\tan^{-1}x} \text{ athongo }}{1 + x^2}$$
 mathongo /// mathongo /// mathongo /// mathongo

$$\text{I.F.} = e^{\int \frac{1}{1+x^2} dx} = e^{\tan^{-1}x \text{ hongo}} \text{ ///. mathongo} \text{ ///. mathongo} \text{ ///. mathongo} \text{ ///. mathongo}$$

$$y \cdot e^{\tan^{-1}x} = \int_{0}^{\infty} \left(\frac{e^{\tan^{-1}x}}{1+x^2}\right) e^{\tan^{-1}x} \cdot dx$$
 mathongo /// mathongo /// mathongo

Let
$$\tan^{-1} x = z$$
 //. $\frac{dx}{1+x^2} = dz$ ///. mathongo ///. mathongo ///. mathongo

$$\therefore y \cdot e^z = \int_{g_0} e^{2z} dz = \frac{e^{2z}}{n \cdot 2} + C$$
mathongo /// mathongo /// mathongo /// mathongo /// mathongo

$$y \cdot e^{\tan^{-1}x} = \frac{e^{2\tan^{-1}x}}{mathongo} + C$$
 mathongo /// mathongo /// mathongo /// mathongo

$$\Rightarrow y = \frac{e^{\tan^{-1}x}}{2} + \frac{C}{e^{\tan^{-1}x}} \text{ mathongo } \text{ mathongo$$

$$\because \mathrm{y}(1) = 0 \Rightarrow 0 = rac{\mathrm{e}^{\pi/4}}{2} + rac{\mathrm{C}}{\mathrm{e}^{\pi/4}} \Rightarrow \mathrm{C} = rac{-\mathrm{e}^{\pi/2}}{2}$$

$$\therefore y = \frac{e^{\tan^{-1}x}}{2} - \frac{e^{\pi/2}a \text{thongo}}{2} \text{ mathongo} \text{ mathongo} \text{ mathongo} \text{ mathongo} \text{ mathongo}$$

$$\frac{Q9}{dy}$$
 mathongo $\frac{y}{dx}$ mathongo $\frac{y$

$$dx$$
 $x\ell \ln x$ $2x^2$... I.F. $= e^{\int \frac{1}{x \ln x} dx} = e^{\ln(\ln(x))} = \ln x$ mathongo /// mathongo /// mathongo

$$y \ell \ln x = \int_0^1 \frac{3 \ln x}{2x^2} dx$$
 mathongo /// mathongo /// mathongo /// mathongo ///

$$= \frac{3 \ln x}{n \cdot 2 \sinh \int_{\text{ngo}}^{x-2} dx} - \int_{\text{ngo}} \left(\frac{3}{2x} \cdot \int x^{-2} dx \right) dx$$

$$3 \ln x \left(1 \right) \int_{\text{ngo}}^{x} \left(1 \right) dx$$
mathongo /// mathongo /// mathongo

$$= \frac{3 \ln x}{2} \left(-\frac{1}{x}\right) - \int \frac{3}{2x} \left(-\frac{1}{x}\right) dx$$

$$= \frac{3 \ln x}{2} \left(-\frac{1}{x}\right) - \int \frac{3}{2x} \left(-\frac{1}{x}\right) dx$$

$$= \frac{3 \ln x}{2} \left(-\frac{1}{x}\right) - \frac{3}{2x} \left(-\frac{1}{x}\right) dx$$
mathongo /// mathongo // m

y.
$$\ln x = \frac{-3\ell nx}{2x} - \frac{3}{2x} + C$$

".' $y\left(e^{-1}\right) = 0$ ".' mathongo ".' mathongo" ".' mathongo ".' m

$$\therefore 0(-1) = \frac{3e}{2} - \frac{3e}{2} + C \Rightarrow C = 0$$
mathongo
$$= \frac{3e}{2} - \frac{3e}{2} + C \Rightarrow C = 0$$
mathongo
$$= \frac{3e}{2} - \frac{3e}{2} + C \Rightarrow C = 0$$
mathongo

$$\frac{1}{2} = \frac{1}{2} = \frac{1}{3} = \frac{1}$$

$$\therefore y = \frac{-3\ell nx}{2x} - \frac{3}{2x}$$
 mathongo /// mathongo

$$_{ ilde{Q}10}^{\prime\prime\prime}$$
 mathongo $\,$ mathongo

$$\frac{dy}{dx} = \frac{(2+\alpha)x - \beta y + 2}{\beta x - y(2\alpha + \beta) + 4\alpha}$$
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$$eta x dy - (2lpha + eta)y dy + 4lpha dy = (2+lpha)x dx - eta y dx + 2 dx \ eta (x dy + y dx) - (2lpha + eta)y dy + 4lpha dy = (2+lpha)x dx + 2 dx$$

$$\beta xy = \frac{(2\alpha + \beta)y^2}{\alpha + \alpha y} + 4\alpha y = \frac{(2 + \alpha)x^2}{\alpha y + \alpha y}$$
 mathongo /// mathongo /// mathongo

$$\Rightarrow \beta = 0$$
 for this to be circle

$$(2+\alpha)\frac{x^2}{2}+\alpha y^2+2x-4\alpha y=0$$
 /// mathongo /// mathongo /// mathongo ///

$$(2+\alpha)\frac{x}{2} + \alpha y^2 + 2x - 4\alpha y = 0$$

$$\begin{array}{c} \text{mathongo} & \text{mathongo}$$

$$X^2 = Y^2$$

/// mathongo /// mathongo /// mathongo /// mathongo /// mathongo /// mathongo ///

$$\Rightarrow$$
 $\alpha = 2$ /// mathongo /// mathongo /// mathongo /// mathongo /// mathongo /// mathongo /// mathongo

$$x^2 + y_0^2 + x_{17} = 4y = 0$$
 mathongo /// mathongo /// mathongo /// mathongo

$$rd = \sqrt{\frac{1}{4} + 4} = \frac{\sqrt{17}}{\cancel{2}}$$
 mathongo $\cancel{1}$ mathongo

$$(e^y + 1)\cos x dx + e^y \sin x dy = 0$$

 $\Rightarrow d((e^y + 1)\sin x) = 0$ thongo /// mathongo /// mathongo /// mathongo /// mathongo

It passes through
$$\left(\frac{\pi}{2},0\right)$$
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$$\Rightarrow$$
 c = 2

$$ightharpoonup c=2$$
 /// mathongo /// mathongo /// mathongo /// mathongo /// mathongo /// mathongo /// mathongo

$$\Rightarrow$$
 e^yn=310ngo ///. mathongo ///. mathongo ///. mathongo ///. mathongo

$$\left(1+y^2\right)e^{\tan x}dx+\cos^2 x\left(1+e^{2\tan x}\right)dy=0$$
 mathongo ma

$$\int rac{\sec^2 x e^{ an x}}{1+e^{2 an x}} dx + \int rac{dy}{1+y^2} = C$$
 $\Rightarrow an^{-1} ig(e^{ an x}ig) + an^{-1} y = C$

for
$$x=0,y=1, an^{-1}(1)+ an^{-1}1=C$$
 mathongo mathongo

$$\tan^{-1}(e^{\tan x}) + \tan^{-1}y = \frac{\pi}{2}$$
 mathongo ///. mathongo ///. mathongo ///. mathongo

Put
$$x=\pi, \tan^{-1}e+\tan^{-1}y=\frac{\pi}{2}$$
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$$y'' = \frac{1}{e}$$
 mathongo /// mathongo /// mathongo /// mathongo /// mathongo

$$\sec^2 y \frac{dy}{dx} + 2x \sin y \sec y = x^3 \cos y \sec y$$
 athongo /// mathongo /// mathongo /// mathongo

$$\sec^2 y \frac{dy}{dx} + 2x \tan y = x^3$$
thongo /// mathongo /// mathongo /// mathongo

$$tany = t \Rightarrow sec^2 y \frac{dy}{dx} = \frac{dt}{dx}$$
 mathongo /// mathongo /// mathongo /// mathongo

$$rac{dt}{dx} + 2xt = x^3, ext{ If } = e^{\int 2x dx} = e^{x^2}$$
 mathongo /// mathon

$$x^2 = Z \Rightarrow t \cdot e^Z = \frac{1}{2} \int e^Z \cdot Z dZ = \frac{1}{2} \left[e^Z \cdot Z - e^Z \right] + c$$
 mathongo /// mathongo /// mathongo

$$2\tan y = (x^2-1) + 2e^{-x^2}$$
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$$y(1) = 0 \Rightarrow c = 0 \Rightarrow y(\sqrt{3}) = \frac{\pi}{4}$$
/// mathongo /// mathongo /// mathongo /// mathongo /// mathongo

$$a|x|=|y|e^{sx}$$
 , $a,b\in\mathbb{N}$ $xdy-ydx+xy(xdy+ydx)=0$ /// mathongo /// mathongo /// mathongo

$$rac{dy}{y}-rac{dx}{x}+(xdy+ydx)=0$$
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$$\ell n|y| - \ell n|x| + xy = c$$
 $y(1) = 2$ mathongo ///. mathongo ///. mathongo ///. mathongo ///. mathongo ///. mathongo ///. mathongo ///.

$$egin{aligned} \ell n|2|-0+2=c\ c=2+\ell n2 \end{aligned}$$

$$c=2+\ell n2$$
 $\ell n|y|-\ell n|x|+xy=2+\ell n2$ /// mathongo /// mathongo /// mathongo ///

$$\ell n|x|=\ell n\left|rac{y}{2}
ight|-2+xy$$
 mathongo /// mathongo /// mathongo /// mathongo /// mathongo

$$|2|$$
 /// mathongo /// mathongo /// mathongo /// mathongo /// mathongo /// mathongo

$$2|x|=|y|e^{xy-2}$$
 $lpha=2$ $eta=2$ $lpha+eta=4$

 $(2y + 5) \frac{dy}{dx} = -3$ // mathongo /// mathongo /// mathongo /// mathongo

(2y-5)dy = -3dx $\frac{y^2}{2}$ athongo /// mathongo /// mathongo /// mathongo /// mathongo /// mathongo

: Curve passes through (0,1)ongo /// mathongo /// mathongo /// mathongo /// mathongo

 $\Rightarrow \lambda = -4$ /// mathongo /// mathongo /// mathongo /// mathongo /// mathongo /// mathongo

 $\left(y-\frac{5}{2}\right)^2=-3\left(x-\frac{3}{4}\right)$ ithongo /// mathongo /// mathongo /// mathongo

 $\therefore 2x + 3y = 9$

016 (x^2+y^2) dx=5xydy mathongo /// mathongo /// mathongo /// mathongo

 $\Rightarrow \frac{dy}{dx} = \frac{x^2 + y^2}{5xy}$ mathongo /// mathongo /// mathongo /// mathongo

Put y = Vx mathongo mathong

 $\Rightarrow \frac{\text{mathorized by }}{\text{dx}} = \frac{1 - 4 \text{ V}^2}{5 \text{ V}} \text{mathongo} \quad \text{///} \quad \text{//} \quad$

Let 124 V2 = t /// mathongo /// mathongo /// mathongo /// mathongo /// mathongo

mathonica // matho

$$= \sqrt{8 \, V_{\rm d} V_{\rm mathongo}} \, / \! / \! / \! / \,$$
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$$\Rightarrow \int_{1}^{\infty} \frac{dt}{(\pm 8)(t)^{3}} = \int_{1}^{\infty} \frac{dx}{5x} = \int_{1}^{\infty$$

$$\Rightarrow \frac{-1}{r8} \ln|t| = \frac{1}{5} \ln|x| + \ln C$$

$$\Rightarrow -5 \ln|t| = 8 \ln|x| + \ln K$$
mathongo /// mathongo /// mathongo /// mathongo

$$\Rightarrow -5 \ln |\mathrm{t}| = 8 \ln |\mathrm{x}| + \ln \mathrm{K}$$

$$\Rightarrow \ln x^8 + \ln |t^5| + \ln K \equiv 0_{\text{ongo}}$$
 /// mathongo /// mathongo /// mathongo

$$\Rightarrow \mathbf{x}^8 \left| \mathbf{t}^5 \right| = \mathbf{C}$$

$$\stackrel{\text{\tiny (4)}}{\Rightarrow} x^8 \big| 1^{\text{\tiny (1)}} 1^{\text{\tiny (2)}} \big|^5 \stackrel{\text{\tiny (2)}}{=} C$$
mathongo $\stackrel{\text{\tiny (4)}}{=} M$ mathongo $\stackrel{\text{$

$$\Rightarrow x^8 \left| \frac{x^2 - 4y^2}{ath_{x^2}go} \right|^5 = C_{nathongo}$$
 //////// mathongo //// mathongo //// mathongo

$$\Rightarrow |x^2 - 4y^2|^5 = Cxx^2$$

$$\text{mathongo} \text{ mathongo} \text{$$

$$\begin{array}{c} \Rightarrow |1|^5 = C \Rightarrow C = 1 \\ \text{mathons} & \text{mathongo} & \text{mathongo} \\ \Rightarrow |x^2 - 4y^2|^5 = x^2 \end{array}$$
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Q17

$$\frac{dy}{dx}$$
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If
$$=e^{\int_{-3}^{-3} dx} = e^{-3x}$$
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$$\therefore y-e^{-3x}=\int e^{-3x}\cdot\alpha dx$$
/// mathongo // mathongo /// mathongo /// mathongo /// mathongo /// mathongo //

$$(*e^{3x})^{
m athongo}$$
 /// mathongo /// mathongo /// mathongo /// mathongo

$$y = \frac{\alpha}{r+3} + C \cdot e^{3x}$$
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on substituting
$$x = 0, y = 1$$

we get
$$y=7-6e^{3x}$$
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