SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Find the general solution to the exact differential equation.

1) $\displaystyle \int \frac{dy}{dx} = \int \csc^2 x - 25x^4$ 1) ____

$y = \tan x - 5x^5 + C$

2) $\displaystyle \frac{dy}{dt} = 8\sqrt{t} + 6(\cos t)e^{\sin t}$ 2) ____

$\int 8t^{1/2} + \int \underbrace{6\cos t}_{u'}\, e^{\overbrace{\sin t}^{u}}$

$\frac{16}{3}t^{3/2} + 6e^{\sin t} + C$

Solve the initial value problem explicitly.

3) $\displaystyle \frac{dy}{dx} = \sin(2x + \pi),\ y = 6 \text{ when } x = 0$ 3) ______________

4) $\displaystyle \frac{du}{dx} = 10x^9 - 4x^3 + 5 \text{ and } u = 2 \text{ when } x = 1$ 4) ______________

$y = -\frac{1}{2}\cos(2x + \pi) + C$

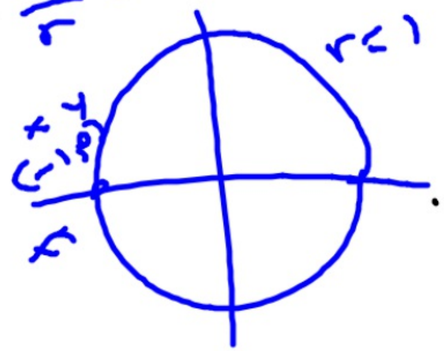
$6 = -\frac{1}{2}\cos(\pi) + C$

$6 = -\frac{1}{2}(-1) + C$

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

$5\frac{1}{2} = C$

$\pi \rightarrow \cos\theta = \frac{x}{r} = \frac{-1}{1}$



4) $\frac{du}{dx} = 10x^9 - 4x^3 + 5$ and $u = 2$ when $x = 1$

$u = x^{10} - x^4 + 5x + C$

$2 = 1 - 1 + 5 + C$

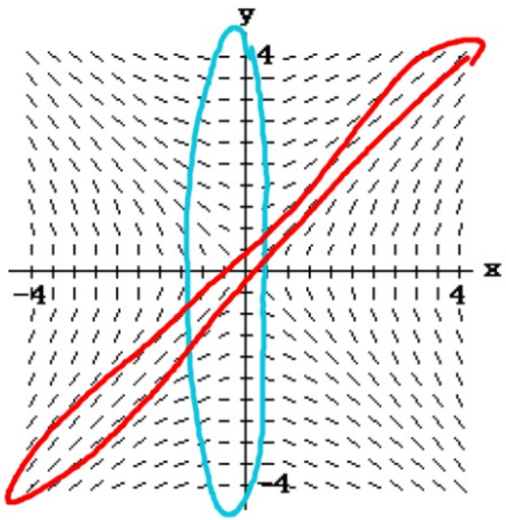
$-3 = C$

Solve the initial value problem using the Fundamental Theorem. Your answer will contain a definite integral.

5) $G'(x) = e^{\sin x}$ and $G(4) = 10$

$G(x) = \int_4^x e^{\sin t}\,dt + 10$

B)



slope

X	Y	Y'
0	1	0
0	2	0
0	3	0
0	4	0
0		

X	Y	Y'
1	1	
2	2	
3	3	

C)

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Evaluate the integral.

7) $\displaystyle\int \frac{\cos(6\theta + 4)}{\sin^2(6\theta + 4)}\,d\theta$ 7) ____________

$u = \sin(6\theta + 4)$ $u' = \dfrac{du}{d\theta}$

$u' = \cos(6\theta + 4) \cdot 6$

$\dfrac{1}{6}du = \cos(6\theta + 4)\,d\theta$

8) $\displaystyle\int \frac{1}{\cot(4x - 5)}\,dx$ 8) ____________

$$\int \frac{1}{6u^2}\,du = \frac{1}{6}\int u^{-2}\,du$$

$$= \frac{1}{6}\left(-u^{-1}\right) + C$$

$$= -\frac{1}{6(\sin(6\theta+4))} + C$$

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7) $\int \frac{\cos(6\theta + 4)}{\sin^2(6\theta + 4)} d\theta$

8) $\int \frac{1}{\cot(4x - 5)}\, dx$ $= \int \frac{1}{\frac{\cos(4x-5)}{\sin(4x-5)}} = \int \frac{\sin(4x-5)}{\cos(4x-5)}\, dx$

$u = \cos(4x-5)$

$du = -\sin(4x-5) \cdot 4\, dx$

$-\frac{1}{4} du = \sin(4x-5)\, dx$

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

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

$= -\frac{1}{4} \ln(u) + C$

$= \boxed{-\frac{1}{4} \ln(\cos(4x-5)) + C}$

9) $\int 9x^2 \sqrt[4]{8+2x^3}\, dx$

10) $\int \frac{dx}{x \ln x^4}$

$u = 8 + 2x^3$

$\frac{3}{2} \cdot du = 6x^2\, dx \cdot \frac{3}{2}$

$\frac{3}{2} du = 9x^2\, dx$

$\int \frac{3}{2} u^{1/4}\, du$

$\frac{6}{5} u^{5/4} + C$

$\frac{6}{5} (8+2x^3)^{5/4} + C$

$\frac{9}{6} = \frac{3}{2}$

$\frac{3}{2} \cdot \frac{4}{5} = \frac{12}{10}$

$= \frac{6}{5}$