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endinput Exercise[chapter]

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Chapter 1

First

In problem ??-??, determine whether the given differential equation is separable

- i. $\frac{dy}{dx} - \sin(x + y) = 0$ ii. $\frac{dy}{dx} = 4y^2 - 3y + 1$
iii. $\frac{ds}{dt} = t \ln(s^{2t}) + 8t^2$

In problem ??-??, solve the equation

- iv. $\frac{dx}{dt} = 3xt^2$ v. $y^{-1}dy + ye^{\cos x} \sin x dx = 0$
vi. $(x + xy^2)dx + ye^{\cos x} \sin x dx = 0$ vii. $\frac{dy}{dt} = \frac{y}{t+1} + 4t^2 + 4t, \quad y(1) = 10$

[ref=EX11]

- iv. This is a solution of Ex 4
i. This is a solution of Ex 1 v. This is a solution of Ex 5
ii. This is a solution of Ex 2 vi. This is a solution of Ex 6
iii. This is a solution of Ex 3 vii. This is a solution of Ex 7

Another exercise. If you don't need a horizontal list, you can simply use
`\Question`

[ref=EX12] This is a solution of Ex 1

Chapter 2

Second

Eight systems of differential equations and five direction fields are given below. Determine the system that corresponds to each direction field and sketch the solution curves that correspond to the initial conditions $(x_0, y_0) = (0, 1)$ and $(x_0, y_0) = (1, -1)$.

- | | | | | | |
|------|---|-------|--|------|--|
| i. | $\frac{dx}{dt} = -x$
$\frac{dy}{dt} = y - 1$ | ii. | $\frac{dx}{dt} = x^2 - 1$
$\frac{dy}{dt} = y$ | iii. | $\frac{dx}{dt} = x + 2y$
$\frac{dy}{dt} = -y$ |
| iv. | $\frac{dx}{dt} = 2x$
$\frac{dy}{dt} = y$ | v. | $\frac{dx}{dt} = x$
$\frac{dy}{dt} = 2y$ | vi. | $\frac{dx}{dt} = x - 1$
$\frac{dy}{dt} = -y$ |
| vii. | $\frac{dx}{dt} = x^2 - 1$
$\frac{dy}{dt} = -y$ | viii. | $\frac{dx}{dt} = x - 2y$
$\frac{dy}{dt} = -y$ | | |

[ref=EX21]

- | | | | |
|------|----------------------------|-------|----------------------------|
| i. | This is a solution of Ex 1 | v. | This is a solution of Ex 5 |
| ii. | This is a solution of Ex 2 | vi. | This is a solution of Ex 6 |
| iii. | This is a solution of Ex 3 | vii. | This is a solution of Ex 7 |
| iv. | This is a solution of Ex 4 | viii. | This is a solution of Ex 8 |

Since these are systems, maybe it's better to put the **aligned** environment within `\left\{` and `\right\}`. Eight systems of differential equations and five direction fields are given below. Determine the system that corresponds to each direction field and sketch the solution curves that correspond to the initial conditions $(x_0, y_0) = (0, 1)$ and $(x_0, y_0) = (1, -1)$.

i.	$\begin{cases} \frac{dx}{dt} = -x \\ \frac{dy}{dt} = y - 1 \end{cases}$	ii.	$\begin{cases} \frac{dx}{dt} = x^2 - 1 \\ \frac{dy}{dt} = y \end{cases}$	iii.	$\begin{cases} \frac{dx}{dt} = x + 2y \\ \frac{dy}{dt} = -y \end{cases}$
iv.	$\begin{cases} \frac{dx}{dt} = 2x \\ \frac{dy}{dt} = y \end{cases}$	v.	$\begin{cases} \frac{dx}{dt} = x \\ \frac{dy}{dt} = 2y \end{cases}$	vi.	$\begin{cases} \frac{dx}{dt} = x - 1 \\ \frac{dy}{dt} = -y \end{cases}$
vii.	$\begin{cases} \frac{dx}{dt} = x^2 - 1 \\ \frac{dy}{dt} = -y \end{cases}$	viii.	$\begin{cases} \frac{dx}{dt} = x - 2y \\ \frac{dy}{dt} = -y \end{cases}$		

[ref=EX22]

- i. This is a solution of Ex 1
- ii. This is a solution of Ex 2
- iii. This is a solution of Ex 3
- iv. This is a solution of Ex 4

- v. This is a solution of Ex 5
- vi. This is a solution of Ex 6
- vii. This is a solution of Ex 7
- viii. This is a solution of Ex 8

Chapter 3

Answer to all problems