MA 341 – Review Assignment 7

Question 1

Solve for x.

$$\begin{vmatrix} x & 2 & 3 \\ 1 & x & 0 \\ 6 & 1 & -2 \end{vmatrix} = 7$$

Question 2

The following matrix is nonsingular.

$$\begin{pmatrix} 6 & 5 \\ 5 & 5 \end{pmatrix}$$

Find the inverse of the matrix. If possible, check your answer using a graphing utility.

Question 3

The following matrix is nonsingular.

$$\begin{pmatrix} 6 & 5 \\ 2 & 2 \end{pmatrix}$$

Find the inverse of the matrix. If possible, check your answer using a graphing utility.

Question 4

Write each combination of vectors as a single vector.

(a) $\overrightarrow{PQ} + \overrightarrow{QR}$

(b) $\overrightarrow{RP} + \overrightarrow{PS}$

(c) $\overrightarrow{QS} - \overrightarrow{PS}$

(d) $\overrightarrow{RS} + \overrightarrow{SP} + \overrightarrow{PQ}$

Question 5

Find $|\mathbf{a}|$, $\mathbf{a} + \mathbf{b}$, $\mathbf{a} - \mathbf{b}$, $2\mathbf{a}$, and $3\mathbf{a} + 4\mathbf{b}$.

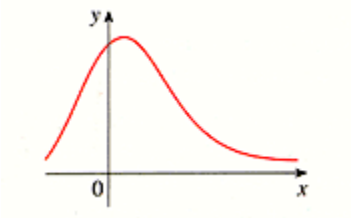
$\mathbf{a} = 7\mathbf{i} - 8\mathbf{j}$
$\mathbf{b} = \mathbf{i} + 5\mathbf{j}$

Question 6

For what values of r does the function $y = e^{r\,t}$ satisfy the differential equation $y'' + y' - 72y = 0$?

Question 7

The function with the given graph is a solution of a differential equation.

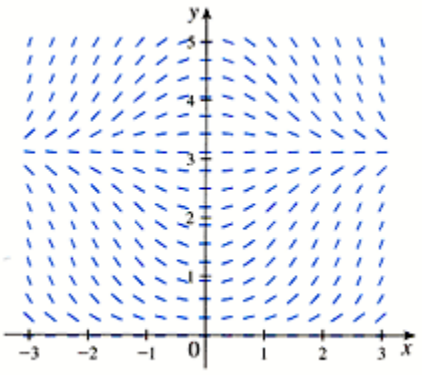


Which of the following differential equations has this solution?

(a) $y' = 1 - 2xy$
(b) $y' = -2xy$
(c) $y' = 1 + xy$

Question 8

A direction field for the differential equation $y' = x \sin y$ is shown below.



Find all the equilibrium solutions using *n* as a generic integer.

Question 9

Use Euler's method with step size 0.2 to estimate $y(1)$, where $y(x)$ is the solution of the initial-value problem below.

$$y' = 1 - xy$$
$$y(0) = 0$$

Question 10

Solve the differential equation.

$$\frac{dy}{dx} = \frac{e^{9x}}{3y^2}$$