Started on	Wednesday, 18 August 2021, 6:58 AM
State	Finished
Completed on	Thursday, 19 August 2021, 9:00 AM
Time taken	1 day 2 hours
Overdue	1 day

Question **1**

Not answered

Marked out of 1.00

Find all values of m so $\{(2,-1,3),(0,m,2),(8,-1,8)\}$ spans $\mathbb{R}^3$

A. $m=\frac{3}{2}$ B. $m\neq\frac{-3}{2}$ C. $m\neq\pm\frac{3}{2}$ D. $m=0$

Select one:

- a. A
- b. B
- c. C
- d. D

Question **2**

Not answered

Marked out of 1.00

If u = (-2; 1; 1) and v = (1; 0; 1), then $\|proj_v u\|$ is:

A. $\frac{\sqrt{2}}{2}$ B. $\frac{\sqrt{6}}{2}$ C. 2 D. $\frac{1}{2}$

Select one:

- a. D
- b. A
- c. B
- d. C

Question **3**

Not answered

Marked out of 1.00

Let $f(x)=\int_{\sqrt{x}}^{x^2} te^t dt$. Find $f'(1)$

A. $\frac{3e}{2}$ B. e C. 0 D. None of the others

Select one:

- a. A
- b. B
- c. C
- d. D

Question **4**

Not answered

Marked out of 1.00

Let $A=\begin{pmatrix} 1 & * & * \\ 0 & 2 & * \\ 0 & 0 & 2 \end{pmatrix}$. Find $\left|(3A)^{-1}\right|$

A. $\frac{27}{4}$ B. $\frac{1}{108}$ C. $\frac{3}{4}$ D. $\frac{108}{27}$

Select one:

- a. D
- b. A
- c. C
- d. B

Question **5**

Not answered

Marked out of 1.00

If M and m are respectively the absolute maximum and absolute minimum values of $f(x)=x^4-4x^2+2$ on the interval $[-2,3]$, then $M+m=$

A. 45 B. 49 C. 50 D. 51

Select one:

- a. C
- b. D
- c. A
- d. B

Question **6**

Not answered

Marked out of 1.00

Find the (2,1) cofactor of the matrix $\begin{pmatrix} 1 & 3 & 3 \\ 4 & -1 & 5 \\ 0 & 7 & 6 \end{pmatrix}$

A. 24 B. -24 C. 3 D. -3

Select one:

- a. A
- b. C
- c. D
- d. B

Question **7**

Not answered

Marked out of 1.00

Which one of the following vectors is a linear combination of $u=(2,1,4)$ and $v=(1,1,3)$?

A. $(2,2,3)$ B. $(5,9,5)$ C. $(-3,1,0)$ D. $(1,0,1)$

Select one:

- a. A
- b. B
- c. C
- d. D

Question **8**

Not answered

Marked out of 1.00

Find the average value of $3t^5 + 2t$ over $[-2,3]$

A. $\frac{135}{2}$ B. $\frac{175}{2}$ C. $\frac{819}{10}$ D. None of the others

Select one:

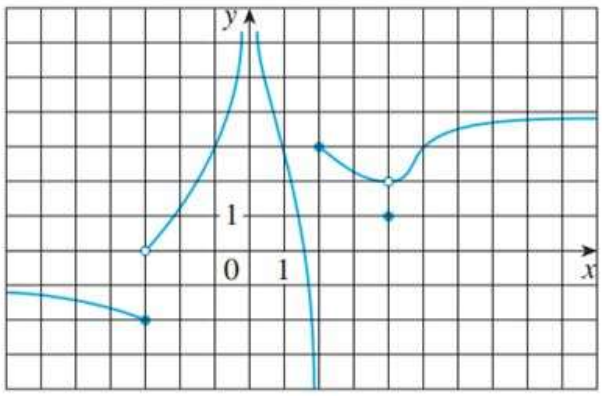
- a. B
- b. A
- c. D
- d. C

Question **9**

Not answered

Marked out of 1.00

The graph of f is given



Find $\lim_{x \to -3} f(x)$

A. 0 B. -2 C. Does not exist D. ∞

Select one:

- a. C
- b. D
- c. A
- d. B

Question **10**

Not answered

Marked out of 1.00

Given $f(x)=1+(x+1)^2$ where $-2 \le x \le 5$, which of the following statements is true?

A. f has no absolute maximum

B. f has no absolute minimum

C. f has absolute minimum $f(0)=2$

D. f has absolute maximum $f(5)=37$

Select one:

- a. D
- b. B
- c. A
- d. C

Question **11**

Not answered

Marked out of 1.00

Evaluate $\int\left(3e^x+\frac{1}{x}+x^{\frac{3}{2}}\right)dx$

A. $3e^x+\ln x+\frac{3}{2}x^{\frac{1}{2}}+C$

B. $3e^x+\ln x+\frac{2}{5}x^{\frac{5}{2}}+C$

C. $3e^x-\frac{1}{x^2}+\frac{3}{2}x^{\frac{1}{2}}+C$

D. $3e^x+\ln x+\frac{5}{2}x^{\frac{5}{2}}+C$

Select one:

- a. A
- b. C
- c. B
- d. D

Question **12**

Not answered

Marked out of 1.00

A particle is moving along a line with acceleration $a(t)=2t-3$ on the interval $[2,5]$. Given $v(0)=0$, find the distance traveled by the particle during the given time interval.

A. 19 B. $\frac{29}{3}$ C. $\frac{59}{6}$ D. 20

Select one:

- a. B
- b. A
- c. D
- d. C

Question **13**

Not answered

Marked out of 1.00

For $f(x)=\frac{1}{2-x^4}$. Find $f'(1)$

A. 1 B. 2 C. -2 D. 4

Select one:

- a. B
- b. A
- c. C
- d. D

Question **14**

Not answered

Marked out of 1.00

Given $A=\begin{pmatrix} 3 & 3 & 4 \\ 1 & -1 & 2 \\ m & 0 & 5 \end{pmatrix}$. Which of the following are true?

A. A is invertible for all values of m

B. A is invertible for all values of m except zero

C. A is invertible for all values of m except $m=3$

D. A fails to be invertible for all values of m

Select one:

- a. D
- b. C
- c. A
- d. B

Question **15**

Not answered

Marked out of 1.00

If $f(x)=x^2+x+1$ and $g(x)=e^x$, then $g_o f(x)=$

A. e^{x^2+x+1} B. $e^{2x}+e^x+e$ C. $(x^2+x+1)e^x$ D. $x^2+x+1+e^x$

Select one:

- a. C
- b. A
- c. B
- d. D

Question **16**

Not answered

Marked out of 1.00

Find all values of k for which the system has nontrivial solutions

$$\begin{cases} x-y+2z=0 \\ -x+y-z=0 \\ x+ky+z=0 \end{cases}$$

A. $k \in \mathbb{R}$ B. $k=1$ C. $k \neq -1$ D. $k=-1$

Select one:

- a. D
- b. B
- c. A
- d. C

Question **17**

Not answered

Marked out of 1.00

Describe how the graph of $y=f(-x)+2$ is obtained from the graph of $f(x)$

A. Shift left 1 unit and shift up 2 units

B. Reflection about the x-axis and shift up 2 units

C. Reflection about the y-axis and shift up 2 units

D. Shift left 1 unit and shift down 2 units

Select one:

- a. A
- b. C
- c. D
- d. B

Question **18**

Not answered

Marked out of 1.00

If $x^3 - 6xy + y^3 + 4 = 0$, find $\frac{dy}{dx}$

A. $\frac{x^2 - 2y}{y^2 - 2x}$ B. $\frac{-x^2 + 2y}{y^2 - 2x}$ C. $\frac{x^2 - y}{y^2 - x}$ D. $\frac{-x^2 + y}{y^2 - x}$

Select one:

- a. A
- b. D
- c. B
- d. C

Question **19**

Not answered

Marked out of 1.00

The characteristic polynomial of $A = \begin{pmatrix} 1 & 1 \\ 4 & -2 \end{pmatrix}$ is

A. $x^2 + x - 6$ B. $x^2 - x - 6$ C. $x^2 - 2x$ D. None of the others

Select one:

- a. C
- b. B
- c. D
- d. A

Question **20**

Not answered

Marked out of 1.00

Suppose a matrix A satisfies $A^3 - 3A^2 + I = 0$, where I denotes the identity matrix. Which one of the following statements is correct?

A. A is not invertible B. $A^{-1} = 3I - A - A^2$

C. $A^{-1} = 3A - A^2$ D. A is the identity matrix I

Select one:

- a. C
- b. D
- c. B
- d. A

Question **21**

Not answered

Marked out of 1.00

Evaluate $\lim_{x\to 0}\frac{\sin 3x-\sin 2x}{e^x-1}$

A. 5 B. 0 C. 1 D. Does not exist

Select one:

- a. A
- b. C
- c. B
- d. D

Question **22**

Not answered

Marked out of 1.00

If $T:\mathbb{R}^2\to\mathbb{R}^2$ is projection on $y=-2x$, then $T\begin{bmatrix}6\\3\end{bmatrix}$ is:

A. $\frac{12}{5}\begin{bmatrix}1\\2\end{bmatrix}$ B. $\begin{bmatrix}0\\0\end{bmatrix}$ C. $\frac{1}{5}\begin{bmatrix}-2\\4\end{bmatrix}$ D. $\frac{1}{5}\begin{bmatrix}2\\-4\end{bmatrix}$

Select one:

- a. D
- b. B
- c. C
- d. A

Question **23**

Not answered

Marked out of 1.00

If f is continuously differentiable real-valued function defined on the interval (-1, 4) such that $f(-1)=1$ and $3\geq f'(x)\geq 1$ for all x, what is the greatest possible value of $f(4)$?

A. 6 B. 4 C. 15 D. 16

Select one:

- a. B
- b. C
- c. A
- d. D

Question **24**

Not answered

Marked out of 1.00

Evaluate $\int_0^4 g(x)dx$, where $g(x)=\begin{cases}3-x & \text{if } x\le 3\\ x^2 & \text{if } x>3\end{cases}$

A. 4 B. $\frac{64}{3}$ C. $\frac{17}{2}$ D. $\frac{101}{6}$

Select one:

- a. B
- b. A
- c. C
- d. D

Question **25**

Not answered

Marked out of 1.00

If $f'(x)=\left(\sqrt{x}-\frac{1}{x}\right)^2$ and $f(4)=\frac{1}{4}$, then $f(1)=$

A. -2 B. -4 C. -6 D. -7

Select one:

- a. A
- b. D
- c. B
- d. C

Question **26**

Not answered

Marked out of 1.00

Find the eigenvalues of $\begin{pmatrix} 1 & 1 & -1 \\ 0 & 0 & -1 \\ 0 & 2 & -3 \end{pmatrix}$

A. 2, 3, 4 B. -1, -2, 3 C. -3, 0, 4 D. -1, -2 , 1

Select one:

- a. C
- b. B
- c. A
- d. D

Question **27**

Not answered

Marked out of 1.00

If c is the number satisfying the conclusion of the Mean Value Theorem for $f(x)=4+\sqrt{3x+1}$ on the interval $[1,5]$, then $c=$

A. $\frac{8}{3}$ B. $\frac{7}{3}$ C. $\frac{11}{3}$ D. 2

Select one:

- a. C
- b. D
- c. B
- d. A

Question **28**

Not answered

Marked out of 1.00

Let $A=\begin{pmatrix}1&1&1\\1&1&0\\1&0&1\end{pmatrix}$. Find the main diagonal of A^{-1}.

A. $(0,1,0)$ B. $(-1,0,-1)$ C. $(0,0,1)$ D. $(-1,0,0)$

Select one:

- a. A
- b. B
- c. D
- d. C

Question **29**

Not answered

Marked out of 1.00

Let A be an 8×6 matrix such that $AX=0$ has only trivial solution. What is the rank of A?

A. 0 B. 6 C. 8 D. 2

Select one:

- a. D
- b. B
- c. A
- d. C

Question **30**

Not answered

Marked out of 1.00

The product of two positive real numbers is 4. If the sum of the square of one of the numbers and the square of twice of the other number is minimum, then the sum of the numbers is

A. $2\sqrt{2}$ B. $3\sqrt{2}$ C. $\frac{3\sqrt{2}}{2}$ $\frac{5\sqrt{2}}{2}$

Select one:

- a. C
- b. B
- c. A
- d. D

Question **31**

Not answered

Marked out of 1.00

Find the constant m that makes f continuous at x = 0

$$f(x)=\begin{cases}\dfrac{\sin 2x}{3x} & \text{if } x\neq 0\\ m+1 & \text{if } x=0\end{cases}$$

A. 3 B. $\frac{2}{3}$ C. $-\frac{1}{3}$ D. None of the others

Select one:

- a. C
- b. B
- c. A
- d. D

Question **32**

Not answered

Marked out of 1.00

A table of values for f, g, f', g' is given

x	$f(x)$	$g(x)$	$f'(x)$	$g'(x)$
0	1	1	2	-2
1	0	2	3	-1
2	4	-1	5	6

Find $h'(0)$. If $h(x)=g_{o}f(x)$

A. -5 B. -6 C. -2 D. -1

Select one:

- a. A
- b. C
- c. D
- d. B

Question **33**

Not answered

Marked out of 1.00

Evaluate $\int x\left(x^2-5\right)^7 dx$

A. $\left(x^2-5\right)^8+C$

B. $\frac{1}{8}\left(x^2-5\right)^8+C$

C. $\frac{1}{16}\left(x^2-5\right)^8+C$

D. $\frac{1}{16}x^2\left(x^2-5\right)^8+C$

Select one:

- a. C
- b. B
- c. A
- d. D

Question **34**

Not answered

Marked out of 1.00

Find the value of t for which $(4,6,3,t)$ lies in the subspace spanned by $(1,3,-4,1)$, $(2,8,-5,-1)$ and $(-1,-5,0,2)$

A. 0 B. 4 C. 11 D. 13

Select one:

- a. C
- b. D
- c. A
- d. B

Question **35**

Not answered

Marked out of 1.00

Newton's Method is used to find an approximation to one of the real roots of the equation $x^5 = x + 1$. If $x_1 = 1$ is the first approximation, then the second apprximation $x_2 =$

A. $\frac{5}{4}$ B. $\frac{3}{7}$ C. $\frac{1}{2}$ D. 1

Select one:

- a. C
- b. B
- c. D
- d. A

Question **36**

Not answered

Marked out of 1.00

Evaluate the improper integral if it exists: $\int_1^{\infty} \frac{dx}{\sqrt{2x-1}}$

A. 0 B. 2 C. $2\sqrt{2}$ D. The improper integral diverges

Select one:

- a. A
- b. C
- c. D
- d. B

Question **37**

Not answered

Marked out of 1.00

An equation of the plane containing (3; 1; 4); (1; 5; 1) and (0; 2; 2) is:

A. $4x - 9y + 36z = 18$ B. $8x - 11y + 18z = 24$

C. $9x + 5y - 2z = 14$ D. $7x - 8y + 5z = 6$

Select one:

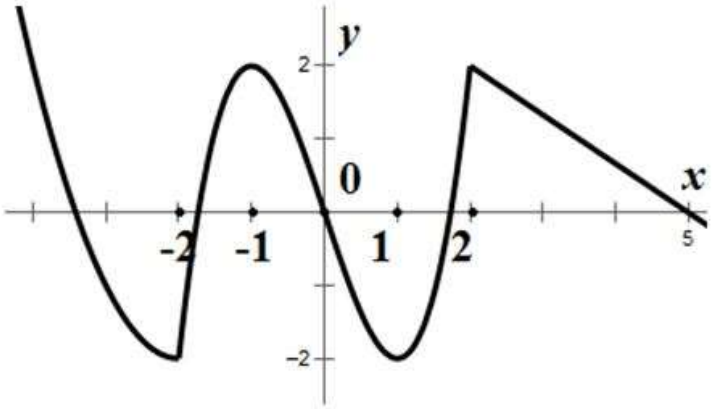
- a. C
- b. D
- c. A
- d. B

Question **38**

Not answered

Marked out of 1.00

The graph of f(x) is given. State the numbers at which f(x) is not differentiable



A. -1, 1 B. -2, 2 C. 2 D. -2, -1, 1, 2

Select one:

- a. D
- b. C
- c. B
- d. A

Question **39**

Not answered

Marked out of 1.00

For what value of m is the set of vectors $\{(1,-1,3),(1,0,2),(1,m,1)\}$ linearly dependent

A. 1 B. 0 C. 2 D. -2

Select one:

- a. A
- b. C
- c. B
- d. D

Question **40**

Not answered

Marked out of 1.00

Compute the rank of the matix $\begin{pmatrix} 1 & 1 & -1 & 3 \\ -1 & 4 & 5 & -2 \\ 1 & 6 & 3 & 4 \end{pmatrix}$

A. 1 B. 2 C. 3 D. 3x4

Select one:

- a. A
- b. D
- c. B
- d. C

Question **41**

Not answered

Marked out of 1.00

For what values of m is the matrix $\begin{pmatrix} m & 0 & 3 \\ 2 & m & -2 \\ 1 & -1 & 1 \end{pmatrix}$ invertible?

A. $m \neq -1, m \neq 6$ B. $m = 1$ C. $m \neq -6, m \neq 1$ D. $m = 1, m = 6$

Select one:

- a. C
- b. A
- c. B
- d. D

Question **42**

Not answered

Marked out of 1.00

Which of the following are not subspaces of $\mathbb{R}^3$?

(i) $\{(x,y,z) \mid 2x-y+3z=0\}$ (ii) $\{(x,y,z) \mid xy=0\}$

(iii) $\{(x,y,z) \mid z=0\}$ (iv) $\left\{(x,y,z) \mid \frac{x}{2}=\frac{y+1}{3}=z\right\}$

A. (ii) only B. (iv) only C. (ii) and (iii) D. None of the others

Select one:

- a. B
- b. A
- c. D
- d. C

Question **43**

Not answered

Marked out of 1.00

For $f(x)=\sqrt{1-2x}$, find $\frac{d^3y}{dx^3}$

A. $\frac{-3}{(1-2x)^{\frac{5}{2}}}$ B. $\frac{3}{(1-2x)^{\frac{5}{2}}}$ C. $\frac{-3}{8(1-2x)^{\frac{5}{2}}}$ D. None of the others

Select one:

- a. C
- b. A
- c. D
- d. B

Question **44**

Not answered

Marked out of 1.00

Evaluate the improper integral if it exists: $\int_0^1 \frac{dx}{\sqrt[3]{x-1}}$

A. $\frac{-3}{2}$ B. -1 C. $\frac{2}{3}$ D. The improper integral diverges

Select one:

- a. C
- b. B
- c. A
- d. D

Question **45**

Not answered

Marked out of 1.00

Find a, b and c so that the system $\begin{cases} x+ay+cz=0 \\ bx+cy-3z=1 \\ ax+2y+bz=5 \end{cases}$ has the solution $(3,-1,2)$

A. $a=1,b=2,c=1$ B. $a=-1,b=2,c=1$

C. $a=1,b=2,c=-1$ D. $a=1,b=-2,c=-1$

Select one:

- a. A
- b. B
- c. C
- d. D

Question **46**

Not answered

Marked out of 1.00

Let $T: R^2 \to R^2$ be a linear transformation, and assume that $T\begin{bmatrix}-1\\2\end{bmatrix}=\begin{bmatrix}3\\2\end{bmatrix}$ and $T\begin{bmatrix}3\\2\end{bmatrix}=\begin{bmatrix}7\\2\end{bmatrix}$.

Compute $T\begin{bmatrix}11\\32\end{bmatrix}$

A. $\begin{bmatrix}32\\75\end{bmatrix}$ B. $\begin{bmatrix}75\\32\end{bmatrix}$ C. $\begin{bmatrix}182\\75\end{bmatrix}$ D. $\begin{bmatrix}75\\182\end{bmatrix}$

Select one:

- a. A
- b. B
- c. C
- d. D

Question **47**

Not answered

Marked out of 1.00

Write the augmented matrix for the following system of linear equations

$$\begin{cases} x+y+z=0 \\ 2x-y+2z=0 \\ x+z=0 \end{cases}$$

A. $\begin{pmatrix}1&1&1\\2&-1&2\\1&0&1\end{pmatrix}$ B. $\begin{pmatrix}1&1&1&0\\2&-1&2&0\\1&0&1&0\end{pmatrix}$

C. $\begin{pmatrix}1&1&1&0\\2&-1&2&0\\1&1&0&0\end{pmatrix}$ D. None of the others

Select one:

- a. B
- b. D
- c. C
- d. A

Question **48**

Not answered

Marked out of 1.00

Determine the values of m such that the system of linear equations has exactly one solution.

$$\begin{cases} mx + y + z = 1 \\ x + my + z = m \\ x + y + mz = m^2 \end{cases}$$

A. $m \neq 1, m \neq -2$ B. $m = 2$ C. $m \neq 1$ D. $m = -2$

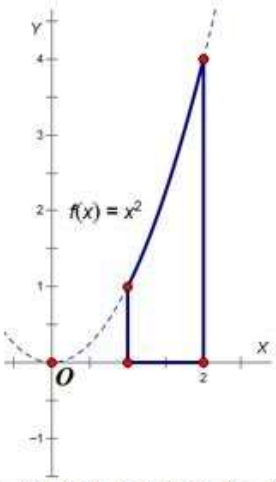
Select one:

- a. C
- b. D
- c. B
- d. A

Question **49**

Not answered

Marked out of 1.00



Calculate the approximate area of the shaded region in the figure by the trapezoidal rule, using divisions at $x = \frac{4}{3}$ and $x = \frac{5}{3}$

A. $\frac{50}{27}$ B. $\frac{251}{108}$ C. $\frac{127}{54}$ D. $\frac{77}{27}$

Select one:

- a. C
- b. B
- c. D
- d. A

Question **50**

Not answered

Marked out of 1.00

The angle between the vectors $x=\left(-3,2\sqrt{3},-\sqrt{3}\right)$ and $y=\left(-3,0,-\sqrt{3}\right)$ is:

A. $\frac{\pi}{6}$ B. $\frac{\pi}{4}$ C. $\frac{\pi}{3}$ D. $\frac{\pi}{2}$

Select one:

- a. A
- b. D
- c. B
- d. C