Started on	Monday, 18 July 2022, 7:17 AM
State	Finished
Completed on	Monday, 18 July 2022, 7:18 AM
Time taken	42 secs
Grade	0.00 out of 10.00 (0%)

Question 1

Not answered

Marked out of 0.20

Let $\mathbf{u} = (1,1,1)$, $\mathbf{v} = (1,2,3)$, $\mathbf{w} = (1,3,7)$ and $\mathbf{x} = (0,-3,-10)$. Which of the following statements is true?

(i) $\mathbf{x}$ is a linear combination of $\mathbf{u}$, $\mathbf{v}$, $\mathbf{w}$.

(ii) $\{\mathbf{u}, \mathbf{v}, \mathbf{w}, \mathbf{x}\}$ is linearly independent.

a. Only (i)

b. Neither

c. Only (ii)

d. Both

The correct answer is:
Only (i)

Question 2

Not answered

Marked out of 0.20

The dimension of the solution space of $A\mathbf{x} = \mathbf{0}$ if $A = \begin{bmatrix} 1 & -2 & 3 & 4 \\ 3 & -5 & 7 & 8 \end{bmatrix}$ is:

a. 0

b. 4

c. 1

d. 3

e. 2

The correct answer is:
2

Question 3
Not answered
Marked out of 0.20

If $\mathbf{u}, \mathbf{v}$ and $\mathbf{w}$ are vectors in $\mathbb{R}^n$, which of the following are true:

a) $\mathbf{v} \bullet \mathbf{w} = \frac{1}{4}[\|\mathbf{v}+\mathbf{w}\|^2 - \|\mathbf{v}-\mathbf{w}\|^2]$

b) $\mathbf{v} \bullet \mathbf{w} = 0$ if and only if $\|\mathbf{v}+\mathbf{w}\|^2 = \|\mathbf{v}\|^2 + \|\mathbf{w}\|^2$

- a. Neither
- b. Only b)
- c. Both
- d. Only a)
- e. -1

The correct answer is:
Both

Question 4
Not answered
Marked out of 0.20

A basis for the eigenspace corresponding to the eigenvalue 1 of the matrix $\begin{bmatrix} 1 & -1 & 4 \\ 3 & 2 & -1 \\ 2 & 1 & -1 \end{bmatrix}$ is:

- a. None of these
- b. (-1, 4, 1)
- c. (1, -1, -1)
- d. (1, 2, 1)
- e. (-2, 1, 4)

The correct answer is:
(-1, 4, 1)

Question 5
Not answered
Marked out of 0.20

For what value of α is the set of vectors $\{(1,1,1),(1,0,2),(1,\alpha,1)\}$ linearly dependent?

- a. -2
- b. 1
- c. 3
- d. 2
- e. None of these

The correct answer is:
1

Question 6
Not answered
Marked out of 0.20

What is the dimension of the subspace of $\mathbb{R}^3$ spanned by $(1,2,-1)$, $(1,-2,1)$, $(-3,2,-1)$ and $(2,0,0)$?

- a. 3
- b. None of these
- c. 4
- d. 5
- e. 2

The correct answer is:
2

Question 7

Not answered

Marked out of 0.20

Let $U = \text{span}\{(1,-2,3,4), (-3,6,-5,-16), (-1,2,-5,-2)\}$. Find all t such that $(1,t,3,4) \in U$.

$= \{ t_1(1,-2,3,4) + t_2(-3,6,-5,-16) + t_3(-1,2,-5,-2) : t_i \in \mathbb{R} \}$

$(1,t,3,4) \in U$

$0 = t+2 \Rightarrow t = -2$

a. 2

b. 1

c. -2

d. -1

e. None of these

The correct answer is:
-2

$t_1 \quad t_2 \quad t_3$

$$\begin{pmatrix} 1 & -3 & -1 \\ -2 & 6 & 2 \\ 3 & -5 & -5 \\ 4 & -16 & -2 \end{pmatrix} \begin{vmatrix} 1 \\ t \\ 3 \\ 4 \end{vmatrix} \rightarrow \begin{pmatrix} 1 & -3 & -1 \\ 0 & 0 & 0 \\ 3 & -5 & -5 \\ 4 & -16 & -2 \end{pmatrix} \begin{vmatrix} 1 \\ t+2 \\ 3 \\ 4 \end{vmatrix}$$

Question 8

Not answered

Marked out of 0.20

If $\begin{vmatrix} a & b & c \\ d & e & f \\ g & h & i \end{vmatrix} = 3$, find $\begin{vmatrix} 4g & a & d-2a \\ 4h & b & e-2b \\ 4i & c & f-2c \end{vmatrix}$.

a. 12

b. -12

c. 24

d. 6

e. None of these

The correct answer is:
12

Question 9
Not answered
Marked out of 0.20

What is the (2,3)-entry of A^{-1} if

$$A = \begin{bmatrix} 1 & 1 & 1 \\ 1 & 2 & 3 \\ 0 & 1 & 1 \end{bmatrix}?$$

a. -2
b. 1
c. 2
d. -1
e. None of these

The correct answer is:
2

Question 10
Not answered
Marked out of 0.20

Find the (3,2)-cofactor of A if

$$A = \begin{bmatrix} 1 & 1 & 1 \\ 1 & 2 & 3 \\ 0 & 1 & 1 \end{bmatrix}.$$

$$a_{32} = (-1)^{3+2} \begin{vmatrix} 1 & 1 \\ 1 & 3 \end{vmatrix} = -2.$$

a. 2
b. None of these
c. -2
d. 1
e. 3

The correct answer is:
-2

Question 11
Not answered
Marked out of 0.20

Suppose A is a 4 x 4 matrix with determinant 7.
Choose the INCORRECT one.

a. $\det((2A)^{-1}) = 7/16$
b. $\det(A^T) = 7$
c. $\det(-A) = -7$
d. $\det(A^2) = 49$

The correct answer is: a, c
det(-A) = -7

Question 12
Not answered
Marked out of 0.20

Find the eigenvalues of the matrix

$$\begin{bmatrix} 1 & 1 \\ 4 & -2 \end{bmatrix}$$

a. 3, -2
b. 2, -1
c. None of these
d. 2, -3
e. 1, -2

The correct answer is:
2, -3

Question 13

Not answered

Marked out of 0.20

Evaluate

$\int_1^{e^2} \frac{\ln y}{\sqrt{y}}\,dy$

$= 2\int_1^{e^2} \frac{\frac{1}{2}\ln y}{\sqrt{y}}\,dy = 2\int_1^{e^2} \frac{\ln\sqrt{y}}{\sqrt{y}}\,dy. = I$

* $u = \sqrt{y}$, $du = \frac{1}{2\sqrt{y}}\,dy \Rightarrow 2du = \frac{dy}{\sqrt{y}}$

$I = 2\int_1^e \ln u \cdot 2\,du = 4\int_1^e \ln u\,du = 4\int_1^e \ln x\,dx$

$\begin{cases} u = \ln x \Rightarrow du = \frac{1}{x}dx \\ dv = dx \Rightarrow v = x \end{cases}$

$= 4\left(x\ln x\Big|_1^e - \int_1^e dx\right)$

$= 4\left(e - x\Big|_1^e\right)$

$= 4(e - (e-1)) = 4$

- a. 2e - 2
- b. None of these
- c. e^2 - 1
- d. 4
- e. 3

The correct answer is: 4

Question 14

Not answered

Marked out of 0.20

$\int_a^{\infty} f(x)\,dx = \lim_{t\to+\infty}\int_a^t f(x)\,dx$

Evaluate the improper integral if it converges.

$\int_2^{\infty} \frac{1}{x^4}\,dx = \lim_{t\to+\infty}\int_2^t \frac{1}{x^4}\,dx = \lim_{t\to+\infty} \frac{x^{-3}}{-3}\Big|_2^t$

$= -\frac{1}{3}\lim_{t\to+\infty}\left(t^{-3} - 2^{-3}\right)$

$= -\frac{1}{3}\lim_{t\to+\infty}\left(\frac{1}{t^3} - \frac{1}{8}\right)$

$= -\frac{1}{3}\cdot\left(-\frac{1}{8}\right) = \frac{1}{24}.$

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

- a. None of these
- b. 1/2
- c. 1/3
- d. It diverges
- e. 1/4

The correct answer is: None of these

Question 15
Not answered
Marked out of 0.20

Find the average value of the function $f(x)=\frac{1}{\sqrt{x}}$ over [1, 4].

$[a,b]$

$f_{ave} = \frac{1}{b-a}\int_a^b f(x)\,dx$

$= \frac{1}{3}\int_1^3 \frac{1}{\sqrt{x}}\,dx = \frac{2}{3}.$

a. 1/2
b. 2
c. 2/3
d. 1
e. None of these

The correct answer is: 2/3

Question 16
Not answered
Marked out of 0.20

$v(x) = 1-3x$

Find dy/dx if

$y=\int_{1-3x}^{1}\frac{u^3}{1+u^2}\,du$

$f(u)$

$\frac{d}{dx}\int_{v(x)}^{u(x)} f(t)\,dt = u'(x)f(u(x)) - v'(x)f(v(x))$

$=0$

Select one (if any)

(i) $\frac{dy}{dx}=\frac{(1-3x)^3}{1+(1-3x)^2}$

(ii) $\frac{dy}{dx}=\frac{-3(1-3x)^3}{1+(1-3x)^2}$

(iii) $\frac{dy}{dx}=\frac{x^3}{1+x^2}$

$\frac{dy}{dx} = -(-3)\cdot\frac{(1-3x)^3}{1+(1-3x)^2} = \frac{3(1-3x)^3}{1+(1-3x)^2}$

a. (iii)
b. None of these
c. (ii)
d. (i)

The correct answer is:
None of these

Question 17

Not answered

Marked out of 0.20

Use Trapezoidal Rule with n = 5 to estimate $\int_0^5 f(x)\,dx$

given

x	0	1	2	3	4	5
f(x)	5	3	7	-2	1	3

$\Delta x = \frac{5}{5} = 1$

$\int_0^5 f(x)dx \simeq \frac{\Delta x}{2}\left(f(x_0) + 2f(x_1) + 2f(x_2) + \dots + f(x_5)\right)$

$= \frac{1}{2}\left(f(5) + 2f(1) + 2f(2) + 2f(3) + 2f(4) + f(5)\right)$

a. None of these
b. 26
c. 13
d. 14
e. 17

The correct answer is: 13

Question 18

Not answered

Marked out of 0.20

Let $U = \{(a,b,c,d) \mid 3a - 5b = 0, b + c + d = 0\}$ be a subspace of R^4.

Find the dimension of U

A. 1 B. 2 C. 3 D. 4

$\begin{cases} 3a - 5b = 0 \\ b + c + d = 0 \end{cases}$

a b c d

$\begin{pmatrix} 3 & -5 & 0 & 0 & 0 \\ 0 & 1 & 1 & 1 & 0 \end{pmatrix}$

$c = t_1$

$d = t_2$

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

The correct answer is:
B

Question 19

Not answered

Marked out of 0.20

Evaluate

$$\lim_{x\to 1}\frac{x^2-5x+2}{x^4+8x+7} = \lim_{x\to 1}\frac{1^2-5+2}{1^4+8+7} = -\frac{1}{8}$$

Select one:

- a. -3/8
- b. 3/8
- c. 0
- d. 1/8
- e. -1/8

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

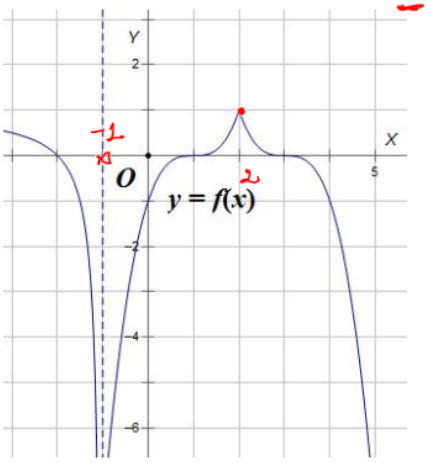
The correct answer is:
E

Question 20

Not answered

Marked out of 0.20

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



Select one:

- a. -1; 2
- b. 2
- c. 1; 3
- d. -1; 1; 2; 3

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

The correct answer is:
A

$\begin{cases} T(u+v) = T(u) + T(v) \\ T(\alpha u) = \alpha T(u) \end{cases}$ *

Question 21
Not answered
Marked out of 0.20

Let $T: R^2 \to R^2$ be a linear transformation such that $T(u) = (1,2), T(v) = (-1,0)$ for given $u, v \in R^2$. Find $T(2u - 3v)$

$= T(2u) - T(3v) = 2T(u) - 3T(v) = 2(1,2) - 3(-1,0)$
$= (5,4)$

A. $(-2,8)$ B. $(-2,4)$ C. $(1,0)$ D. $(5,4)$

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

The correct answer is:
D

Question 22
Not answered
Marked out of 0.20

Use Newton's method with the specified initial approximation $x_1 = 2$ to find x_3 of the following equation
$\ln(x^2 + 4) - 2x = 0$

$x_{n+1} = x_n - \frac{f(x_n)}{f'(x_n)}$

Select one:
a. 0.71696
b. 0.76070
c. 0.76054
d. 0.71963

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

The correct answer is:
C

Question 23

Not answered

Marked out of 0.20

Let $A=\begin{pmatrix}1 & * & * & *\\ 0 & 3 & * & *\\ 0 & 0 & 5 & *\\ 0 & 0 & 0 & 7\end{pmatrix}$, where (*) denotes any real number. Compute $\det\left(2A^{-1}\right)$

A. $\frac{2}{105}$ B. 210 C. $\frac{16}{105}$ D. None of the others

a. D

b. C

c. A

d. B

The correct answer is:
C

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Question **24**

Not answered

Marked out of 0.20

Find all values m such that the system of equations $\begin{cases} x+y-z=1 \\ x+2y+mz=0 \\ 2x+3y-2z=m \end{cases}$ has exactly one solution

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

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

The correct answer is:
C

$$\left(\begin{array}{ccc|c} 1 & 1 & -1 & 1 \\ 1 & 2 & m & 0 \\ 2 & 3 & -2 & m \end{array}\right) \rightarrow \left(\begin{array}{ccc|c} 1 & 1 & -1 & 1 \\ 0 & 1 & m+1 & -1 \\ 0 & 1 & 0 & m-2 \end{array}\right)$$

x y z

$$\rightarrow \left(\begin{array}{ccc|c} 1 & 1 & -1 & 1 \\ 0 & 1 & m+1 & -1 \\ 0 & 0 & m+1 & -m+1 \end{array}\right) \times.$$

$(m+1)z = 1-m$

Question **25**

Not answered

Marked out of 0.20

Let A be the augmented matrix of a homogeneous of 3 equations in 6 variables. If rank(A) = 1, how many solutions and how many parameters does this system have?

A. Infinitely many solutions and 3 parameters

B. Infinitely many solutions and 2 parameters

C. Infinitely many solutions and 5 parameters

D. Unique solution

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

The correct answer is:
C

var rank

$n - r = 6 - 1 = 5$ (parameters)

Question 26

Not answered

Marked out of 0.20

Describe how the graph of y = f(x + 2) + 3 is obtained from the graph of y = f(x)

Select one:

a. Shift 2 units to the left, then shift 3 units down

b. Shift 2 units to the left, then shift 3 units up

c. Shift 3 units to the left, then shift 2 units up

d. Shift 2 units to the right, then shift 3 units up

e. Shift 3 units to the left, then shift 2 units down

a. A

b. B

c. C

d. D

The correct answer is:
B

Question 27

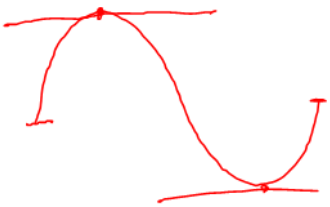
Not answered

Marked out of 0.20

Find all the numbers c that satisfy the conclusion of Rolle' s Theorem

$f(x) = x\sqrt{x+3}; [-3; 0]$

$f'(x) = 0$



Select one:

a. -1

b. -3 and 0

c. -3 and -1

d. -2 and 0

e. -2

a. B

b. A

c. E

d. C

e. D

The correct answer is:
E

Question 28

Not answered

Marked out of 0.20

Find m such that the set $\{(2,m,1),(m,0,0),(1,1,m)\}$ is a basis of $\mathbb{R}^3$

A. $m \neq 0$ B. $m \neq \pm 1$ C. $m \neq 1$ D. $m \in R \setminus \{0,1,-1\}$

$\dim \mathbb{R}^3 = 3$

$\begin{vmatrix} 2 & m & 1 \\ m & 0 & 1 \\ 1 & 0 & m \end{vmatrix} \neq 0$

a. B

b. C

c. A

d. D

The correct answer is:
D

Question 29

Not answered

Marked out of 0.20

Find the absolute maximum and absolute minimum values of the function
$f(x) = x^4 - 32x^2 + 2$ on [-5; 5]

Select one:

a. absolute maximum 2, absolute minimum -254

b. None of the others

c. absolute maximum 2, absolute minimum -173

d. absolute maximum 2, absolute minimum 0

a. C

b. B

c. A

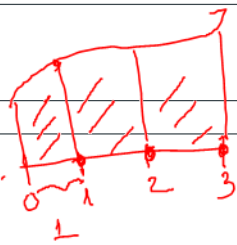
d. D

The correct answer is:
A

Question 30

Not answered

Marked out of 0.20



$\Delta x = \frac{3}{3} = 1$

Estimate the area of under the graph of $f(x) = 18 - 2x^2$ from $x = 0$ to $x = 3$, using three approximating rectangles and right endpoints.

$A = 1\,(f(1) + f(2) + f(3))$

a. 28

b. 26

c. 40

d. 44

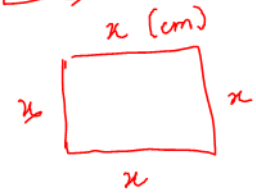
The correct answer is:
26

Question 31

Not answered

Marked out of 0.20

Each side of square is increasing ~~at rate of~~ 3 cm/s. At what rate (in cm^2/s) is the area of the square increasing when the area of square is $25cm^2$?



$\frac{dx}{dt} = 3$ cm/s.

$A = x^2 = 25 \Rightarrow x = 5$

$= (x(t))^2$

$\frac{dA}{dt} = 2x\frac{dx}{dt} = 2 \cdot 5 \cdot 3 = 30\ cm^2/s$

Select one:

a. None of the others

b. 5

c. 30

d. 25

e. 15

a. B

b. A

c. C

d. D

The correct answer is:
C

Question 32

Not answered

Marked out of 0.20

Find the linear approximation for $f(x) = \frac{1}{2x-1}$ at x = 1

$L(x) \approx f(x)$

$L(x) = f'(1)(x-1) + f(1)$

Select one:

- a. 2x - 3
- b. None of the others
- c. 2x + 3
- d. -2x - 3
- e. -2x + 3

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

The correct answer is:
E

Question 33

Not answered

Marked out of 0.20

Find dy/dx by implicit differentiation if $2xy + y^3 = 5$

Select one:

- a. $\frac{2y}{3y^2-2x}$
- b. $\frac{2y}{3y^2+2x}$
- c. $\frac{-2y}{3y^2-2x}$
- d. $\frac{-2y}{3y^2+2x}$

$2y + 2x\frac{dy}{dx} + 3y^2\frac{dy}{dx} = 0$

$\Rightarrow \frac{dy}{dx}(2x + 3y^2) = -2y$

$\Rightarrow \frac{dy}{dx} = \frac{-2y}{2x+3y^2}$

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

The correct answer is:
D

Question 34

Not answered

Marked out of 0.20

Find $f_o g_o h$, where f(x) = 2x + 1; g(x) = $\sin(x^2)$; h(x) = e^{-x}

$f(g(h(x)))$

Select one:

- a. $2\sin(x^2 e^{-2x} + 1)$
- b. $2\sin(e^{-2x} + 1)$
- c. $2\sin(x^2 e^{-x}) + 1$
- d. $2\sin(e^{-2x}) + 1$

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

The correct answer is:
D

Question 35

Not answered

Marked out of 0.20

Find the numbers at which f is discontinuous.

$$f(x) = \begin{cases} 1 + x^2 & \text{if } x \leq 0 \\ 2 - x & \text{if } 0 < x \leq 2 \\ (x-2)^2 & \text{if } x > 2 \end{cases}$$

$x = 0$, $x = 2$

f(x) is continuous at a.

$\lim_{x \to a^-} f(x) = f(a)$

Notes:
- f(a) exist
- $\lim_{x \to a} f(x)$ exist: $\lim_{x \to a^-} f(x) = \lim_{x \to a^+} f(x)$
- $\lim_{x \to a} f(x) = f(a)$

- a. None of these
- b. 0
- c. 0, 2
- d. 2

* $x = 0$: $f(0) = 1$; $\lim_{x \to 0^-} f(x) = 1$; $\lim_{x \to 0^+} f(x) = 2$; $1 \neq 2$ ⇒ f is discontinuous at $x = 0$

* $x = 2$: $f(2) = 0$; $\lim_{x \to 2^-} f(x) = 0 = \lim_{x \to 2^+} f(x)$ ⇒ f is continuous at $x = 2$

The correct answer is:
0

Question 36
Not answered
Marked out of 0.20

Evaluate

$$\int_0^{\frac{\pi}{2}} (1+\sin x)^3 \cos x \, dx$$

a. 17/4
b. None of these
c. 15/4
d. 4
e. 13/4

The correct answer is:
15/4

Question 37
Not answered
Marked out of 0.20

Evaluate

$$\int_1^2 \frac{\cos(\pi / x)}{x^2} dx$$

Select one.

(i) $-\frac{1}{\pi}$

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

(iii) $-\frac{2}{\pi}$

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

a. None of these
b. (iv)
c. (ii)
d. (iii)
e. (i)

The correct answer is:
(i)

Question 38
Not answered
Marked out of 0.20

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

a. None of these
b. (2, 2, 3)
c. (5, 9, 5)
d. (1, 2, 1)
e. (-3, 1, 0)

$t_1(2,1,4) + t_2(1,-1,3) = (2,2,3)$ ✗

The correct answer is:
(1, 2, 1)

Question 39
Not answered
Marked out of 0.20

$V \subset \mathbb{R}^3$

Which of the following are subspaces of $\mathbb{R}^3$?
(i) $\{(x, y, z) \mid 2x - y + 3z = 0\}$
(ii) $\{(x, y, z) \mid xy = 0\}$

a. Only (i)
b. Neither
c. Both
d. Only (ii)

① • zero vector $\in V$
② • $x, y \in V \Rightarrow x + y \in V$
③ • $x \in V \Rightarrow tx \in V$, $t \in \mathbb{R}$

The correct answer is:
Only (i)

Question 40

Not answered

Marked out of 0.20

Which set is/are basis (bases) of R^3?

(i) $\{(1,0,1),(6,4,5),(-4,-4,7)\}$

(ii) $\{(3,-1,2),(5,1,1),(1,1,1)\}$

a. Both

b. Neither

c. Only (ii)

d. Only (i)

The correct answer is:
Both

Question 41

Not answered

Marked out of 0.20

Which of the vectors below is a linear combination of $\mathbf{u} = (1,1,2)$, $\mathbf{v} = (-2,3,1)$ and $\mathbf{w} = (2,-1,1)$?

p = (0, 1, 1)

q = (1, 1, 1)

a. Only q

b. Both

c. Neither

d. Only p

The correct answer is:
Only p

Question **42**
Not answered
Marked out of 0.20

If $\mathbf{u} = (6, 0, 0, 3, 0)$ and $\mathbf{w} = (-1, 4, 2, 1, 3)$, find $\|\mathbf{u} - 3\mathbf{w}\|$ in $\mathbb{R}^5$.

a) $\sqrt{271}$ b) $3\sqrt{38}$ c) $3\sqrt{39}$ d) $\sqrt{306}$

- a. b)
- b. d)
- c. c)
- d. a)

The correct answer is:
b)

Question **43**
Not answered
Marked out of 0.20

Find the dimension of the column space of $\begin{bmatrix} -1 & 7 & 0 & 3 & 1 \\ 1 & -1 & 0 & -1 & -1 \\ 0 & -3 & 0 & -1 & -1 \\ 0 & 5 & 3 & 4 & -3 \end{bmatrix}$

- a. 4
- b. None of these
- c. 2
- d. 5
- e. 3

The correct answer is:
4

Question **44**

Not answered

Marked out of 0.20

What is the dimension of the subspace spanned by $S = \{(1,1,1), (-1,1,-1), (1,1,3), (0,2,1)\}$?

a. 4
b. 3
c. 2
d. None of these
e. 5

The correct answer is:
3

Question **45**

Not answered

Marked out of 0.20

Find all $x \in \mathbb{R}$ such that $\{(1,1,2), (-2,x,1), (2,-1,1)\}$ is a linearly independent set.

a. any number but 3
b. any number but 0
c. any number but 2
d. any number but 1

The correct answer is:
any number but 3

Question **46**
Not answered
Marked out of 0.20

Which of the following vectors belong to the column space of the matrix

$$A = \begin{bmatrix} 1 & 2 & 3 \\ 2 & 4 & 6 \\ -1 & -2 & -3 \end{bmatrix} ?$$

(i) $\mathbf{u} = (-1, -2, 1)$ (ii) $\mathbf{v} = (1, 2, 3)$

a. Only v
b. Both
c. Only u
d. Neither

The correct answer is:
Only u

Question **47**
Not answered
Marked out of 0.20

The characteristic polynomial of the matrix

$$\begin{bmatrix} 2 & 3 \\ 1 & 1 \end{bmatrix}$$

is

a. None of these
b. (x - 2)(x - 1) - (x - 3)(x - 1)
c. x^2 - 3x - 1
d. (x - 2)(x - 1)
e. x^2 - 3x + 5

The correct answer is:
x^2 - 3x - 1

Question 48

Not answered

Marked out of 0.20

Given $f(x) = x^2 + 1$ and $h(x) = f(f(x))$.

Compute $h'(2)$.

- a. 10
- b. 15
- c. None of these
- d. 40
- e. 20

The correct answer is: 40

Question 49

Not answered

Marked out of 0.20

Use the Chain Rule to find dz/dx given these functions

$x \longmapsto a = x^2 \longmapsto b = a + 5 \longmapsto c = \sqrt{b} \longmapsto z = 3c$

Select one.

$(i)\ \frac{3x}{x^2+5}$ $(ii)\ \frac{6x}{\sqrt{x^2+5}}$ $(iii)\ \frac{3x}{\sqrt{x^2+5}}$

- a. (i)
- b. None of these
- c. (ii)
- d. (iii)

The correct answer is: (iii)

Question 50

Not answered

Marked out of 0.20

Find the limit or say that it does not exist

$$\lim_{x \to \pi} \sin(x + \sin x)$$

a. 1

b. It does not exist

c. -1

d. 0

The correct answer is:
0