

Multiple choices 1/50

### Answer

- A (See picture)
  - B A. (i)
  - C B. (ii)
  - D C. (iii)
  - E D. (iv)

E. None of the other choices is correct

Next

$$\begin{aligned} \text{rate of change of } f: \\ f'(t) &= 2e^t + 2te^t \\ \rightarrow f'(3) &= 2e^3 + 6e^3 \\ &= 8e^3 \end{aligned}$$

The position in meter of a particle after  $t$  seconds is modeled by the function:

$$f(t) = 2te^t, \text{ where } t \geq 0.$$

At what rate, in meters per second, is the position of the particle changing at  $t = 3$ ?

- (i)  $8e^3$

(ii)  $2e^3$

(iii)  $2+e^3$

(iv)  $6e^3$

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**Finish**

Solved

**Multiple choices 2/50**

**Answer**

(Choose 1 answer)

- A
- B
- C
- D
- E

[Next](#)

*shift 1 unit upward*

$f(x) \rightarrow f(3x) \rightarrow f(3x) + 1$

*compress horizontally*

- Describe how the graph of  $y = f(3x) + 1$  is obtained from graph of  $y = f(x)$
- A. Compress horizontally by a factor of 3, and then shift 1 unit upward
  - B. Compress vertically by a factor of 3, and then shift 1 unit upward
  - C. Stretch horizontally by a factor of 3, and then shift 1 unit upward
  - D. Stretch vertically by a factor of 3, and then shift 1 unit upward
  - E. None of the other choices is correct

1  2  3  4  5  6  7  8  9  10  11  12  13  14  15  16  17  18  19  20  21  22  23  24  25  26  27  28  29  30  31  32  33  34  35  36  37  38  39  40  41  42

43  44  45  46  47  48  49  50

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[Exit](#)

$$x = x(t), \quad y = y(t)$$

$$2x \cdot \frac{dx}{dt} + 2y \cdot \frac{dy}{dt} = 4 \frac{dx}{dt}$$

Thay  $x=1$ ,  $y = \sqrt{3}$ ,  
 $\frac{dy}{dx} = 6$ .

- Multiple choices 3/30**

**Answer** (Choose 1 answer)  
(See picture)

A A. (iv)

B B. (i)

C C. (ii)

D D. (iii)

E E. None of the other choices is correct

If  $x^2 + y^2 = 4x$  and  $dy/dt = 6$ , find  $dx/dt$  at the point  $(1, \sqrt{3})$ .

- (i)  $6\sqrt{3}$   
(ii)  $-6\sqrt{3}$   
(iii)  $12\sqrt{3}$   
(iv)  $-12\sqrt{3}$

$$2 \frac{dx}{dt} + 2\sqrt{3}.6 = 4 \frac{dx}{dt}$$

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42  
43 44 45 46 47 48 49 50

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$$x_{n+1} = x_n - \frac{f(x_n)}{f'(x_n)} = x_n - \frac{x_n^3 - 3x_n^2 + 1}{3x_n^2 - 6x_n}$$

$$x_1 = 3 \rightarrow x_2 \rightarrow x_3$$

**Multiple choices 4/50**

**Answer**

(Choose 1 answer)

- A (See picture)
- B A. 1.8794
- C B. 1.1206
- D C. 2.8794
- E D. 2.9888
- F E. None of the other choices is correct
- F. 1.1112

[Next](#)

Use Newton's method with the specified initial approximation  $x_1$  to find  $x_3$ , the third approximation to the root of the given equation.

$$x^3 - 3x^2 + 1 = 0, x_1 = 3$$

(Give your answer to 4 decimal places)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42
43	44	45	46	47	48	49	50																																		

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**Multiple choices 5/50**

**Answer**

(Choose 1 answer)

- A
- B
- C
- D
- E
- F. 0
- G. 2

[Next](#)

1 2 3 4 **5** 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42  
43 44 45 46 47 48 49 50

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Find the limit

$$\lim_{x \rightarrow \infty} [\sqrt{x+4} - \sqrt{x}]$$

$$\lim_{x \rightarrow \infty} \frac{\sqrt{x+4} - \sqrt{x}}{\sqrt{x+4} + \sqrt{x}}$$

$$= \lim_{x \rightarrow \infty} \frac{4}{\sqrt{x+4} + \sqrt{x}} = 0$$

Nhân chia  
lý luận  
hđp

**Multiple choices 6/50**

**Answer**

- (Choose 1 answer)
- A  
 B  
 C  
 D
- A. I diverges, J converges  
 B. Both diverges  
 C. Both converges ✓  
 D. I converges, J diverges

[Next](#)

Nh<sup>2</sup>:  $\int_a^b \frac{1}{(x-a)^\alpha} dx$

by  $\int_a^b \frac{1}{(b-x)^\alpha} dx$

$\alpha < 1$ : conv  
 $\alpha \geq 1$ : div

Determine whether the improper integrals converge or diverge

$$I = \int_0^1 \frac{1}{\sqrt{x}} dx, \quad J = \int_1^{+\infty} \frac{1}{x^2} dx$$

conv                      conv

Nh<sup>3</sup>:  $\int_a^{+\infty} \frac{1}{x^\alpha} dx$

$\alpha > 1$ : conv  
 $\alpha \leq 1$ : div

**Multiple choices 7/50**

**Answer**

(Choose 1 answer)  
 A  
 B  
 C  
 D  
 E

- (See picture)
- A. Reflection in the x-axis. ✓  
 B. None of the other choices is correct  
 C. Reflection about  $y = -x$ .  
 D. Rotation through 180 degrees  
 E. Reflection in the y-axis.

[Next](#)

Let  $T: \mathbb{R}^2 \rightarrow \mathbb{R}^2$  be rotation through  $\pi/2$  followed by reflection in the line  $y = x$ . Then  $T$  is:

Quay  $90^\circ$  sau do' txa qua  $y = x$ .

$$\begin{aligned}
 e_1 &= \begin{bmatrix} 1 \\ 0 \end{bmatrix} \xrightarrow{\text{Quay } 90^\circ} \begin{bmatrix} 0 \\ 1 \end{bmatrix} \xrightarrow{y=x} \begin{bmatrix} 1 \\ 0 \end{bmatrix} = e_1 \\
 e_2 &= \begin{bmatrix} 0 \\ 1 \end{bmatrix} \xrightarrow{\quad} \begin{bmatrix} -1 \\ 0 \end{bmatrix} \xrightarrow{y=x} \begin{bmatrix} 0 \\ -1 \end{bmatrix} = -e_2
 \end{aligned}$$

$\Rightarrow$

**Multiple choices 8/50****Answer**

- A  
 B  
 C  
A. (iii)  
B. None of the other choices is correct  
 D  
 E  
C. (iv)  
D. (i)  
 F  
E. (v)  
F. (ii)

**Next**

(Choose 1 answer)

(See picture)



Find the domain of the function

$$f(x) = \sqrt[3]{x+4}$$

- (i)  $(-\infty, \infty)$   
(ii)  $(-\infty, -4)$   
(iii)  $[-4, \infty)$   
(iv)  $(-\infty, -4]$   
(v)  $(-4, \infty)$

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42  
43 44 45 46 47 48 49 50

 I want to finish the exam.**Finish****Start****Exit**

Multiple choices 9/50

**Answer**

- (Choose 1 answer)  
 A  
 B  
 C  
 D  
 E  
✓

Next

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42

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Làm nhầm. Cho,  $a = 10$   
 chép han  
 bám may → chọn kQ

Let  $a$  be a nonzero number. Find the (3,2)-entry of  $A^{-1}$  for

$$A = \begin{bmatrix} a & 0 & 0 \\ a & a+1 & a+2 \\ 1 & 1 & 1 \end{bmatrix} \quad \det A = a \begin{vmatrix} a+1 & a+2 \\ 1 & 1 \end{vmatrix} = -a$$

$$C_{23} = (-1)^5 \begin{vmatrix} a & 0 \\ 1 & 1 \end{vmatrix} = -a$$

$$\text{adj}(A) = C^T = \begin{bmatrix} * & * & * \\ * & * & * \\ * & -a & * \end{bmatrix}$$

$$\Rightarrow A^{-1} = \frac{1}{\det A} \text{adj} A = \begin{bmatrix} * & * & * \\ * & * & * \\ * & 1 & - \end{bmatrix}$$

Exit

**Multiple choices 10/50****Answer**

- A  
 B  
 C  
 D

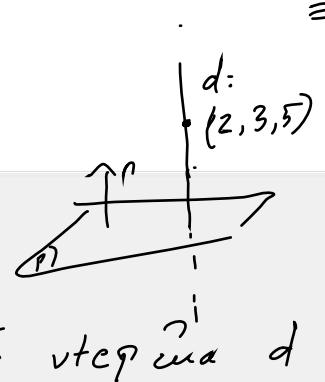
**Next**

(Choose 1 answer)

để them  
 ko lâm  
 &c  
 nhang cản  
 may de

Find a parametric equation of the line which goes through  $P(2,3,5)$  and perpendicular to the plane  $-7 = 0$ .

- A.  $x = 2 + t, y = 3 + 2t, z = 5 + 3t$ .  
 B.  $x = 2 + 2t, y = 4 + 3t, z = 6 + 5t$ .  
 C.  $x = 2t, y = 4t, z = 6t - 7$ .  
 D. None of the other choices is correct



**Multiple choices 11/50**

**Answer**

- A
- B
- C
- D
- E

[Next](#)

(Choose 1 answer)

$$\begin{aligned} & (x+y)(x-y) \\ &= x \cdot x - x \cdot y + x \cdot y - y \cdot y \\ &= \|x\|^2 - 0 + 0 - \|y\|^2 = 0 \end{aligned}$$

$$\begin{aligned} & (x+2y)(x-y) \\ &= \|x\|^2 - 0 + 2 \cdot 0 - 2\|y\|^2 = -1 \end{aligned}$$

Let  $\{X, Y\}$  be an orthogonal set with  $\|X\| = \|Y\| = 1$ . Which of the following sets are orthogonal?

- (i)  $\{X+Y, X-Y\}$
- (ii)  $\{X+2Y, X-Y\}$
- A. Only (i) is orthogonal
- B. Not enough information
- C. None of (i) and (ii) is orthogonal
- D. Only (ii) is orthogonal
- E. Both (i) and (ii) are orthogonal

**Multiple choices 12/50**

**Answer**

- (Choose 1 answer)
- A  
 B  
 C  
 D  
 E  
 (See picture)  
 A. -11/2  
 B. 9  
 C. None of the other choices is correct  
 D. 6  
 E. 11 ✓

[Next](#)

Bên may cho phans

Evaluate the definite integral  $\int_1^4 \frac{7 - \sqrt{x}}{\sqrt{x}} dx$ .

$$\begin{aligned}
 t &= \sqrt{x}, \quad dt = \frac{1}{2\sqrt{x}} dx \\
 x &\Big| 1 \Big| 4 \\
 +t &\Big| 1 \Big| 2 \\
 \int_1^4 \frac{7 - \sqrt{x}}{\sqrt{x}} dx &= 2 \int_1^2 (7 - t) dt \\
 &= 2 \left( 7t - \frac{t^2}{2} \right) \Big|_1^2 = 11
 \end{aligned}$$

**Multiple choices 13/50**

**Answer**

(Choose 1 answer)

- A (See picture)
- B A. All of the other choices are incorrect
- C B. abc
- D C.  $a(b+2)(c-3)$
- D 0

[Next](#)

Evaluate the determinant of the matrix

$$A = \begin{bmatrix} a & b & c \\ a+2 & b+2 & c+2 \\ a-3 & b-3 & c-3 \end{bmatrix}$$

$$\begin{aligned} |A| &= \begin{vmatrix} a & b & c \\ 2 & 2 & 2 \\ -3 & -3 & -3 \end{vmatrix} && \text{đthíc khang} \\ &\quad \rightarrow && \text{đòn kh. công} \\ &= 0 \begin{pmatrix} \text{vì có } 2, \\ \text{hang tì lệ} \end{pmatrix} && \begin{array}{l} \text{thêm vào 1} \\ \text{hang k làm} \\ \text{hang } \neq \end{array} \end{aligned}$$

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	
43	44	45	46	47	48	49	50																																			

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[Score](#)

[Exit](#)

Multiple choices 14/50

Answer

- (Choose 1 answer)
- A  
 B  
 C  
 D  
 E  
 F
- (See picture)
- A. 0  
B. 2  
C.  $-2/e+2$  ✓  
D. None of the other choices is correct  
E.  $e+2$   
F.  $2/e+2$

Next

Bên may' cho nhau!

$$I = 2 - \frac{2}{e}$$



$$\int_{-1}^1 |x| e^x dx = \int_{-1}^0 -x e^x dx + \int_0^1 x e^x dx$$

$$u = x \quad du = dx \\ dv = e^x dx \quad v = e^x$$

$$-\int_{-1}^0 x e^x dx = -\left( x e^x - e^x \right) \Big|_{-1}^0 = e^{-1} + 1 - e^1 = 1 - \frac{e}{e}$$

$$\int_0^1 x e^x dx = \left( x e^x - e^x \right) \Big|_0^1 = e - e + 1 = 1$$

Multiple choices 15/50

(Choose 1 answer)

- A
  - B
  - C
  - D

$$U: \quad 2x - y + z = 0$$

$\dim V = 2 \rightarrow$  (ii) ~~sei~~.

Thus (1) :  $(1, 0, -2) \in V$

$$(0, 1, 1) \in V$$

vector konung fg

$\rightarrow$  (i) drug

Let  $U = \{(x, y, z) | 2x-y+z = 0\}$  be a subspace of  $\mathbb{R}^3$ . Which of the following statements are true?

- (ii)  $U = \text{span} \{(1, 2, 0)\}$

  - A. (i) only
  - B. (ii) only
  - C. Both (i) and (ii)
  - D. None of the other choices is correct

### Answer

□ A

B

□ B

Next

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42

43 44 45 46 47 48 49 50

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**Finish**

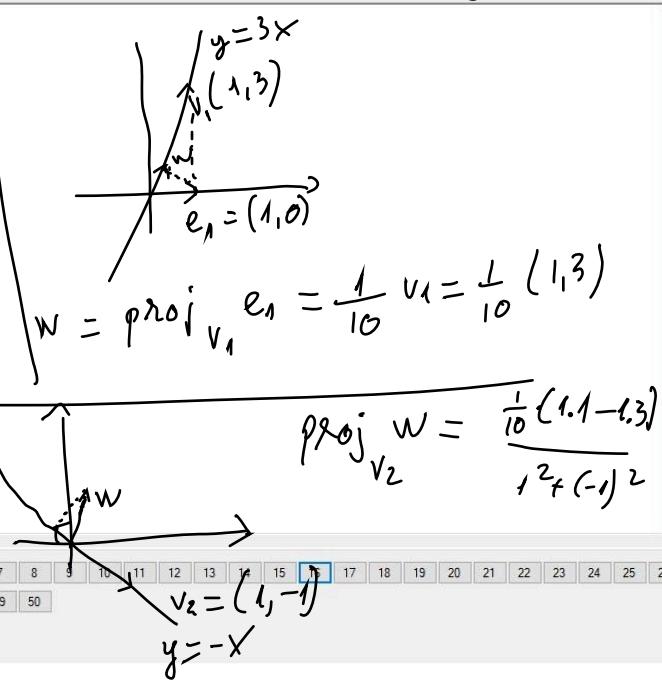
Solved

Multiple choices 16/50

Answer

- A
- B
- C
- D

Next



Let  $T : \mathbb{R}^2 \rightarrow \mathbb{R}^2$  be projection on the line  $y = 3x$  followed by projection on the line  $y = -x$ .

Find the (2,1)-entry of the matrix of  $T$ .

chi co tam and cu  $e_1 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$

$$T = \begin{bmatrix} a & b \\ c & d \end{bmatrix}$$

?

$$\Rightarrow c = \frac{1}{10}$$

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	
43	44	45	46	47	48	49	50																																			

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Start

Exit

**Multiple choices 17/50**

**Answer**

- (Choose 1 answer)
- A  
 B  
 C  
 D  
 E  
 None of the other choices is correct

[Next](#)

$\frac{dy}{dx}$  viet gos la  $y'$

$$9y + 9x \cdot y' + 2y' = 0$$

$$y' = -\frac{9y}{9x+2}$$

Find  $dy/dx$  by implicit differentiation

$$9xy + 2y - 2 = 0$$

(i)  $(-9y(x+1))/2$

(ii)  $(-9y)/(9xy+2)$

(iii)  $-9(x+y)/2$

(iv)  $(-9y)/(9x+2)$



**Multiple choices 18/50**

**Answer**

- (Choose 1 answer)  
 A  
 B  
 C  
 D  
 E  
 F  
 (See picture)
- A. 1  
 B. 0  
 C. 0 and 1  
 D. None of the other choices is correct  
 E. 0, 1 and 1/2  
 F. 1/2
- V

[Next](#)

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42  
 43 44 45 46 47 48 49 50

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Find the critical numbers of the function

$$g(x) = \sqrt[3]{x^2 - x} \quad D = \mathbb{R}$$

$$g' = \frac{1}{3} (x^2 - x)^{-\frac{2}{3}} \cdot (2x - 1)$$

$$= \frac{2x - 1}{\sqrt[3]{(x^2 - x)^2}}$$

$g'$  ko fai khi:  $x = 0, x = 1$

$g' = 0$  khi:  $x = \frac{1}{2}$ .

[Previous](#)

[Exit](#)

{ 10:  $\hat{x}$  là cột  $\Rightarrow$   $\hat{x}$  là một hpt  $A\hat{x} = \emptyset$   
 Rank  $A = 4 = 10 - 6$  là số cột riêng với leading one

Multiple choices 19/50

Answer

- (Choose 1 answer)
- A
  - B
  - C
  - D
  - E

Next

còn 6 parameter

để bùn

nghiệm tquat  
của hpt  $A\hat{x} = \emptyset$

Let  $A$  be a  $7 \times 10$  matrix. If the rank of  $A$  is 4, what is the dimension of the null space of  $A$ ?

- A. 4
- B. 7
- C. 10
- D. 6
- E. 3

$$\begin{aligned}\dim(\text{Null } A) &= 10 - \text{Rank } A \\ &= 10 - 4 = 6\end{aligned}$$



Multiple choices 20/50

### Answer

(Choose 1 answer)

(See picture)

A.  $x=0, y=0$  only.

B.  $x=y=0$

C. None of

D.  $x=y=1$

$$E. x=1, y=0$$

$\rightarrow f^{2bc}$

$\rightarrow f^{2bc}$

1  $\left| \begin{array}{l} \text{clan B} \\ \text{clan A} \end{array} \right.$

er choices is correct

$\rightarrow \text{loan}$

$\rightarrow \text{loan}'$

Next

Find all values of  $x$  and  $y$  so that the matrix

$$\begin{bmatrix} y & 1 & x \\ 0 & x & y \end{bmatrix}$$

is reduced row-echelon.

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42

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**Finish**

Scholastic

Multiple choices 21/50

### Answer

(Choose 1 answer)

(See picture)

- A. None of the other choices is correct
  - B. (ii)
  - C. (iii)
  - D. (iv)
  - E. (i)

**Next**

$$\begin{vmatrix} \lambda - 1 & 0 \\ 0 & \lambda^2 - 4\lambda + 25 \end{vmatrix} = 0$$

Find the characteristic equation of the matrix

$$\begin{bmatrix} 5 & -6 \\ 5 & -1 \end{bmatrix}$$

- (i)  $\lambda^2 - 4\lambda + 25 = 0$
  - (ii)  $\lambda^2 - 4\lambda - 35 = 0$
  - (iii)  $\lambda^2 - 6\lambda - 35 = 0$
  - (iv)  $\lambda^2 - 6\lambda + 25 = 0$

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42  
43 44 45 46 47 48 49 50

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**Multiple choices 22/50**

**Answer**

(Choose 1 answer)

- A
  - B
  - C
  - D
  - E
  - F
- A. 0  
B. any number but 0 ✓  
C. None of the other choices is correct  
D. any number but 1  
E. 1  
F. any real number

[Next](#)

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

$$\rightarrow \begin{bmatrix} 1 & -1 & -1 & 1 \\ 0 & 2 & 0 & 1 \\ 0 & 2 & 0 & m+1 \end{bmatrix}$$

$$\rightarrow \begin{bmatrix} 1 & -1 & -1 & 1 \\ 0 & 2 & 0 & 1 \\ 0 & 0 & 0 & m \end{bmatrix}$$

Find all values of  $m$  so that the system

$$\begin{cases} x - y - z = 1 \\ x + y - z = 2 \\ -x + 3y + z = m \end{cases}$$

has no solution.

$$m = 0: \text{ no solution}$$

$$m \neq 0: \text{ no solution}$$

## Multiple choices 23/50

## Answer

- (Choose 1 answer)
- A  
 B  
 C  
 D  
 E  
 F

F. None of the other choices is correct

Barn may  
 Calc  $x = 1.000\ 000\ 1$

Evaluate the limit, if it exists

$$\lim_{x \rightarrow 1^+} \frac{|x^2 - 4x + 3|}{x - 1}$$

$$\begin{aligned}
 &= \lim_{x \rightarrow 1^+} \frac{|(x-1)(x-3)|}{x-1} \\
 &\quad \text{xet dán} \\
 &= \lim_{x \rightarrow 1^+} \frac{(x-1)(x-3)}{x-1} \xrightarrow{\text{gá}} \lim_{x \rightarrow 1^+} (x-3) \\
 &= 2
 \end{aligned}$$

**Multiple choices 24/50****Answer**

- A  
 B  
 C  
 D
- (See picture)
- A. (i) ✓  
B. (i) and (ii)  
C. (ii)  
D. (ii) and (iii)

**Next**Which of the followings are subspaces of  $\mathbb{R}^3$ ?

- (i)  $U = \{(x, y, z + 1) \mid x, y \text{ and } z \text{ in } \mathbb{R}\}$  ✓ →  $\mathbb{R}^3$   
(ii)  $U = \{(x, y, z) \mid x + 2y - 3z = 0\}$  ← Mất facing qua O  
(iii)  $U = \{(x, y, z) \mid x^2 + y^2 + z^2 = 1\}$ .

Mất còn X

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42
43	44	45	46	47	48	49	50																																		

 I want to finish the exam.**Finish****Start****Exit**

Multiple choices 25/50

<b>Answer</b>	(Choose 1 answer)
<input type="checkbox"/> A	(See picture)
<input type="checkbox"/> B	A. 2
<input type="checkbox"/> C	B. None of the other choices is correct
<input type="checkbox"/> D	C. -1 ✓ D. -1 and 2

$$\lim_{x \rightarrow -1^-} f(x) = \lim_{x \rightarrow -1^-} (2x+1) = -1 \neq f(-1)$$

$\Rightarrow$  gen. discontinuity  
at  $x = -1$

$$\lim_{x \rightarrow 2^-} f(x) = 2 = \lim_{x \rightarrow 2^+} f(x) = f(2)$$

$\Rightarrow$  f func fcc x=2

Find all points of discontinuity of the function

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

Giải tuc /  $(-\infty, -1)$ ,  $(-1, 2)$ ,  $(2, +\infty)$   
 Ch. côn ktra tính liên  
 tục tại  $x = -1$ ,  $x = 2$



**Multiple choices 27/50**

**Answer**

- (Choose 1 answer)
- (See picture)
- A
- B
- C
- A. (i)
- B. (i) and (ii)
- D
- C. None of the other choices is correct
- E
- D. (iii)
- F
- E. (i) and (ii)
- F. (ii)

[Next](#)

$$\det \begin{bmatrix} v_1 & v_2 & v_3 \end{bmatrix} \neq 0$$

to learn

Đọc bài

Which of the following subsets are independent in  $\mathbb{R}^3$  ?

- (i)  $\{[1 \ 2 \ 3]^T, [2 \ 0 \ -1]^T, [1 \ 1 \ -1]^T\}$
- (ii)  $\{[1 \ 1 \ -1]^T, [2 \ 1 \ 4]^T, [1 \ 3 \ 7]^T\}$
- (iii)  $\{[2 \ 0 \ 1]^T, [-1 \ 2 \ 1]^T, [1 \ 1 \ 1]^T, [2 \ 1 \ -1]^T\}$

**Multiple choices 28/50****Answer**

- (Choose 1 answer)  
 A  
 B  
 C  
 D  
 E  
(See picture)
- A. (iii)  
B. (iv)  
C. (ii)  
D. None of other choices is correct  
E. (i)

[Next](#)

- camp - file

Determine whether  $u$  and  $v$  are parallel in each of the following cases.

- (i)  $u = [2; 5; -3]^T; v = [-3; 6; 0]^T$   
(ii)  $u = [2; 1; -3]^T; v = [-3; 4; 0]^T$   
(iii)  $u = [2; 0; -1]^T; v = [-8; 0; 4]^T$  ✓  
(iv)  $u = [1; 0; -1]^T; v = [1; 0; 1]^T$

**Multiple choices 29/50****Answer**

- (Choose 1 answer)  
 A (See picture)  
 B A. Not enough information  
 C B. 16/105  
 D C. All of the other choices are incorrect  
 E D. 2/105  
 E. 210

**Next**

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

$$A: 4 \times 4 \quad \Rightarrow \det A^{-1} = \frac{1}{\det A}$$

$$\det(2A^{-1}) = 2^4 \det A^{-1} = \frac{16}{105}$$

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42  
 43 44 45 46 47 48 49 50

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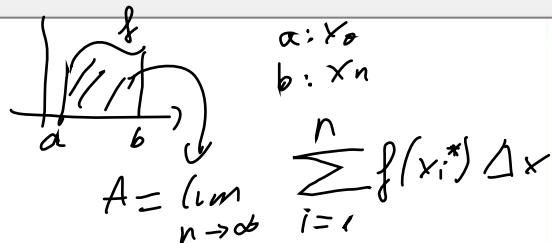
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Multiple choices 30/50

**Answer**

- A (See picture)
- B
- C
- D
- E (iii)
- F (iv)
- G (i)
- H (ii)

Next



$$\Delta x = \frac{\frac{\pi}{2} - \frac{\pi}{4}}{n} = \frac{\pi}{4n}$$

→ Chọn (iii)

Determine a region A whose area is equal to

$$\lim_{n \rightarrow \infty} \sum_{i=1}^n \frac{\pi}{4n} \sin\left(\frac{(i+n)\pi}{4n}\right)$$

$$i=0 : \lambda \ln\left(\frac{\pi}{a}\right) \quad i=n : \lambda \ln\left(\frac{\pi}{2}\right)$$

- (i) under the graph of  $f(x) = \sin x$  from  $x=0$  to  $x=\frac{\pi}{4}$  X
- (ii) under the graph of  $f(x) = \frac{1}{4} \sin x$  from  $x=0$  to  $x=\frac{\pi}{4}$  X
- (iii) under the graph of  $f(x) = \sin x$  from  $x=\frac{\pi}{4}$  to  $x=\frac{\pi}{2}$
- (iv) under the graph of  $f(x) = \frac{1}{4} \sin x$  from  $x=\frac{\pi}{4}$  to  $x=\frac{\pi}{2}$

**Multiple choices 31/50**

**Answer**

(Choose 1 answer)

- A (See picture)
- B
- C A. None of the other choices is correct
- D B. (1,1)
- E C. (1,2)
- F D. (2,2)
- G E. (2,1)

[Next](#)



$$\begin{pmatrix} 3 \\ 2 \\ 1 \end{pmatrix} = a \begin{pmatrix} 1 \\ 1 \\ 1 \end{pmatrix} + b \begin{pmatrix} 1 \\ 1 \\ 0 \end{pmatrix} + c \begin{pmatrix} 1 \\ 0 \\ 0 \end{pmatrix} \xrightarrow{\text{gau}} \begin{array}{l} a=1 \\ b=1 \\ c=1 \end{array}$$

$$T\left(\begin{pmatrix} 3 \\ 2 \\ 1 \end{pmatrix}\right) = 1T\left(\begin{pmatrix} 1 \\ 1 \\ 1 \end{pmatrix}\right) + 1T\left(\begin{pmatrix} 1 \\ 1 \\ 0 \end{pmatrix}\right) + 1T\left(\begin{pmatrix} 1 \\ 0 \\ 0 \end{pmatrix}\right) = \begin{pmatrix} 2 \\ 2 \\ 1 \end{pmatrix}$$

Let  $T : R^3 \rightarrow R^2$  be a linear transformation such that

$T(1,1,1) = (0,1)$ ,  $T(1,1,0) = (1,0)$  and  $T(1,0,0) = (1,1)$ .

Find  $T(3,2,1)$ .

**Multiple choices 32/50****Answer**

- (Choose 1 answer)  
(See picture)
- A
  - B
  - C
  - D
- A. (ii)  
B. (i)  
C. None of the other choices is correct  
D. (iii)

[Next](#)

Let  $A$  and  $B$  be invertible matrices of the same size. Which of the following statements are true

- (i)  $(AB)^{-1} = A^{-1}B^{-1}$
- (ii)  $(AB)^{-1} = B^{-1}A^{-1}$
- (iii)  $(A + B)^{-1} = A^{-1} + B^{-1}$

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42  
43 44 45 46 47 48 49 50

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**Multiple choices 33/50****Answer**

- (Choose 1 answer)  
 A  
 B  
 C  
 D  
 E
- (See picture)
- A. [2 6]  
B. None of the other choices is correct  
C. [2 8]  
D. [1 6]  
E. [1 8]

[Next](#)

Let  $A = \begin{bmatrix} 1 & 3 \\ 2 & 4 \end{bmatrix}$  and  $B = \begin{bmatrix} 0 & 6 \\ 5 & 1 \end{bmatrix}$   
Find the first row of the matrix  $A + B^T$

de

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42  
43 44 45 46 47 48 49 50

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**Multiple choices 34/50**

**Answer**

- A  
 B  
 C  
 D  
 E  
 (See picture)
- A. None of the other choices is correct  
 B. (ii)  
 C. (iii)  
 D. (i)  
 E. (iv)

[Next](#)

$$T(x, y, z) = \begin{bmatrix} x \\ y \\ z \end{bmatrix} \xrightarrow{\text{linear transformation}} (0x - 4y + 8z, 5x + 0y + 13z)$$

Find the standard matrix for the linear transformation  $T : R^3 \rightarrow R^2$  defined by

$$T(x, y, z) = (8z - 4y, 5x + 13z).$$

- (i)  $\begin{bmatrix} 8 & 5 & 0 \\ -4 & 13 & 0 \end{bmatrix}$       (iii)  $\begin{bmatrix} 0 & -4 & 8 \\ 5 & 0 & 13 \end{bmatrix}$   
 (ii)  $\begin{bmatrix} 8 & 13 & 0 \\ 0 & 4 & 5 \end{bmatrix}$       (iv)  $\begin{bmatrix} 0 & 0 & 8 \\ 4 & 5 & 13 \end{bmatrix}$

Multiple choices 35/50

**Answer**

(Choose 1 answer)

- A
- B
- C
- D
- E

E. None of the other choices is correct

[Next](#)

$$\frac{dy}{dt} = F'(x) \quad \begin{matrix} \curvearrowleft \\ \curvearrowright \end{matrix}$$

$$= \frac{1}{\sqrt{16-x^2}}$$

Find  $\frac{dy}{dx}$  for  $y = \int_1^x \frac{1}{\sqrt{16-t^2}} dt$  =

(i)  $\frac{1}{\sqrt{16-x^3}}$

(ii)  $\frac{1}{\sqrt{16-x}}$

(iii)  $\frac{1}{\sqrt{16-x^2}}$

(iv)  $\frac{x}{\sqrt{16-t^2}}$

*Với F là anti-derivative  
của  $\frac{1}{\sqrt{16-t^2}}$*



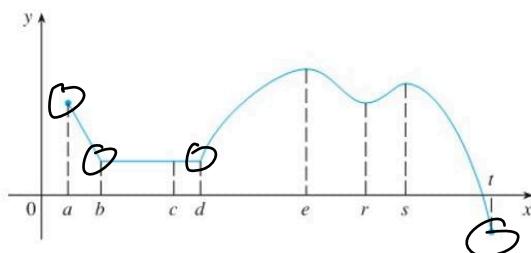
**Multiple choices 36/50**

**Answer**

- (Choose 1 answer)
- A  
 B  
 C  
 D  
 E
- (See picture)
- A. b,d  
B. a, b, d, t  
C. None of the other choices is correct  
D. a,d, r  
E. a, t

[Next](#)

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



$$\frac{x}{t} \Big|_0^2 + \frac{3}{\sqrt{15}}$$

**Multiple choices 37/50**

**Answer**

- (Choose 1 answer)
- A  
 B  
 C  
 D  
 E
- (See picture)
- A. (iii)  
B. (ii)  
C. None of others  
D. (i)  
E. (iv)

Beam,  
may

Evaluate the integral  $\int_0^2 \frac{x dx}{\sqrt{9-x^2}}$

- (i)  $3-\sqrt{5}$   
(ii)  $\sqrt{5}-3$   
(iii)  $5-\sqrt{3}$   
(iv)  $3+\sqrt{5}$

$$t = \sqrt{9-x^2} \quad dt = \frac{-2x}{2\sqrt{9-x^2}} dx$$

$$\int_0^2 \frac{x dx}{\sqrt{9-x^2}} = \int_3^{\sqrt{5}} -dt$$

$$= 3 - \sqrt{5}$$

[Next](#)

$$AX = \emptyset$$

**Multiple choices 38/50****Answer**

(Choose 1 answer)

- A
- B
- C
- D
- E

[Next](#)

Consider a homogeneous system of 3 linear equations in 5 variables. Assume that the augmented matrix has rank 2. Choose correct statements.

- A. There are exactly 2 parameters
- B. The system has no solution
- C. There are exactly 3 parameters ✓
- D. None of the other choices is correct
- E. The system has only the trivial solution

No of Parameters

$$5 - \text{Rank } A = 3$$

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	
43	44	45	46	47	48	49	50																																			

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**Multiple choices 39/50****Answer**

- (Choose 1 answer)  
 A  
 B  
 C  
 D  
 E  
 (See picture)
- A. 15.55  
 B. 31.1  
 C. None of the other choices is correct  
 D. 28.90  
 E. 14.45

**Next**

Use the Trapezoidal Rule with n = 5 steps to approximate the integral

$$\Delta x = \frac{6-1}{5} = 1 \quad \int_1^6 f(x)dx = \frac{\Delta x}{2} (f(x_0) + 2f(x_1) + \dots + 2f(x_4) + f(x_5))$$

x	1	2	3	4	5	6
f(x)	3.2	1.6	2.4	3.8	4.4	1.3

$$I = \frac{1}{2} (3.2 + 2 \cdot 1.6 + 2 \cdot 2.4 + 2 \cdot 3.8 + 2 \cdot 4.4 + 1.3)$$

Multiple choices 40/50

**Answer**

- A (See picture)
- B A. (i)
- C B. (iv)
- D C. (v)
- E D. (iii)
- F E. (ii)

**Next** F. None of the other choices is correct

Find an equation of the line through the point  $(4,5)$  that cuts off the least area from the first quadrant.

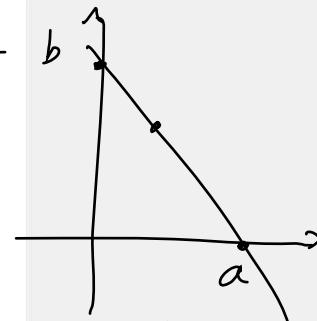
$$(i) \frac{x}{8} - \frac{y}{10} = 0$$

$$(ii) 8x + 10y = 82$$

$$(iii) \frac{x}{8} + \frac{y}{10} = 1 \quad \checkmark$$

$$(iv) 8x - 10y = -18$$

$$(v) \frac{x}{8} + \frac{y}{10} = -1$$



$$d: \frac{x}{a} + \frac{y}{b} = 1$$

$$(4, 5) \in d \Rightarrow \frac{4}{a} + \frac{5}{b} = 1$$

$$b = \frac{5}{1 - \frac{4}{a}}$$

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42

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Next

Exit

$$2. \text{Area} \approx a \cdot b = \frac{5a}{1 - \frac{4}{a}} = \frac{5a^2}{a - 4} = f(a)$$

$$f'(a) = \frac{10a(a-4) - 1 \cdot 5a^2}{(a-4)^2}, \quad f' = 0 \quad (\Rightarrow 5a^2 - 40a = 0) \quad \begin{cases} a=0 \\ a=8 \end{cases} \rightarrow b=10$$

Bài này có nhiều cách giải ngắn hơn

**Multiple choices 41/50****Answer**

- (Choose 1 answer)  
 A  
 B  
 C  
 D  
 E  
(See picture)
- A.  $-\sin(\cos(x))$   
B.  $\cos(\cos(\sin(x)))$   
C. None of the other choices is correct  
D.  $\cos(x)\cos(\sin(x))$  ✓  
E.  $\cos(\cos(x))$

[Next](#)

Find the derivative of  $\sin(\sin(x))$

$$\begin{aligned} & \cos(\sin x) \cdot (\sin x)' \\ &= \cos(\sin x) - \cos x \end{aligned}$$

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42  
43 44 45 46 47 48 49 50

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**Multiple choices 42/50**

**Answer**

(Choose 1 answer)

- A (See picture)
- B A.  $3x - 2$
- C B.  $2x - 1$  ✓
- D C. None of the other choices is correct
- E D.  $2x + 1$
- E.  $3x + 2$

[Next](#)

Find the linear approximation for

$$f(x) = \sqrt{x^3 + 1} \text{ at } x = 2$$

$$L(x) = f'(x_0)(x - x_0) + f(x_0)$$

$$x=2 \rightarrow f(2) = 3$$

$$f'(x) = \frac{3x^2}{2\sqrt{x^3+1}} \rightarrow f'(2) = \frac{3 \cdot 4}{2 \cdot 3} =$$

$$L(x) = 2(x - 2) + 3$$

$$= 2x - 1$$

**Multiple choices 43/50****Answer**

- (Choose 1 answer)  
(See picture)
- A
  - B A. -1
  - C B. z is arbitrary
  - D C. None of the other choices is correct
  - E D. 1
  - F E. 2
  - F. 0

[Next](#)

Solve for z in the system of equations

$$\begin{cases} x + y - z = 3 \\ x + 2y - 2z = 4 \\ 2x + y + 2z = 5 \end{cases}$$

[1](#) [2](#) [3](#) [4](#) [5](#) [6](#) [7](#) [8](#) [9](#) [10](#) [11](#) [12](#) [13](#) [14](#) [15](#) [16](#) [17](#) [18](#) [19](#) [20](#) [21](#) [22](#) [23](#) [24](#) [25](#) [26](#) [27](#) [28](#) [29](#) [30](#) [31](#) [32](#) [33](#) [34](#) [35](#) [36](#) [37](#) [38](#) [39](#) [40](#) [41](#) [42](#)[43](#) [44](#) [45](#) [46](#) [47](#) [48](#) [49](#) [50](#) I want to finish the exam.[Finish](#)[Statistics](#)[Exit](#)

**Multiple choices 44/50****Answer**

- (Choose 1 answer)
- A  
 B  
 C  
 D  
 E

E. None of the other choices is correct

Next

Find  $y'(2)$  for  $y = \frac{x^3}{x - 1}$

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42  
43 44 45 46 47 48 49 50

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**Finish**

**Start**

**Exit**

**Multiple choices 45/50****Answer**

- (Choose 1 answer)  
(See picture)
- A
  - B
  - C
  - D
- A. (ii)  
B. (iii)  
C. None of the others.  
D. (i)

[Next](#)

Choose the correct statement.

- (i) If the (3,1)-entry of  $A$  is 7 then the (1,3)-entry of  $A^T$  is -7.
- (ii) If  $A^T=3I$  then  $A=3I$       ✓
- (iii) If  $AB=0$ , then  $A=0$  or  $B=0$  for every  $2 \times 2$  matrices  $A, B$ .

X      VD:  
 $\begin{pmatrix} 1 & 0 \\ 1 & 0 \end{pmatrix} \begin{pmatrix} 0 & 0 \\ 1 & 1 \end{pmatrix}$   
 $\begin{pmatrix} 1 & 0 \\ 0 & 0 \end{pmatrix}$

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42  
43 44 45 46 47 48 49 50

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**Multiple choices 46/50**

**Answer**

(Choose 1 answer)  
(See picture)

- A
- B
- C
- D
- E

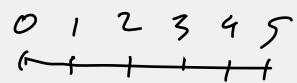
E. None of the other choices is correct

[Next](#)

Estimate the area under the graph of

$$f(x) = 25 - x^2$$

on  $[0, 5]$  using 5 rectangles and right endpoints



$$\Delta x = \frac{5-0}{5} = 1$$

$$A \approx \sum_{i=1}^{5} f(x_i) \Delta x = 1 \left( f(1) + f(2) + f(3) + f(4) + f(5) \right)$$

$$= (24 + 21 + 16 + 9 + 0)$$

concave up       $f'' > 0$   
 down       $f'' < 0$

Multiple choices 47/50

Answer

- A (See picture)
- B A. (iv)
- C B. (iii)
- D C. (i)
- E D. (ii)
- E. None of the other choices is correct

Next

Determine where the function

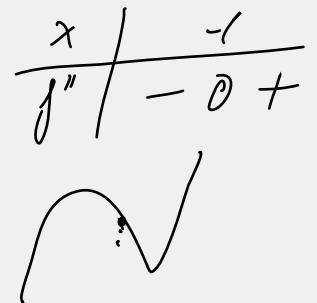
$$f(x) = x^3 + 3x^2 - x - 24$$

is concave up and where it is concave down.

- (i) Concave up on  $(-\infty, \infty)$
- (ii) Concave down on  $(-1, \infty)$  and concave up on  $(-\infty, -1)$
- (iii) Concave up on  $(-1, \infty)$  and concave down on  $(-\infty, -1)$
- (iv) Concave down  $(-\infty, \infty)$

$$f' = 3x^2 + 6x - 1$$

$$f'' = 6x + 6$$



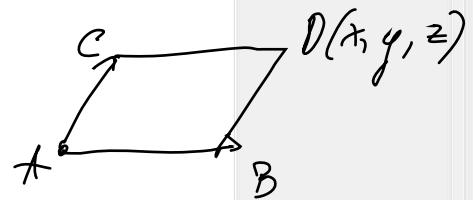
Multiple choices 48/50

### Answer

- A
  - B
  - C
  - D
  - E

Let A(3,-1,-1), B(1,-2,0), C(1,-1,2) be three vertices of the parallelogram with two adjacent sides AB and AC. Find the fourth vertex.

- A.  $(-1, 2, 3)$
  - B. None of the other choices is correct
  - C.  $(-1, -2, -3)$
  - D.  $(1, -2, 3)$
  - E.  $(-1, -2, 3)$



$$\overrightarrow{CD} = \overrightarrow{AB}$$

$$(x, y, z) - (1, -1, 2) = (1, -2, 0) - (3, -1)$$

$$\Rightarrow (x, y, z)$$

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Submit

Multiple choices 49/50

**Answer**

(Choose 1 answer)

(See picture)

- A
  - B
  - C
  - D
  - E
- A. None of the other choices is correct  
 B. (ii)  
 C. (iv)  
 D. (iii)  
 E. (i)

[Next](#)

Given that  $\lambda = 9$  is an eigenvalue for the matrix

$$\begin{bmatrix} 5 & 2 & -2 \\ 2 & 5 & -2 \\ -2 & -2 & 5 \end{bmatrix}$$

Find basic eigenvectors corresponding to  $\lambda = 9$ .

- (i)  $[1 \ 1 \ -1]^T$
- (ii)  $[1 \ -1 \ -1]^T$
- (iii)  $[1 \ 1 \ 1]^T$  and  $[0 \ 1 \ 1]^T$
- (iv)  $[1 \ 1 \ -1]^T$  and  $[1 \ 0 \ 1]^T$

$$(9I - A)x = 0$$

$$\begin{bmatrix} 4 & -2 & 2 \\ -2 & 4 & 2 \\ 2 & 2 & 4 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix} = \begin{bmatrix} 0 \\ 0 \\ 0 \end{bmatrix}$$

$$\begin{bmatrix} 2 & -1 & 1 \\ -1 & 2 & 1 \\ 1 & 1 & 2 \end{bmatrix} \xrightarrow{\sim} \begin{bmatrix} 1 & 1 & 2 \\ -1 & 2 & 1 \\ 2 & -1 & 1 \end{bmatrix}$$

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42
43	44	45	46	47	48	49	50																																		

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$$\begin{cases} x_1 + x_2 + 2x_3 = 0 \\ x_2 + x_3 = 0 \end{cases}$$

$$\xrightarrow{\sim} \begin{bmatrix} 1 & 1 & 2 \\ 0 & 3 & 3 \\ 0 & -3 & -3 \end{bmatrix} \xrightarrow{\sim} \begin{bmatrix} 1 & 1 & 2 \\ 0 & 1 & 1 \\ 0 & 0 & 0 \end{bmatrix}$$

$$\begin{cases} x_1 = -t \\ x_2 = -t \\ x_3 = t \end{cases}$$

$\rightarrow$  Basic eigenvector corresponding to  $\lambda = 9$

$$\begin{bmatrix} 1 \\ 1 \\ -1 \end{bmatrix}$$

**Multiple choices 50/50**

**Answer**

- A (See picture)  
 B A. (i)  
 C B. (iv)  
 D C. (ii)  
 E D. None of the other choices is correct  
E. (iii)

[Next](#)

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50

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Find the shortest distance between two parallel lines

$$(L_1) : [x, y, z] = [-1, 1, 2] + t[2, 1, 1]$$

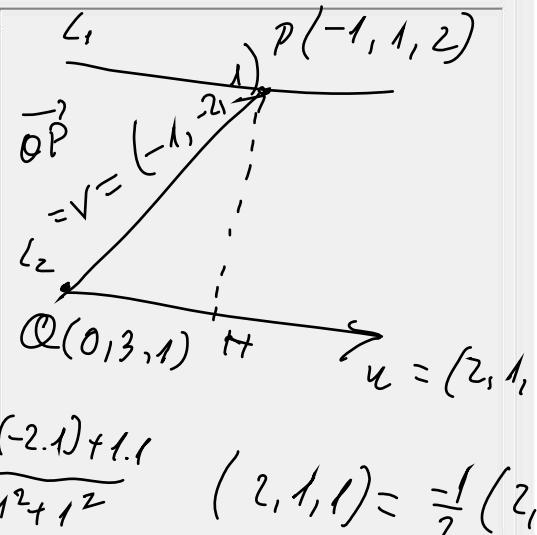
$$(L_2) : [x, y, z] = [0, 3, 1] + t[2, 1, 1]$$

$$(i) \sqrt{3}$$

$$(ii) \frac{3\sqrt{2}}{2}$$

$$(iii) \frac{3\sqrt{2}}{4}$$

$$(iv) \frac{3}{2}$$



$$\vec{QH} = \vec{PQ} \times \vec{n} = \frac{-12 \times (-2, 1) + 1, 1}{\sqrt{2^2 + 1^2 + 1^2}}$$

$$(2, 1, 1) = \frac{1}{2}(2, 1, 1)$$

$$\vec{HP} = \vec{OP} - \vec{OQ} = (0, -1.5, 1.5)$$

$$\|\vec{HP}\| = \sqrt{0^2 + 1.5^2 + 1.5^2} = \frac{3\sqrt{2}}{2}$$