Kizspy.me There are 40 questions, and your progress of answering is

Answer

- [ ] A
- [ ] B
- [ ] C
- [ ] D

Back Next

(Choose 1 answer)

(See picture)

A. -3/2

B. 1

C. 0

D. -2

Use Gram-Schmidt algorithm to convert the basis

$$\{[0\ \ -3\ \ \ 5]^T, [-2\ \ -2\ \ \ 2]^T, [-4\ \ -3\ \ \ 4]^T\}$$

into an orthogonal basis $\{E_1, E_2, E_3\}$.

Find the **first coordinate** of the vector E_2.

I want to finish the exam.

Exit

1

Kizspy.me There are 40 questions, and your progress of answering is

Answer

- [ ] A
- [ ] B
- [ ] C
- [ ] D

Back Next

(Choose 1 answer)

(See picture)

A. 11

B. 12

C. 10

D. 13

Let X, Y be two independent Gaussian distributions

$$p(x) \sim \mathcal{N}(2, 1)$$
$$p(y) \sim \mathcal{N}(1, 3).$$

What is the variance of $X - 2Y$?

1 - 2.3

var (μ, var)

- [ ] I want to finish the exam.

Exit 2

Kizspy.me There are 40 questions, and your progress of answering is

Answer

- [ ] A
- [ ] B
- [ ] C
- [ ] D
- [ ] E

Back Next

(Choose 1 answer)

(See picture)

A. 1

B. -3

C. 0

D. 2

E. none of the other choices is true

Let A be a 2×2 matrix. Given that 1 and 2 are eigenvalues of A with corresponding eigenvectors $[1\ 3]^T$ and $[0\ 1]^T$.

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

$$\begin{bmatrix} 1 & 0 \\ 3 & 1 \end{bmatrix}$$

- [ ] I want to finish the exam.

Exit

Kizspy.me There are 40 questions, and your progress of answering is

Answer

- [ ] A
- [ ] B
- [ ] C
- [ ] D

(Choose 1 answer)

(See picture)

A. -1.852

B. 1.54

C. 0.795

D. 0.823

Back Next

Let $f(x,y) = x^2y+3y$. Applying the gradient descent algorithm with the step-size $\gamma = 0.1$, the **momentum** $\alpha = 0.02$ and the initial point $(x_0,y_0) = (1, -1)$, find y_2 of the point after 2^{nd} iteration.

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Exit

Kizspy.me There are 40 questions, and your progress of answering is

Answer

- [ ] A
- [ ] B
- [ ] C
- [ ] D

(Choose 1 answer)

(See picture)

A. (iii)

B. (iv)

C. (ii)

D. (i)

Back Next

Consider the function $f(x, y) = e^{-x^2+y^2}$. What is the Hessian matrix $H(0,0)$ of f at the point $(0,0)$?

(i) $\begin{bmatrix} -2 & 0 \\ 0 & 2 \end{bmatrix}$

(ii) $\begin{bmatrix} 2 & 0 \\ 0 & -2 \end{bmatrix}$

(iii) $\begin{bmatrix} 2 & 0 \\ 0 & 2 \end{bmatrix}$

(iv) $\begin{bmatrix} -2 & 0 \\ 0 & -2 \end{bmatrix}$

- [ ] I want to finish the exam.

Finish

Exit

There are 40 questions, and your progress of answering is

Answer

- [ ] A
- [ ] B
- [ ] C
- [ ] D
- [ ] E

Back Next

(Choose 1 answer)

(See picture)

A. (i)

B. (ii)

C. (iv)

D. (iii)

E. None of the others

Given that λ=1 is an eigenvalue of the matrix

$$\begin{bmatrix} 1 & 1 & 1 \\ 0 & 1 & 1 \\ 0 & 0 & 0 \end{bmatrix}.$$

Find a set of basic eigenvectors corresponding to this eigenvalue λ=1.

(i) $\{[0,0,1]^T\}$

(ii) $\{[1,0,0]^T, [0,0,1]^T\}$

(iii) $\{[1,0,0]^T\}$

☐ I want to finish the exam.

Finish

Exit

Kizspy.me There are 40 questions, and your progress of answering is

Answer

- [ ] A
- [ ] B
- [ ] C
- [ ] D

(Choose 1 answer)

(See picture)

A. (ii)

B. (iii)

C. (i)

D. (iv)

Back Next

The (2, 3)-entry of the Hessian matrix of

$$f(x, y, z) = 3xyz - x^2 + 3y^2 - 5yz$$

at $(1, -1, 2)$ is

(i) -2 (ii) -8

(iii) -5 (iv) -3

I want to finish the exam.

Exit

Kizspy.me There are 40 questions, and your progress of answering is

Answer

- [ ] A
- [ ] B
- [ ] C
- [ ] D
- [ ] E

Back Next

(Choose 1 answer)

(See picture)

A. 2 and -3

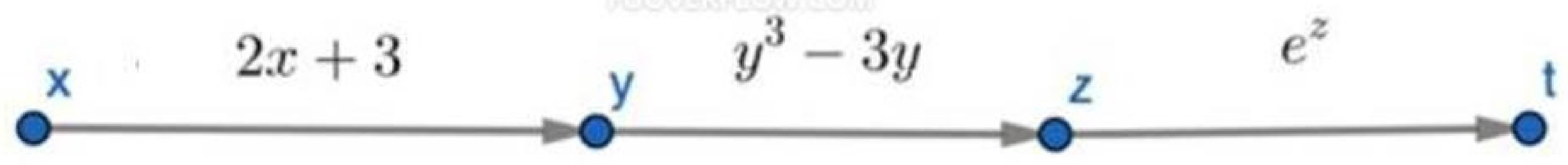
B. 2 and 3

C. -2 and 3

D. -2 and -3

E. -1 and -2

A computational graph is given as bellow.



Find all values of x such that the derivative of t with re

ish the exam.

Exit

8

Kizspy.me There are 40 questions, and your progress of answering is

Answer

- [ ] A
- [ ] B
- [ ] C
- [ ] D

(Choose 1 answer)

(See picture)

A. (iii)

B. (iv)

C. (i)

D. (ii)

Back Next

Compute the length of the vector $\mathbf{x} = [2 \;\; -1]^T$ using the inner product

$$<\mathbf{x}, \mathbf{y}> = \mathbf{x}^T A \mathbf{y},$$

in which $A = \begin{bmatrix} 2 & -1 \\ -1 & 1 \end{bmatrix}$.

(i) 4

(ii) $\sqrt{17}$

(iii) $\sqrt{13}$

(iv) $\sqrt{15}$

- [ ] I want to finish the exam.

Finish

Exit

9

Kizspy.me There are 40 questions, and your progress of answering is

Answer

- [ ] A
- [ ] B
- [ ] C
- [ ] D

(Choose 1 answer)

(See picture)

A. (ii)

B. (iv)

C. (iii)

D. (i)

Back Next

Consider the following bivariate distribution $f(x, y)$ of two random variables X and Y

$$f(x,y) = \begin{cases} 1.5x + 0.5y & \text{if } 0 \le x, y \le 1 \\ 0 & \text{otherwise} \end{cases}$$

Find the probability density function $f(x)$ of X.

6,575

(i) $f(x) = \begin{cases} 2x & \text{if } 0 \le x \le 1 \\ 0 & \text{otherwise} \end{cases}$

(ii) $f(x) = \begin{cases} 0.5x + 0.75 & \text{if } 0 \le x \le 1 \\ 0 & \text{otherwise} \end{cases}$

(iii) $f(x) = \begin{cases} x + 0.5 & \text{if } 0 \le x \le 1 \\ 0 & \text{otherwise} \end{cases}$

- [ ] I want to finish the exam.

Exit

Kizspy.me There are 40 questions, and your progress of answering is

Answer

- [ ] A
- [ ] B
- [ ] C
- [ ] D
- [ ] E

Back Next

(Choose 1 answer)

(See picture)

A. 0.25

B. None of the other choices is correct

C. 0.5

D. 0.75

E. 0.125

Let X, Y be independent continuous random variables having uniform distributions over [0, 2].

The probability $P(0 \leq X \leq 1, 0 \leq Y \leq 1)$ is

I want to finish the exam.

Exit

Kizspy.me There are 40 questions, and your progress of answering is

Answer

- [ ] A
- [ ] B
- [ ] C
- [ ] D

(Choose 1 answer)

(See picture)

A. (i)

B. (iv)

C. (ii)

D. (iii)

Back Next

The second order Taylor polynomial of

$$f(x, y) = \sin(2xy) + \cos y$$

about $(0, 0)$ is:

(i) $1 - xy + y^2$

(ii) $1 + xy - y^2$

(iii) $1 - 2xy + 0.5y^2$

(iv) $1 + 2xy - 0.5y^2$

☐ I want to finish the exam.

Exit

Kizspy.me There are 40 questions, and your progress of answering is

Answer

- [ ] A
- [ ] B
- [ ] C
- [ ] D

Back Next

(Choose 1 answer)

(See picture)

A. (i)

B. (ii)

C. (iv)

D. (iii)

Let A be an invertible square matrix of size 2x2. Let 1 and 2 be the two singular values of A. Choose the correct answer :

(i) 1 and 1/2 are two singular values of matrix A^{-1}

(ii) 1 and 1/2 are two singular values of matrix A^T

(iii) -1 and -2 are two singular values of matrix A^{-1}

(iv) 1 and $\sqrt{2}$ are two singular values of matrix A^T

I want to finish the exam.

Exit

Kizspy.me There are 40 questions, and your progress of answering is

Answer

☐ A

☐ B

☐ C

☐ D

(Choose 1 answer)

(See picture)

A. (i)

B. (ii)

C. (iv)

D. (iii)

Back Next

Find the dual optimization problem to the following linear programming

$$\min\ 2x_1 - 3x_2$$

$$\text{subject to} \quad \begin{aligned} x_1 + x_2 &\leq 1 \\ 3x_1 - 4x_2 &\leq -2 \\ x_2 &\leq -1 \end{aligned}$$

(i) $$\begin{aligned} \max \quad & -\lambda_1 + 2\lambda_2 + \lambda_3 \\ \text{subject to} \quad & \lambda_1 + 3\lambda_2 = -2 \\ & \lambda_1 - 4\lambda_2 + \lambda_3 = 3 \\ & \lambda_1 \geq 0, \lambda_2 \geq 0, \lambda_3 \geq 0 \end{aligned}$$

(iii) $$\begin{aligned} \max \quad & \lambda_1 + 2\lambda_2 - \lambda_3 \\ \text{subject to} \quad & \lambda_1 + 3\lambda_2 \\ & \lambda_1 - 4\lambda_2 + \lambda_3 \\ & \lambda_1 \geq 0, \lambda_2 \geq 0, \ldots \end{aligned}$$

(ii) $$\begin{aligned} \max \quad & -\lambda_1 + 2\lambda_2 + \lambda_3 \\ \text{subject to} \quad & \lambda_1 + 3\lambda_2 = 2 \\ & \lambda_1 - 4\lambda_2 + \lambda_3 = -3 \\ & \lambda_1 \geq 0, \lambda_2 \geq 0, \lambda_3 \geq 0 \end{aligned}$$

(iv) $$\begin{aligned} \max \quad & \lambda_1 + 2\lambda_2 - \lambda_3 \\ \text{subject to} \quad & \lambda_1 + 3\lambda_2 \\ & \lambda_1 - 4\lambda_2 + \lambda_3 \\ & \lambda_1 \geq 0, \lambda_2 \geq 0, \ldots \end{aligned}$$

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Exit

Kizspy.me There are 40 questions, and your progress of answering is

Answer

- [ ] A
- [ ] B
- [ ] C
- [ ] D

(Choose 1 answer)

(See picture)

A. (ii)

B. (iii)

C. (iv)

D. (i)

Back Next

The first order Taylor polynomial of $f(x, y) = (x^2 + 2xy)^{-2}$ at $(1, 1)$ is of the form $a + b(x - 1) + c(y - 1)$.

The value of $b + c$ is:

(i) $4/9$ (ii) $-4/9$

(iii) $2/9$ (iv) $-2/9$

I want to finish the exam.

Exit

Kizspy.me There are 40 questions, and your progress of answering is

Answer

- [ ] A
- [ ] B
- [ ] C
- [ ] D

(Choose 1 answer)

(See picture)

A. (iv)

B. (iii)

C. (i)

D. (ii)

Back Next

All nonzero singular values of $A = \begin{bmatrix} 1 & 1 \\ 1 & 0 \\ 0 & -1 \end{bmatrix}$ are:

(i) 3 and 1 (ii) $\sqrt{3}$ and 1

(iii) 2 and 1 (iv) $\sqrt{2}$ and 1

- [ ] I want to finish the exam.

Exit

Kizspy.me There are 40 questions, and your progress of answering is

Answer

- [ ] A
- [ ] B
- [ ] C
- [ ] D

(Choose 1 answer)

(See picture)

A. (iv)

B. (iii)

C. (i)

D. (ii)

Back Next

All nonzero singular values of $A = \begin{bmatrix} 1 & 1 \\ 1 & 0 \\ 0 & -1 \end{bmatrix}$ are:

(i) 3 and 1 (ii) $\sqrt{3}$ and 1

(iii) 2 and 1 (iv) $\sqrt{2}$ and 1

I want to finish the exam.

Exit

16

Kizspy.me There are 40 questions, and your progress of answering is

Answer

- [ ] A
- [ ] B
- [ ] C
- [ ] D

(Choose 1 answer)

(See picture)

A. 20

B. -64

C. -32

D. 74

Back Next

Find $\frac{\partial z}{\partial x}(4, -4)$ for $z = (4x + 6y)^2$

.

I want to finish the exam.

Exit

Kizspy.me There are 40 questions, and your progress of answering is

Answer

- [ ] A
- [ ] B
- [ ] C
- [ ] D
- [ ] E

Back Next

(Choose 1 answer)

(See picture)

A. 0.6

B. 0.8

C. 0.7

D. None of the other choices is correct

E. 0.5

Consider the following bivariate distribution $p(x, y)$ of two discrete random variables X and Y.

		Y = 1	2	3
X	-1	0.2	0.3	0.1
	1	0.15	0.15	0.1

Compute $P(X \leq 1, Y \leq 2)$.

0,2 + 0,3 + 0,15 +0,15

☐ want to finish the exam.

Exit

Kizspy.me There are 40 questions, and your progress of answering is

Answer

- [ ] A
- [ ] B
- [ ] C
- [ ] D

(Choose 1 answer)

(See picture)

A. (ii)

B. (iii)

C. (iv)

D. (i)

Back Next

Let $W = [X \ \ Y]^T$ be a 2-dimensional random variable with normal distribution $W = N(\mu, \Sigma)$, in which

$$\mu = [0 \ \ 1]^T, \Sigma = \begin{bmatrix} 1 & 0 \\ 0 & 2 \end{bmatrix}.$$

Find the formula for the probability density function p(x,y) of W.

(i) $$p(x,y) = \frac{1}{2\pi\sqrt{2}} e^{-\frac{(x-1)^2}{2} - \frac{y^2}{4}}$$

(ii) $$p(x,y) = \frac{1}{2\pi\sqrt{2}} e^{-\frac{(x-1)^2}{4} - \frac{y^2}{2}}$$

(iii) $$p(x,y) = \frac{1}{2\pi\sqrt{2}} e^{-\frac{x^2}{4} - \frac{(y-1)^2}{2}}$$

(iv) $$p(x,y) = \frac{1}{2\pi\sqrt{2}} e^{-\frac{x^2}{2} - \frac{(y-1)^2}{4}}$$

- [ ] I want to finish the exam.

Exit

Kizspy.me There are 40 questions, and your progress of answering is

Answer

- [ ] A
- [ ] B
- [ ] C
- [ ] D

Back Next

(Choose 1 answer)

(See picture)

A. Only g

B. Neither f nor g

C. Both f and g

D. Only f

Which the following functions are convex on $\mathbb{R}^2$?

$$f(x,y) = x^2 + 2y^2$$
$$g(x,y) = x^2 + xy + y^2.$$

I want to finish the exam.

Exit

Kizspy.me There are 40 questions, and your progress of answering is

Answer

- [ ] A
- [ ] B
- [ ] C
- [ ] D

Back Next

(Choose 1 answer)

(See picture)

A. -0.00694

B. 0.0017

C. -0.0017

D. 0.00694

Let $p(x,y) = y-x$ with $0 \leq x \leq 1$, $1 \leq y \leq 2$ be the joint probability function of some continuous random variables X and Y. Given the following marginal probability functions of X and Y.

$p(x) = 1.5-x, \quad 0 \leq x \leq 1$

$p(y) = y-0.5, \quad 1 \leq y \leq 2$

Find the covariance of X and Y.

- [ ] I want to finish the exam.

Exit

Kizspy.me There are 40 questions, and your progress of answering is

Answer

- [ ] A
- [ ] B
- [ ] C
- [ ] D

(Choose 1 answer)

(See picture)

A. (i)

B. (iv)

C. (ii)

D. (iii)

Back Next

Consider the following bivariate distribution $p(x, y)$ of two random variables X and Y

$$p(x,y) = \begin{cases} xy, & \text{if } 0 \le x \le 2, 0 \le y \le 1 \\ 0, & \text{otherwise} \end{cases}$$

The probability $P(0 < X < 1, 0 \le Y \le 0.5)$ is

(i) 0.05 (ii) 0.0625

(iii) 0.075 (iv) 0.0825

- [ ] I want to finish the exam.

Exit

24

There are 40 questions, and your progress of answering is

Answer

☐ A
☐ B
☐ C
☐ D
☐ E

(Choose 1 answer)

(See picture)

A. -2

B. 2/3

C. 2

D. -4/3

E. 1

Back Next

Given a dataset consisting of the following vectors

$x_1 = [1\ \ 0\ \ 2]^T$, $x_2 = [0\ \ 2\ \ -1]^T$, $x_3 = [2\ \ -2\ \ 2]^T$.

Let $S = [s_{ij}]$ be the covariance matrix of this dataset. Find s_{33}.

☐ I want to finish the exam.

Finish

Exit

25

Kizspy.me There are 40 questions, and your progress of answering is

Answer

- [ ] A
- [ ] B
- [ ] C
- [ ] D
- [ ] E

(Choose 1 answer)

(See picture)

A. -2

B. 2/3

C. 2

D. -4/3

E. 1

Back Next

Given a dataset consisting of the following vectors

$x_1 = [1 \;\; 0 \;\; 2]^T$, $x_2 = [0 \;\; 2 \;\; -1]^T$, $x_3 = [2 \;\; -2 \;\; 2]^T$.

Let $S = [s_{ij}]$ be the covariance matrix of this dataset. Find s_{33}.

I want to finish the exam.

Exit

Kizspy.me There are 40 questions, and your progress of answering is

Answer

- [ ] A
- [ ] B
- [ ] C
- [ ] D
- [ ] E

Back Next

(Choose 1 answer)

(See picture)

A. -1 and 30

B. -5 and -11

C. 5 and 1

D. 11 and -30

E. 1 and 11

Suppose that the characteristic polynomial of a matrix A is

$$p_A(\lambda) = \lambda^4 + \lambda^3 - 11\lambda^2 - 5\lambda + 30.$$

The trace and the determinant of A respectively are:

want to finish the exam.

Exit

There are 40 questions, and your progress of answering is

Answer

- [ ] A
- [ ] B
- [ ] C
- [ ] D

(Choose 1 answer)

(See picture)

A. 3.231

B. 3.196

C. 3.017

D. 3.162

Back Next

Let $\widehat{A}_1$ be the rank-1 approximation of the matrix A given by:

$$A = \begin{pmatrix} 3 & 1 & 1 \\ -1 & 3 & 1 \end{pmatrix}$$

What is the spectral norm of $A - \widehat{A}_1$?

I want to finish the exam.

Exit

Kizspy.me There are 40 questions, and your progress of answering is

Answer

- [ ] A
- [ ] B
- [ ] C
- [ ] D

(Choose 1 answer)

(See picture)

A. (iv)

B. (ii)

C. (iii)

D. (i)

Back Next

For the following functions, calculate $\frac{df}{dt}$ in matrix form:

$$f(x) = f(x_1, x_2) = x_1^4 \sin(x_2)$$
$$x_1 = 2t$$
$$x_2 = 1 + t^2$$

(i) $\begin{bmatrix} 4x_1^3 \sin(x_2) \\ x_1^4 \cos(x_2) \end{bmatrix} \begin{bmatrix} 2 & 2t \end{bmatrix}$

(ii) $\begin{bmatrix} 4x_1^3 \sin(x_2) & x_1^4 \cos(x_2) \end{bmatrix} \begin{bmatrix} 2 \\ 2t \end{bmatrix}$

(iii) $\begin{bmatrix} 4x_1^3 \sin(x_2) \\ x_1^4 \cos(x_2) \end{bmatrix} \begin{bmatrix} 2t & 1+t^2 \end{bmatrix}$

(iv) $\begin{bmatrix} 4x_1^3 \sin(x_2) & x_1^4 \cos(x_2) \end{bmatrix} \begin{bmatrix} 2t \\ 1+t^2 \end{bmatrix}$

- [ ] I want to finish the exam.

Exit

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Answer

- [ ] A
- [ ] B
- [ ] C
- [ ] D

(Choose 1 answer)

(See picture)

A. (iv)

B. (ii)

C. (iii)

D. (i)

Back Next

For the following functions, calculate $\frac{df}{dt}$ in matrix form:

$$f(x) = f(x_1, x_2) = x_1^4 \sin(x_2)$$
$$x_1 = 2t$$
$$x_2 = 1 + t^2$$

(i) $\begin{bmatrix} 4x_1^3 \sin(x_2) \\ x_1^4 \cos(x_2) \end{bmatrix} \begin{bmatrix} 2 & 2t \end{bmatrix}$

(ii) $\begin{bmatrix} 4x_1^3 \sin(x_2) & x_1^4 \cos(x_2) \end{bmatrix} \begin{bmatrix} 2 \\ 2t \end{bmatrix}$

(iii) $\begin{bmatrix} 4x_1^3 \sin(x_2) \\ x_1^4 \cos(x_2) \end{bmatrix} \begin{bmatrix} 2t & 1+t^2 \end{bmatrix}$

(iv) $\begin{bmatrix} 4x_1^3 \sin(x_2) & x_1^4 \cos(x_2) \end{bmatrix} \begin{bmatrix} 2t \\ 1+t^2 \end{bmatrix}$

☐ I want to finish the exam.

Exit

Kizspy.me There are 40 questions, and your progress of answering is

Answer

- [ ] A
- [ ] B
- [ ] C
- [ ] D

(Choose 1 answer)

(See picture)

A. 0.23

B. 0.07

C. 0.16

D. 0.45

Back Next

Consider the problem of minimizing $f(x, y) = x^2 + xy + 2y^2$ using the gradient descent method. Starting from the point $(x_0, y_0) = (1, 1)$ and step-size $\gamma = 0.1$. Find y_2.

I want to finish the exam.

Exit

Kizspy.me There are 40 questions, and your progress of answering is

Answer

- [ ] A
- [ ] B
- [ ] C
- [ ] D

(Choose 1 answer)

(See picture)

A. (ii)

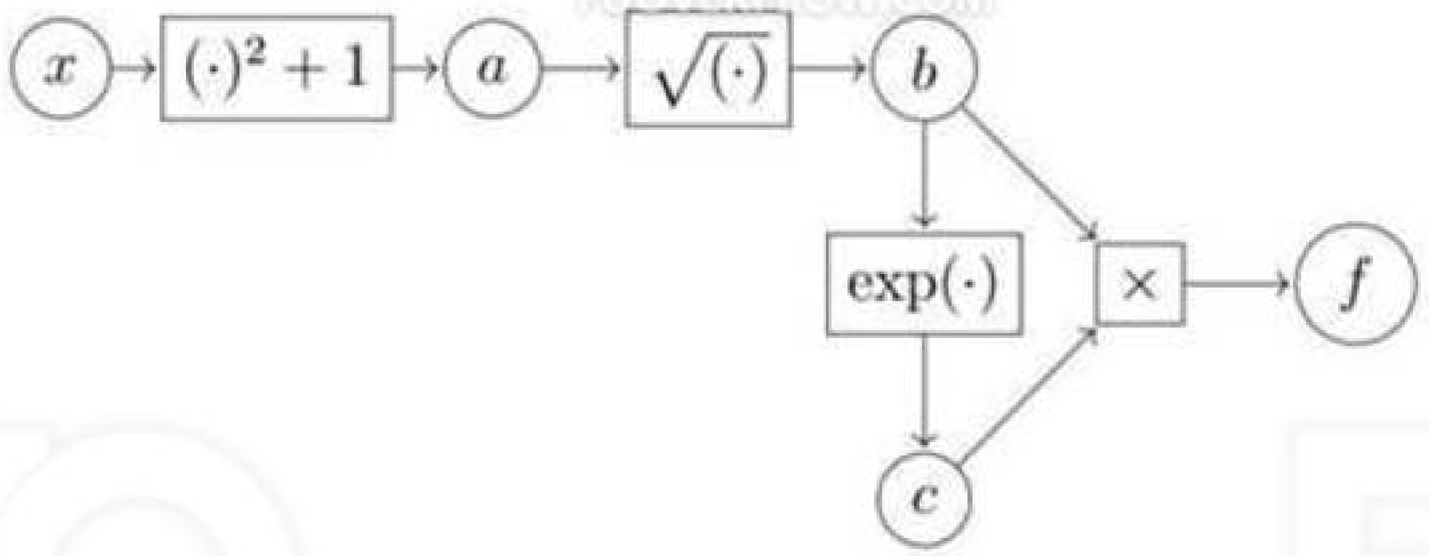
B. (iii)

C. (iv)

D. (i)

Back Next

Consider a computation graph with inputs x, function value f and intermediate variables a, b, c. Find the formula of f.



(i) $(x^2+1)\exp(x^2+1)$ (ii) $(x^2+1)\exp(\sqrt{x^2+1})$

(iii) $\sqrt{x^2+1}\exp(x^2+1)$ (iv) $\sqrt{x^2+1}\exp(\sqrt{x^2+1})$

- [ ] I want to finish the exam.

Exit 38

Kizspy.me There are 40 questions, and your progress of answering is

Answer

- [ ] A
- [ ] B
- [ ] C
- [ ] D

Back Next

(Choose 1 answer)

(See picture)

A. Both x and y

B. x only

C. y only

D. None of x or y

Let $U = \text{span}\{[1 \quad 1 \quad -2]^T, [1 \quad 0 \quad 1]^T\}$.
Which of the following vectors are in $U^{\perp}$?

$\mathbf{x} = [1 \quad -3 \quad -1]^T \quad \mathbf{y} = [0 \quad 0 \quad -1]^T$

☐ I want to finish the exam.

Finish Exit

40